FOCUS GROUP DISCUSSION: IDENTIFICATION OF TUBERCULOSIS PROBLEMS IN BANGETAYU WETAN VILLAGE, SEMARANG CITY THROUGH A DIAGRAM APPROACH FISHBONE

Fitriani Kahar[1*], Teguh Budiharjo[2] , Arintina Rahayuni[3]
[1,2,3] *Poltekkes Kemenkes Semarang, Indonesia*

**Corresponding author: fitrianikahar555@gmail.com*

Abstract

Tuberculosis (TB) is an infectious disease caused byMycobacterium tuberculosis and transmitted through airborne droplets. This study aims to identify TB control issues in Bangetayu Wetan Village, Semarang City, through Focus Group Discussions (FGDs) and Fishbone diagram mapping.Research methods This is a qualitative study using Focus Group Discussion (FGD) techniques, conducted from June to September 2024, with purposive selection of informants from the Community Health Center program, sub-district government, community leaders, health cadres, and residents. The FGD findings were grouped into six Fishbone categories: people (man), materials/media (material), methods (method), budget (money), environment (environment), and stigma (market). Research result shows that the identified problems include the reluctance of some residents or families to undergo examinations, limited educational media, non-routine outreach and screening activities, limited resources, home/environmental conditions that do not support prevention, and social stigma against TB sufferers.The conclusionThe problem of TB case management in Bangetayu Wetan Village is multifactorial and not solely related to health services. The main issues are low public awareness and compliance with screening, the use of conventional educational media, suboptimal implementation of regular screening, limited funding, inadequate environmental sanitation, and the persistence of social stigma against TB sufferers.The findingsThis study shows that perceived barriers to TB control are related to individual, service, environmental, and social factors. TB control requires an integrated approach through strengthening education, increasing early detection and screening, improving the environment, providing resources, and actively engaging the community and cross-sectors. These findings can serve as an initial basis for developing recommendations for TB case control programs.

Keywords: Tuberculosis; Fishbone Diagram; Focus Group Discussion; TB Control

1. INTRODUCTION

Tuberculosis (TB) is an infectious disease that is mainly caused byMycobacterium tuberculosis and transmitted through the air. This disease primarily attacks the lungs, but can affect other organs. These transmission characteristics require continuous TB control, ranging from prevention, case detection, diagnostic testing, treatment, compliance monitoring, to social and environmental support. The global TB burden remains high. The World Health Organization (WHO) estimates that 10.7 million people will develop TB by 2024 and approximately 1.23 million will die from the disease. Indonesia is one of the countries with a large contribution to global TB cases [1].

The TB problem is not solely determined by the ability of health facilities to identify and treat patients. The success of programs is also influenced by the community's ability to understand the risks, willingness to seek care, family support, the patient's relationship with healthcare providers, and the social conditions in which the patient lives. Interventions that improve treatment adherence have demonstrated the importance of patient-centered support and their social environment [2]. In terms of case detection,active case finding Community-based interventions have the potential to expand the

reach of patient identification, although outcomes are highly influenced by the characteristics of the intervention and target population [3].

The home environment is also a concern in preventing transmission. Inadequate ventilation can contribute to conditions that allow exposure to contaminated air, so ventilation aspects need to be considered in TB control strategies at the household level [4]. Barriers to active case detection also do not stand alone, but are related to individual factors, community factors, access to services, implementation capacity, and system support [5].

Stigma is a social factor that can complicate TB control. Measuring stigma in the Indonesian context indicates that TB stigma is an identifiable construct and requires program attention [6]. Several studies in Indonesia have also found the burden of stigma and psychosocial problems in TB patients, as well as the need for community-based psychosocial support [7]. At the program implementation level, the involvement of community health workers can help expand active case finding and improve the efficiency of program implementation [8].

In Indonesia, the context of TB control is also related to strengthening the health system and case recording. The Indonesian Health Profile illustrates that TB remains a health problem that requires ongoing attention [9]. The government continues to encourage the acceleration of TB elimination by strengthening case detection, treatment, prevention, and cross-sector coordination [10]. At the patient level, non-adherence to treatment has also been linked to individual perceptions and social factors as well as health services [11]. Furthermore, stigma can also occur in the workplace, indicating that stigma issues can arise in the broader social environment, not only in the relationship between patients and health facilities [12].

Studies on the implementation of health screening show that screening approaches can be beneficial if designed with appropriate coverage and methods, but their effectiveness depends on the context of implementation [13]. Therefore, screening needs to be positioned as a series of services linked to diagnostic examinations, case determination, treatment, and follow-up. WHO guidelines also emphasize the importance of patient-centered TB services and support during treatment [14].

An effective TB response requires the involvement of communities and community organizations/community leaders or health workers, including in information dissemination, stigma reduction, patient support, and advocacy [15]. Prevention also includes efforts to identify individuals at risk and provide preventive interventions as indicated [16]. On the diagnostic side, the use of rapid diagnostic methods and service networks capable of following up on test results are essential components [17]. The practice of community engagement in various contexts shows that communities can be positioned as partners in the TB response, not simply program recipients [18].

Recent global reports indicate that TB remains a major problem and Indonesia is among the countries with a high number of incident cases [19]. Management also needs to consider comorbid conditions and continuity of care [20]. The 2023–2024 Indonesian TB inventory study demonstrated the importance of strengthening surveillance and the completeness of case detection and reporting [21].

This context is relevant to Bangetayu Wetan Village, Genuk District, Semarang City, because active TB cases are still found in the village. Previous research has identified various barriers to tuberculosis (TB) control, both related to individual and community factors and to the health care system. Fenta et al. (2023), through a systematic review of qualitative research in low- and middle-income countries, identified several barriers to active TB case detection, including limited community knowledge, stigma, health worker capacity, availability of diagnostic tools, workload, and program financing [5]. Meanwhile, Burke et al. (2021) examined community-based TB case detection interventions and demonstrated the importance of the scope and intensity of intervention implementation in supporting TB control [3]. Both studies provide a scientific basis for demonstrating that TB control is multidimensional and requires an approach that considers community factors and the health care system.

However, the findings from this research review do not directly describe how various TB control issues are mapped within the social context and health services at the sub-district level, particularly in Bangetayu Wetan Sub-district, Semarang City. A contextual approach is needed that can gather the perspectives of various stakeholders and organize the problems into a systematic framework. This study systematically identifies the causal factors of TB cases from the perspective of program implementers and the community using FGDs and Fishbone diagrams. This research gap indicates the

need for contextual mapping at the sub-district level by integrating various dimensions of the problem into a single Fishbone diagram analytical framework. In this context, FGDs can be used to explore and discuss issues deemed relevant by participants, while Fishbone diagrams can help group the mapping results into human resource aspects (Man), facilities and infrastructure (Material), implementation method (Method), financing (Money), environment (Environment), and social acceptance (Market).

This study aims to identify and categorize TB control issues in Bangetayu Wetan Village, Semarang City, based on stakeholder perspectives through FGDs and analyzing the root causes using Fishbone diagrams. The contribution of this study is expected to provide a contextual overview of the obstacles to TB control at the village level and become a consideration for community health centers, village governments, health cadres, community leaders, and related stakeholders in designing educational interventions, screening, community empowerment, strengthening patient support, environmental improvement, and cross-sector collaboration.

2. METHOD

2.1 FGD Design and Implementation

This study used a qualitative descriptive approach with Focus Group Discussions (FGDs) to identify tuberculosis control issues in Bangetayu Wetan Village, Semarang City. Informants were selected based on their relevant roles and experiences with tuberculosis control activities. The study was conducted from June to September 2024 in Bangetayu Wetan Village, Semarang City. FGDs were used to obtain information on the perceptions, experiences, obstacles, and understanding of various stakeholders related to TB control issues. The composition of informants included elements of health services/health centers (Head of Health Centers), elements of village government (Lurah), community leaders (Head of LPMK), health cadres (Head of FKK), PKK Groups, TP-PKK, Head of Karang Taruna, Members of Posyandu and the community as summarized in Table 1. The number of participants was 18 people and the FGD was conducted in one session with a duration of 90 minutes divided into 2 groups. Each group consisted of 9 people. This study has received informed consent from informants for participation through informed consent. This research has also received ethical approval from the Poltekkes Kemenkes Semarang with No. 0607/EA/KEPK/2023.

Table 1. Informant Groups and Roles in FGD

No.	Informant Category	Information	Role in FGD
1	Health Officer/Head of Community Health Center	Health stakeholder informants	Describe the achievements and constraints of the infectious disease control program in general and provide technical-operational data on the TB program in the work area and explain the media and educational strategies that have been implemented so far.
2	Village Head/Sub-district Government	Regional stakeholder informants	Providing policy perspectives and resource support at the cross-sector coordination regional level, and the role of government in TB control.

3	Public figure	Community informants	Describes patterns of acceptance, social norms, and potential stigma towards TB patients.
4	Health Cadres	Informant for implementing community activities	Delivering field conditions related to the implementation of socialization, discovery of suspected cases and patient assistance.
5	Youth organization	Youth element informant	Providing a youth perspective on the potential for youth involvement in disseminating health information, TB education and support for prevention activities in the village environment.
6	PKK Group	Informant on family empowerment elements	Explaining the role of family and community empowerment in implementing clean and healthy living behavior, and support for family members undergoing treatment.
7	Members of Integrated Health Post	Informant of community health service elements	Providing information on community-based health education activities, as well as opportunities for integrating TB prevention messages into community health service activities.
8	Public	Citizen informant	Provides direct perspective on insights, attitudes, and obstacles in TB prevention.

The discussion was facilitated to explore participants' perspectives on barriers to tuberculosis control. The information obtained was grouped into six categories in a fishbone diagram: man (human resources), material (facilities and supporting materials), method (implementation methods), money (financing), environment (environment), and market (social acceptance, stigma, and community norms, as defined in this study). These groups served as a framework for organizing and presenting the issues raised by participants.

During the FGD, discussions were recorded by a note-taker, and the notes entered into a computer (laptop) were displayed on an LCD/projector, but not recorded using audio devices. Therefore, data processing was based on written notes generated during the activity.

2.2 Provisions for Implementing FGD

The provisions for implementing FGD are:

1. Selection of participants: using*purposive sampling*, namely selecting informants who have experience, knowledge, or roles relevant to the research topic.
2. Group composition: participants have relevant characteristics or experiences.
3. Moderator: leads the discussion neutrally, does not direct answers, and gives equal opportunities to participants.

4. Note-taker: notes down the main points of opinion, differences of opinion, interactions and responses of participants.
5. Duration: approximately 60–90 minutes per session, depending on the complexity of the topic.

2.3 Stages of the FGD procedure

The stages of the FGD procedure are:

Stage 1. Preparation

Establish objectives, participant criteria, number of groups, schedule, location, moderator, note-taker, question guide, and ethical procedures.

Stage 2. Participant recruitment

Identify and invite informants who meet the criteria. Prepare sufficient backup participants to anticipate no-shows.

Stage 3. Opening

The moderator introduces the team, explains the purpose, duration, confidentiality, discussion rules, and asks for participants' consent.

Stage 4. Core discussion

Ask open-ended questions, moving from general to specific. The goal is to explore experiences, causes of problems, impacts, obstacles, and proposed solutions, and avoid leading questions.

Stage 5. Clarification and closing

The moderator summarizes the findings, confirms whether the summary aligns with the participants' views, provides an opportunity to add information, and then closes the session.

Stage 6. Data processing and analysis

Transcription, discussion, identification of themes, comparison of participant views, compilation of results, and documentation of direct quotations that actually come from recordings or notes.

These stages are in line with the FGD implementation guidelines which emphasize the preparation of objectives and questions, neutral facilitation, data recording, and preparation of reports after the session.

2.4. Data Analysis

The analysis was conducted by grouping information from the FGD notes directly and summarizing them into six predetermined Fishbone categories. Each note was reviewed to identify issues raised by participants, then grouped into relevant categories and summarized as findings. Grouping was done directly based on the Fishbone categories and no coding or qualitative software was used. The note-taker's notes contained only summaries and no verbatim quotations.

2.5. Data Validity (Trustworthiness)

The data validity effort carried out included checking the summary of the results with participants (member checking) to support credibility. The results entered on the laptop were displayed via LCD/projector so that participants could check the data they had written, assess the accuracy of the summary, and correct or add information. Corrections were made directly and witnessed by each participant and also received approval from each participant. The criteria for data sufficiency or termination of data collection were determined after the six fishbone findings were met and the contents had been approved by each participant.

The dependability aspect is carried out through storing and documenting activity records, FGD guides, and summaries.

For the confirmability aspect, through discussions between researchers about grouping findings in a Fishbone diagram after the procedure has been verified.

For the transferability aspect, this research has been conducted transparently and explains the characteristics and roles of each informant and the stages of FGD implementation.

3. RESULTS

Identification of Tuberculosis Control Problems Based on Fishbone Diagrams

Problem mapping using a Fishbone diagram groups tuberculosis control issues into six categories, namely:Man, Material, Method, Environment, Money, And Market. CategoryMancovers issues of cadre involvement and public awareness. CategoryMaterialrelated to the availability of educational media. CategoryMethodincludes the implementation of screening and education. CategoryMoneyrelated to budget support and activity coordination. CategoryEnvironmentincludes the condition of the residential environment, while the categoryMarketincludes social acceptance and stigma towards people with tuberculosis.

These six categories provide a framework for describing the various dimensions of tuberculosis control issues in the study area. These results represent a mapping of issues based on available discussion documents and are not intended to indicate the prevalence of each problem or determine the most dominant causal factors.

The results of the research based on the Fishbone diagram compiled with informants show that the TB problem in Bangetayu Wetan Village, Genuk District, Semarang City originates from six main elements, namely Man (human), Material, Method, Money (budget), environmental conditions, and Market (community acceptance/stigma), as presented in Figure 1 and Table 2.

Problem Identification in Bangetayu Wetan Village

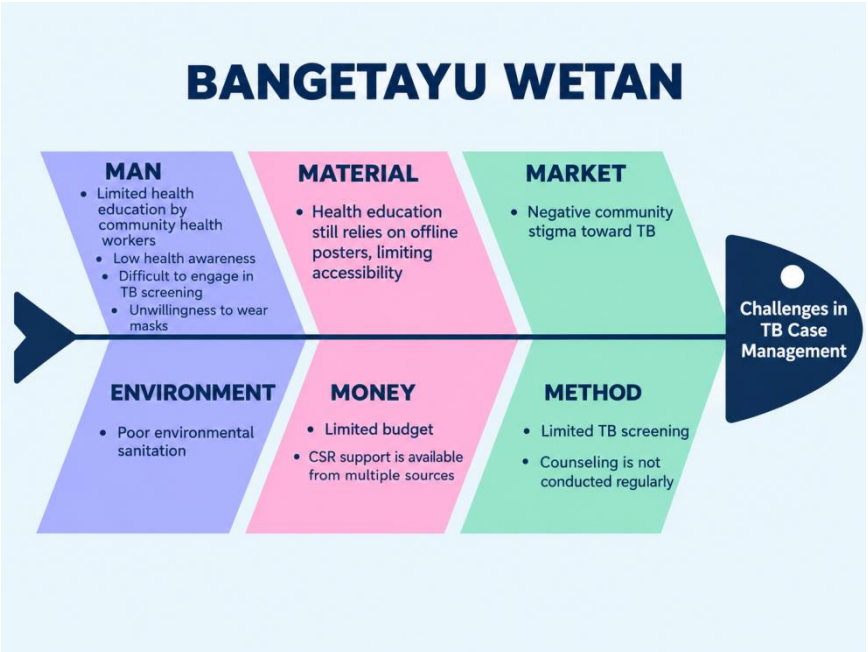


Figure 1. Mapping of TB control problems in Bangetayu Wetan Village using a Fishbone diagram (six categories).

Aspect	Problem	Alternative Problem Solving
1. Man (Human)	a. Cadres have not optimally carried out socialization b. Public concern for health is still low c. The family of a TB patient is reluctant to be examined due to limited knowledge. d. TB patients refuse to undergo examination e. Education is difficult to implement; patients refuse to wear masks because they are uncomfortable.	a. Intensive training for health workers including cadres b. Creative educational campaigns (cleanliness competitions, game-based outreach) c. Emotional approach by showing the positive impact of treatment d. Emphasis on the importance of early diagnosis and treatment e. Provision of comfortable and reusable cloth masks
2. Material	a. Educational resources are still in the form of printed posters so their reach is limited.	a. Digitization of educational materials via social media, health applications, or community WhatsApp groups
3. Method	a. TB screening schedules at Community Health Centers are still rare b. Counseling is not yet carried out routinely, only at certain moments	a. Addition of routine screening schedules, especially on busy visiting days b. Scheduling monthly counseling with varying themes
4. Money	a. The available budget is still limited b. Quite a lot of CSR (Corporate Social Responsibility) activities	a. Budget optimization for activities that have a direct impact (screening, education) b. Synchronizing CSR programs with local government agendas
5. Environmental Conditions	a. Inadequate residential sanitation (damp, minimal ventilation and light)	a. Educate residents about the importance of ventilation, lighting, and environmental cleanliness.
6. Market	a. The stigma among residents towards TB sufferers is still quite strong	a. Anti-stigma campaign via social media/radio with positive messages b. Delivering success stories of patients who have recovered

Table 2. *Identification of Problems and Alternative Solutions to TB Problems in Bangetayu Wetan Village*

Table 2 presents a problem mapping based on the summarized discussion results, not an in-depth analysis of the FGD transcripts. The FGD results demonstrate that the TB problem in Bangetayu Wetan Village is multifactorial. This finding is important because an approach focused solely on patient treatment will not fully address the barriers encountered at the community level. The WHO places the TB response within a community- and patient-centered care framework, including social support, health education, community engagement, and service system strengthening [16, 20, 21].

a. Human Aspect (Human Resources)

Results of FGD mapping on aspectsManidentified several problems related to human resources in TB control, namely the suboptimal involvement of health cadres in outreach, public awareness of health issues that still needs to be improved, difficulties in encouraging people to undergo examinations, and preventive behaviors that have not been consistently implemented, including the use of masks. These problems indicate that TB control efforts require not only health services, but also active community involvement in recognizing symptoms, accessing examinations, and supporting transmission prevention. These conditions can be understood as challenges in developing health-seeking behavior and community participation. Research by Fenta et al. (2023) identified that low public awareness, stigma, limited knowledge and skills of health workers, and resource constraints can affect the implementation of active TB case finding [5]. In line with this, Burke et al. (2021) showed that the effectiveness of community-based TB case finding is influenced by the scope and intensity of activity implementation [3].

Based on the results of this mapping, strengthening the capacity of cadres, providing accessible education, engaging families, and de-stigmatizing communication could be considered as program strategies. However, because this study lacks verbatim transcripts, these findings should be understood as issues identified in the FGD mapping, not as a quantitative depiction of the level of knowledge or behavior of the entire Bangetayu Wetan sub-district community.

b. Material Aspects (Facilities and Infrastructure)

On the aspectMaterialThe FGD results summarized in the problem mapping show that TB education media are still limited and screening and diagnostic facilities are considered inadequate. These limitations have the potential to hinder information delivery and case detection, especially if the community has limited access to health information or screening services. In the context of TB control, communication media need to be tailored to the characteristics of the target and regional conditions. Information delivered solely through print media can reach the community only if distribution, readability, or supporting educational activities are not optimal. Furthermore, the availability of screening and diagnostic facilities needs to be considered along with access to services, staff readiness, and referral mechanisms.

Burke et al. (2021) emphasized the importance of the scope and intensity of community-based case-finding interventions [3]. These findings support the need to assess not only the availability of facilities but also their utilization in TB control activities. However, this study did not quantitatively measure the effectiveness of educational media or the adequacy of diagnostic tools. Therefore, the limitations of the materials in this study were positioned as issues identified in the discussion and require further assessment through data on facility inventory, media availability, and service records.

c. Method Aspect (Method and Implementation)

AspectMethodThis study indicates problems related to the irregular implementation of TB education and outreach, suboptimal screening and case finding activities, and the need for strengthened cross-program coordination. The results of this mapping indicate that the existence of a program alone is insufficient if its implementation is not integrated and sustainable. Active case finding requires planning, targeting, examination, and follow-up of individuals suspected of having TB. Burke et al. (2021), through a systematic review of community-based TB case finding, showed that intervention outcomes can vary and are influenced by the intensity and scope of implementation [3]. Meanwhile, Fenta et al. (2023) identified limited resources, workload, staff capabilities, and communication barriers as factors that can hinder active case finding activities [5].

Compared to the aforementioned research, the Bangetayu Wetan mapping study highlighted the importance of educational continuity, screening, and cross-program coordination. Practical implications include a planned educational schedule, clear task allocation, an easily understood referral mechanism, and regular evaluation of activity implementation. However, this study was unable to determine the most effective method because it did not conduct intervention testing or measure program outcomes comparatively.

d. Money Aspect (Financing)

On the aspectMoneyThe FGD mapping results identified limited TB program budgets, suboptimal cross-sectoral financial support, and the need for improved budget management. These issues illustrate the importance of financial support in maintaining the continuity of education, case detection, coordination, and community support activities. TB control activities involving health care facilities, village governments, cadres, and community elements require financial planning aligned with activity needs. If financial support is not coordinated, activities requiring cross-sectoral participation have the potential to be difficult to implement sustainably. However, this relationship in this study is a programmatic interpretation, not a tested cause-and-effect relationship.

Thus, recommendations include mapping budget requirements based on activity priorities, aligning work plans between stakeholders, and monitoring budget utilization. Further research should utilize budget documents and activity reports to more objectively assess funding adequacy. Because this study does not present a financial analysis, its results cannot be used to determine the extent of the budget shortfall or determine the most effective funding sources.

e. Environmental Aspects

On the aspectEnvironment, the results of problem mapping indicate that poor environmental sanitation and home ventilation are seen as relevant issues for preventing TB transmission. Housing conditions are one of the environmental aspects that need to be considered in controlling airborne infectious diseases. However, identifying problems through FGDs is not the same as directly measuring the physical condition of the house or the level of transmission risk. Chamie et al. (2013), in a study on household ventilation and TB transmission in Kampala, Uganda, discussed the relevance of ventilation conditions to the residential environment and TB transmission [4]. Although this study provides a scientific context for attention to ventilation, the results cannot be directly considered representative of housing conditions in Bangetayu Wetan due to differences in location, population characteristics, and research context.

Based on this mapping, education on ventilation and air circulation, transmission prevention behaviors, and identification of households requiring attention can be considered in community programs. Further assessments should be conducted through observation of home conditions, measurement of relevant environmental indicators, and recording of risk factors. Therefore, the findings of this study indicate environmental aspects that require attention, but do not prove that all homes in the study area have poor ventilation or sanitation.

f. Market Aspect (Social Acceptance)

On the aspectMarket, this term is used operationally in a Fishbone diagram to describe social acceptance, stigma, and community norms toward TB, not commercial marketing. The results of the FGD mapping identified stigma toward TB patients, suboptimal social acceptance, and varying family and community support. These issues indicate that social factors need to be considered alongside service delivery, resources, and program implementation.

Stigma can be related to concerns about negative judgment from others and can potentially influence a person's openness about their illness and willingness to seek support. Fuady et al. (2024), in a multi-site study in Indonesia, discussed stigma in people with TB and its relationship to psychosocial conditions and support needs.[6] These findings provide relevant national context for the importance of a TB control approach that takes into account patients' social experiences.

In the context of Bangetayu Wetan, the mapping results indicate that social acceptance and family support need to be considered in developing educational activities. Strategies that could be considered include providing information that does not blame the patient, involving community leaders, protecting patient confidentiality, and strengthening family support. However, this study did not standardize stigma levels and cannot determine the extent of stigma within the community. Therefore, these results should be understood as identifying social issues that emerged during the FGD mapping.

3.1 Knowledge, awareness, and behavior factors

Low public awareness of health screening was one of the key findings of the FGD. This finding indicates a gap between the availability of services and the public's decision to utilize them. In the context of infectious disease control, knowledge is one component that can influence the formation of attitudes and behavior, but increased knowledge does not always automatically result in behavioral change. The results of Kahar and Wikandari's study show that knowledge and health prevention behavior need to be seen as two interrelated, but not always identical, aspects [33]. Therefore, TB education in Bangetayu Wetan should not stop at providing information, but should be directed at concrete actions such as recognizing symptoms, understanding when to get checked, practicing cough etiquette, and supporting family members who need testing.

Strengthening communication is also important because barriers encountered originate from families and patients. A persuasive, non-judgmental approach that takes into account community experiences is more appropriate than one-way messaging. Health education combined with community empowerment and cadre involvement has been reported to improve understanding of TB and preventative behaviors [35].

3.2 Strengthening Cadres and Community Empowerment

Cadres and the Family Welfare Movement (PKK) hold a strategic position because they interact directly with the community. However, FGDs revealed that outreach efforts by cadres have not been optimal. Cadre development needs to be directed not only at improving knowledge but also at improving communication skills, identifying symptoms, delivering prevention messages, recognizing signs requiring referral, and providing social support.

These findings are reinforced by community empowerment activities conducted in Bangetayu Wetan through the Health Promotion Model (HPM) and sneezing etiquette training. These activities involved local residents and demonstrated increased insight and ability to implement preventative behaviors and coughing/sneezing etiquette [35]. Therefore, the FGD results in this study have practical relevance to the empowerment approach implemented in the same location. Cadres can be positioned as liaisons between communities, families, and service facilities without taking over the functions of health workers.

3.3 Educational media and digitalization of communication

Research results show that educational media is still dominated by posters or conventional media. These media remain useful, but their reach can be limited. The development of digital communication provides opportunities to expand health messages through social media and community communication groups. Social media can be a complement to disseminating TB information, as demonstrated by a study of the use of social media for TB health promotion [1]. The use of digital media can be directed towards short, visual, easy-to-understand content that is relevant to local issues.

However, digitalization should not replace face-to-face communication. Communities with limited digital access still need cadres and officers as sources of information. A combined approach of posters, face-to-face outreach, short videos, WhatsApp groups, and social media can broaden information exposure. This principle also aligns with findings that behavioral change requires a process that does not rely solely on knowledge [33].

3.4 Regular screening and case finding of TB

The finding of inadequate screening is one issue directly related to early detection. Lack of screening is a significant issue because delays in case detection can prolong the period of time a person goes without diagnosis and treatment. Evidence regardingactive case findingshows that a community-based approach can increase the reach of case detection, but its implementation needs to be tailored to the characteristics of the target and the service system [3]. Qualitative studies also show that the success of active case detection is influenced by individual, community, and health system factors [5].

In Bangetayu Wetan, expanding the screening schedule needs to be accompanied by referral and follow-up mechanisms. Screening is insufficient if positive or suspected cases do not receive prompt diagnostic testing and management. WHO guidelines on diagnosis emphasize the importance of access to rapid and accurate diagnostic methods [17,28]. Local findings regarding AFB testing in Semarang health facilities also indicate that laboratory testing continues to play a role in case identification. In a study of 656 patients with a clinical diagnosis of pulmonary tuberculosis, 220 patients, or 33.5%, were AFB positive [34]. These data cannot be generalized to Bangetayu Wetan, but they

provide context for the importance of laboratory testing as a crucial component of the diagnostic process.

3.5. The Importance of Laboratory Testing and Continuity of Service

Strengthening screening must be accompanied by adequate diagnostic capacity. From a laboratory perspective, testing serves not only as a technical procedure but also as part of clinical and programmatic decisions. Therefore, the relationship between cadres, community health centers, laboratory personnel, and patients needs to be clearly defined to ensure that screened individuals do not stop at the symptom identification stage.

Continuity of care also includes monitoring patient condition during treatment. Local research on urine glucose and ketone examinations in pulmonary TB patients receiving anti-TB drugs (OTC) showed attention to monitoring laboratory parameters during therapy [37]. These findings were not the results of this focus group discussion (FGD) study, but they can broaden the perspective that TB control needs to integrate case finding with patient monitoring throughout the treatment course.

3.6 Treatment compliance and social support

Although the research focused on identifying problems, findings regarding low awareness and patient reluctance to undergo testing have implications for treatment continuity. TB treatment requires regularity over a period of time, making support from patients, families, healthcare workers, and the community crucial.

Patient reluctance to seek medical attention, as identified in FGDs, is potentially related to challenges in treatment continuity. TB adherence is influenced by various factors, including patient perceptions, family support, social conditions, and service characteristics [11]. Systematic evidence suggests that family support is a factor that needs to be considered in treatment adherence [26]. A review of the role of family support also confirms its relevance to medication adherence and patient quality of life [24].

Support doesn't always have to be rigid supervision. Patients need respectful communication, appropriate reminders, practical assistance, and support when dealing with side effects or social barriers. Evidence regarding patient support suggests that an individualized approach, education, reminders, and psychosocial support can aid the treatment process [27]. Nutritional support also has the potential to aid adherence, although evidence is mixed and requires higher-quality research [25].

3.7 Preventive behavior, cough etiquette and PHBS

FGD findings indicated that some patients refused to wear masks due to discomfort. This issue demonstrates that prevention messages need to be delivered with consideration for comfort, habits, and social context. Previous cough and sneeze etiquette training conducted in the Bangetayu Wetan community demonstrated that the Health Promotion Model approach can be used to improve knowledge and skills in preventive behavior [35].

Prevention efforts also need to be placed within the framework of clean and healthy living behaviors. Experience with PHBS socialization and screening programs shows that community education activities can be used as a gateway to increase health awareness [36]. In the context of TB, these messages can be linked to cough etiquette, mask use as needed, home hygiene, ventilation, and recommendations for testing when relevant symptoms appear.

3.8 Stigma as a social barrier

Stigma is one of the most important issues identified in FGD findings because it can influence how patients and families interact with healthcare services. Studies in Indonesia have shown that TB stigma is significant and associated with psychosocial consequences and quality of life [7]. Recent qualitative research has also demonstrated the psychological burden of stigma and the various coping strategies used by people living with TB [22].

Therefore, anti-stigma campaigns should be part of the program strategy, not just an additional activity. Public education needs to correct myths, explain that TB is diagnosable and treatable, and encourage community support for patients. A systematic review of health education shows that structured approaches, community empowerment, and support from cadres can be used to increase knowledge and reduce stigma [23]. If patient stories are used as a campaign medium, identity and

confidentiality must be protected, and the use of personal experiences must be based on informed consent.

3.9 Home environment and ventilation and sanitation

Damp house conditions, limited ventilation, inadequate lighting, and the habit of not opening windows are findings in the elements.Environment. Environmental factors need to be understood as part of the conditions that can influence the risk of exposure, not as the sole cause of TB. Research on home ventilation shows that air circulation characteristics are relevant in the study of TB transmission [4].

Environmental interventions can begin with relatively simple steps, such as increasing air circulation, utilizing natural lighting whenever possible, maintaining cleanliness, and reducing density. However, recommendations must take into account the physical condition of the home and the community's economic capacity. Household-based approaches also need to be integrated with family education and contact screening according to guidelines.

3.10 Cross-sector financing and collaboration

Budget constraints were identified in the Money element. This situation requires stakeholders to prioritize activities that have a direct impact on case detection, education, mentoring, and prevention. A financing approach involves not only increasing the budget but also reducing duplication of activities and integrating TB messages into existing community activities.

WHO emphasizes the importance of community and societal involvement in the TB response [15]. At the sub-district level, coordination between community health centers, sub-district government, cadres, community leaders, and local organizations can make limited resources more efficient. The development of Indonesia's surveillance system also demonstrates the importance of integrating recording, reporting, and coordination between services [30].

3.11 Integration of Services, Surveillance and Policy

TB control increasingly requires integration between primary care, laboratories, surveillance systems, and the community. Epidemiological and surveillance studies in Indonesia indicate that there are still challenges in identifying and reporting all cases, making strengthening data recording and integration crucial [29,30]. Guidelines for the management of drug-resistant TB also emphasize the importance of adequate system capacity and services to address the complexities of TB [31, 38]. In children and adolescents, diagnostic challenges also require a specialized approach [32].

The implication for Bangetayu Wetan Village is the need to establish a simple but consistent pathway: community education → symptom/risk identification → screening → diagnostic testing → treatment → monitoring → family and community support → recording and evaluation. This approach helps connect the six Fishbone issues so they are not addressed as separate activities.

3.12 Synthesis of findings and program implications

Overall, the Fishbone diagram helps organize TB control issues in Bangetayu Wetan Village into six interrelated categories. When all findings are combined, a chain of problems emerges. Low knowledge can lead to low risk perception; low risk perception can lead to delayed testing; delayed testing can perpetuate sources of infection; stigma can exacerbate reluctance to seek care; limited screening can lead to missed symptomatic cases; and environmental conditions can increase the likelihood of exposure.

This grouping provides a starting framework for understanding that program challenges are not always isolated. Therefore, recommended interventions should be comprehensive, not single-point activities. The package could include: strengthening cadres, routine education, media digitalization, periodic screening, referral and follow-up systems, anti-stigma campaigns, home ventilation education, and cross-sectoral coordination of financing and activities.

This research contributes to the initial mapping of TB program issues at the village level using focus group discussions (FGDs) and Fishbone diagrams as a tool to organize the discussion results. This mapping can help stakeholders prioritize follow-up actions. The novelty of this research lies in mapping TB issues at the village level by combining the perspectives of program managers, village government officials, community leaders, cadres, and the community within a single Fishbone

framework. This approach produces a problem map that connects human factors, materials, methods, budget, environment, and social acceptance. Thus, recommendations are not solely patient-oriented but directed toward strengthening the community system in an integrated manner.

3.13 Research limitations

This study faced limitations in qualitative data documentation. Group discussions were not audio-recorded, and detailed notes allowing for retrieval of each informant's statement were not available. Therefore, the analysis relies primarily on problem mapping documented in tables and fishbone diagrams. This situation limits the verification of individual statements, detailed exploration of the theme formation process, and assessment of variations in views among informants. Therefore, these results represent only a preliminary identification of the problem within the research area and cannot be statistically generalized or used to establish causal relationships. Future research is recommended to utilize documented discussion guides, systematic note-taking, and, where possible, audio recording with participants' consent, to better trace the relationship between the initial data, the coding process, and the analysis results.

4. CONCLUSION

Based on the results of research conducted during the implementation of the Fishbone diagram FGD activity, it can be concluded that the problem of handling TB in Bangetayu Wetan Village, Genuk District, Semarang City stems from six main elements, namely: (1) Man: lack of awareness, insight, and compliance of residents in checking themselves and undergoing TB treatment; (2) Material: educational facilities that are still conventional and have limited reach; (3) Method: infrequent routine screening and counseling schedules; (4) Money: limited budget accompanied by overlapping programs; (5) Environment: sanitation conditions in settlements that do not support the prevention of transmission; and (6) Market: social stigma of residents towards TB sufferers.

The FGD approach provides insight into the issues directly experienced by the community and program implementers, while the Fishbone approach helps systematically organize these causes. The research findings support the need to shift from a solely patient-centered approach to community-based and cross-sectoral TB control.

Alternative solutions that can be developed include increasing the capacity of cadres, creative and digital education, regular screening, strengthening follow-up systems, optimizing budgets, improving home ventilation and sanitation, and anti-stigma campaigns. With this approach, communities can be positioned not merely as program targets but as active partners in TB control.

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