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Review Article

Community Empowerment through Cadres in the Tuberculosis Program: A Scoping Review

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Abstract

Background: Tuberculosis (TB) remains a global public health problem with high morbidity and mortality rates, especially in low- and middle-income countries. Community-based approaches, including empowerment of health cadres, have been recognized as a key strategy to improve the success of TB control programs. This review systematically identifies research that has been carried out to determine the contribution of cadres in tuberculosis control programs in various countries.

Methods: This scoping review used five electronic databases, namely PubMed, Scopus, Medline-Ebscohost, ProQuest, and Cochrane, to identify the contribution of cadres in TB programs. Article selection was based on PCC (Population, Concept, Context) criteria with a limitation of 2014-2024 and only English-language articles.

Results: Out of 793 initial articles, 20 articles met the eligibility criteria. Studies show that empowering cadres is effective in detecting TB cases, improving patient adherence to treatment, and overcoming stigma through culture-based education. However, challenges such as lack of training, incentives, and access to diagnostic tools often hinder cadre performance.

Conclusion: Health cadres play an important role in bridging the gap between formal health services and the community. With the support of structured training, resource allocation, and community empowerment, cadres can maximize their impact in TB control programs.

Keywords: Cadres; Community empowerment; Tuberculosis program

Introduction

Tuberculosis (TB) remains one of the largest public health problems globally, with a significant impact on morbidity and mortality rates, particularly in low- and middle-income countries. Although effective treatments have been available for decades, TB continues to be a major challenge due to various factors, including low case detection, social stigma, non-adherence to treatment, and limited access to health services. Nearly 40% of TB patients go undiagnosed or experience treatment delays, leading to increased transmission and new cases in the community (1).

Community-based approaches have been recognized as a key strategy to improve the success of TB control programs. Community involvement not only improves access to health services but also supports behavioral changes necessary for treatment program sustainability. In this context, the empowerment of health cadres is crucial. Health cadres are community members trained to provide health education, support active case detection, and facilitate patient adherence to treatment. They play a central role in bridging the gap between formal health facilities and underserved communities (2).

Community empowerment programs through cadres have been shown to be effective in improving early detection of TB cases and supporting treatment. For example, trained cadres are able to conduct household-based approaches to change community perceptions of TB and reduce the associated stigma. They also provide the psychosocial support needed for patients to complete their treatment (3). However, empowerment of TB program cadres also faces various barriers. One of the main barriers is the lack of adequate training for cadres, which limits their ability to provide effective services, which limits their ability to provide effective services (4). Cadre training is often irrelevant to local needs or lacks interactive approaches that enhance their practical skills. In addition, a lack of logistical support, such as incentives and access to diagnostic tools, reduces cadres' motivation and effectiveness in carrying out their roles (4).

Community-based interventions involving cadres also face cultural and social barriers, including stigma towards TB patients. This reduces the success of active case detection and treatment adherence. However, research shows that with the right approach, cadres can help overcome these barriers through culturally and community-based education. They can also strengthen local health systems by providing relevant community-based data for TB control programs (5). Community empowerment programs through cadres also have great potential to improve overall health system effectiveness. The involvement of cadres in active case finding, patient mentoring, and promotion of healthy behaviors not only improves TB treatment success but also strengthens the capacity of communities to address other health challenges. For example, programs such as the Community Empowerment Program for Tuberculosis (TB CEPAT) in Indonesia have successfully improved TB-related knowledge, attitudes, and practices of cadres and communities, contributing to the sustainability of TB control programs (2).

In the global context, community-based approaches have been adopted in various forms, including training cadres to support drug-resistant TB (MDR-TB) patients and customizing programs to address local barriers. Well-trained cadres can increase treatment success rates by up to 65% in MDR-TB patients by facilitating community-based treatment that is more affordable than hospital-based care (6). Community empowerment through health cadres is a promising strategy for TB control, particularly in communities that face major challenges in access to health services. However, further research is needed to identify factors that support the success of this program and address implementation challenges. Health systems need to integrate this community-based approach on an ongoing basis to ensure its effectiveness and impact on reducing the global burden of TB.

Methods

The research question for this scoping review is 'how do cadres contribute to the success of tuberculosis programs?'. The eligibility of studies was assessed using the PCC (Population, Concept, Conteks) framework as shown in Table 1. Studies were included for review if they met the following inclusion criteria: published within the last ten years, from 2014 to 2024, as the researchers need the latest studies to determine the involvement of cadres in tuberculosis control programs. There were no geographic restrictions, but only articles published in English were considered. The article must contain a discussion regarding cadre involvement in the tuberculosis program. Articles

that meet the inclusion criteria are then included in the exclusion criteria. Exclusion criteria were applied when the article was a review articles, the article was not written in English, the article was published more than ten years ago, or had unclear review content. The data obtained is reviewed, selected, grouped and discussed based on various points.

Table 1: PCC Framework

Framework	Inclusion Criteria	Exclusion Criteria
Population	Cadres	-
Concept	Community Empowerment	-
Conteks	Tuberculosis Program	-

In our scoping review, we conducted an extensive search for relevant research articles in various databases. We employed a literature search strategy on five indexed electronic databases, namely Pubmed, Scopus, Medline-Ebscohost, ProQuest, and Cochrane. The search terms in the systematic review were aligned with Medical Subject Heading (MeSH) terms, encompassing keywords like 'Cadres' or 'Community Health Volunteer' or 'Community Health Aides' or 'Community Health Worker' and 'Community Empowerment' or 'Community Involvement' or 'Community Contribution' or 'Community Participation' or 'Community Support' combined with 'Tuberculosis Program' or "Tuberculosis Control' or 'Tuberculosis Treatment' or 'Tuberculosis Care'. We used Boolean operators, including 'AND', 'OR', and 'NOT', to refine our search. Our search results were limited to studies published in the English language between 2014 and 2024. This research represents a review article aimed at identifying the contribution of cadres in the tuberculosis program. To present the findings of our scoping review, we employed the PRISMA checklist and flow diagram for reporting items (7). All articles were first screened for research outcomes through the abstract, and detailed findings were reviewed in the full text to assess methodology, results, and conclusions as presented in Fig. 1. Data extraction was performed using the PRISMA flow chart to review study characteristics and level of evidence for each article. Evidence analysis and evaluation of identified articles were conducted according to the flowchart. The initial keyword-based literature search yielded a total of 793 articles. Prior to screening, 232 articles were excluded as duplicates.

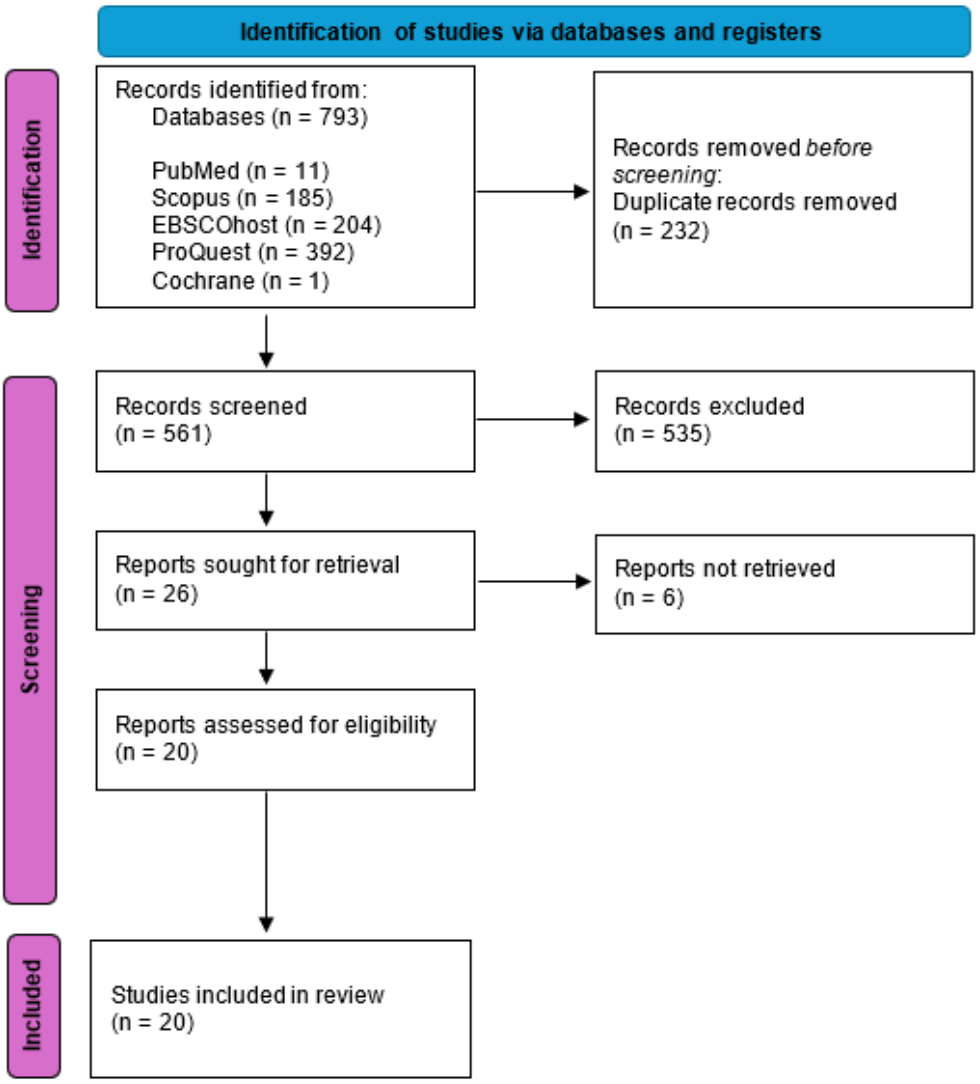

Fig. 1: PRISMA flowchart

Results

After screening, 535 papers were excluded for various reasons, including population mismatch with the study objectives, articles written outside the English language, and non-open access status. Twenty-six full papers were evaluated for eligibility after the remaining 6 articles were disqualified for being more than ten years old and not being original research. As a result, 20 articles met the eligibility criteria.

Relevant data related to the research question in this systematic review were extracted, including author, publication year, title study, population & sample, methods used, and results. In order to compile data for this scoping review, a narrative technique was used to gather and create a cohesive textual narrative that emphasized study differences and commonalities. This narrative highlighted both the distinctions and similarities among the studies, offering a nuanced understanding of the topic. Table 2 displays the research results in the form of data extraction from the included articles.

Table 2: Data extraction results

No.	Title Study, Author & Year	Population & Sample	Content of Program (Intervention & Training	Measuring (Variables)	Results
1	Sapar, et. al. (8)	Population: all TB patients in Makassar City Sample: 128 TB patients	The role of cadres includes early detection, advocacy, social mobilization, motivation, and reducing stigma among TB patients.	Independent variable: Role of TB cadres Dependent variable: TB patient treatment adherence	The role of Aisyiyah TB community cadres is low and does not have a significant influence on TB patient treatment adherence. However, the overall level of patient treatment adherence was in the high category.
2	Febriani, et. Al. (9)	The total number of participants was 39 informants, consisting of 24 health cadres, 3 nurses, 4 DR-TB patients, 3 family members, 2 peer supporters, a puskesmas head, and 2 TB staff from the local Health Office.	The health cadre training program included improved knowledge of TB, effective communication, patient condition assessment, and patient tracing. The training was held over three days, with a pretest and posttest to measure effectiveness.	Variables included cadres' knowledge of TB, communication skills, ability to trace patients, and patient tracing outcomes as measured by the number of patients successfully contacted and enrolled in treatment.	Variables included cadres' knowledge of TB, communication skills, ability to trace patients, and patient tracing outcomes as measured by the number of patients successfully contacted and enrolled in treatment.
3	Akingbade, et. al. (10)	All community TB volunteers (CTVs) 10 people in Ibadan North region were involved	CTVs activities include case detection, awareness campaigns, community education, and patient tracing.	Variables include activities of CTVs, needs of TB patients, and challenges faced by CTVs.	CTBC programs in the region are considered progressive with many success stories, such as increased case detection. However, significant challenges include the need for government support in the form of financing, free drug supply, and assistance with media advertising.
4	Onazi, et. al., (11)	Focus on Community Health Workers (CWs) in Nigeria involved in four ACF-based community models. The sample included 8 FGDs with CWs, 2 state-level TB program managers, 8 community-based organizations (CBOs), and 6 local supervisors for TB and leprosy.	Training includes short modules (1-5 days) on TB symptoms, how to make referrals, and infection control. The program has four implementation models with variations in supervision, referral quotas, and compensation.	Variables measured included the effectiveness of TB case referrals by CWs, quality of training, supervisory support, and social and logistical challenges faced by CWs.	Results show that the ACF program faces many challenges, such as stigma, poor logistics support, inadequate training, and a weak public health system. Low compensation and inadequate supervision affect the motivation of CWs.

Table 2: Continued …

5	Okeyo, et al. (12)	Research involving 14 CCWs in Grahamstown, Eastern Cape, South Africa	Training includes basic information on TB, but is not standardized and often considered insufficient. CCWs expressed the need for ongoing training and easy-to-understand information materials.	The study measured perceived motivation, satisfaction with their role, and the need for additional information and training in managing TB.	Altruism is the primary motivation for CCWs, supported by personal experience in caring for sick family or community members. CCWs take pride and satisfaction in their contribution to patient care and community education.
6	Samal, et. al. (13)	The sample consisted of 10 CVs (1 female, 9 male) in an urban slum area of Chhattisgarh, India.	The training lasted two days, covering the basics of TB and RNTCP program activities. The training was conducted in a structured manner by various instructors, including sessions on RNTCP by local staff.	Knowledge, attitudes and post-training evaluation included the number of households reached, sputum collected, and TB cases detected and treated.	CVs' knowledge improved in various aspects, such as understanding TB transmission and prevention measures. CVs' attitudes did not show significant improvement. In three months, 8 CVs reached 5,633 households, collected 648 sputum samples, detected 45 TB cases, and managed patients in the DOTS program.
7	Sukartini, et. al. (3)	The population consisted of TB cadres, with a sample of 30 TB cadres.	Interventions include training, counseling, and availability of health facilities. Reinforcement is done through community support and incentives or rewards.	Independent Variables: Predisposing factors, enabling factors, reinforcing factors. Dependent Variable: Successful TB case finding.	There was a significant association between knowledge, counseling, training, availability of health facilities, rewards, and community support for successful TB case finding. No significant relationship was found between cadre attitude and TB case finding.
8	Syarifah, et. al. (14)	The population consisted of health cadres in the working areas of Puskesmas Helvetia and Medan Area. The sample consisted of 15 health cadres	Training materials included an introduction to TB and MDR TB, the role of cadres, active case finding, contact investigation, patient assistance, and tracking of absent patients.	Independent Variable: Knowledge, attitudes, and actions of cadres before and after training. Dependent Variable: Changes in cadre behavior in preventing, finding, and controlling TB cases.	There were significant improvements in cadres' knowledge, attitudes, and actions after the training. The training effectively improved cadres' social role as social capital for TB care community development.
9	Jerene, et. al. (15)	The population was children who had close contact with adult TB patients. The sample included children in three intervention and two control districts in Ethiopia.	The training covered TB basics, COVID-19 prevention, and communication skills.	Primary Outcomes: Percentage of children who started and completed TPT treatment.	TPT initiation rates increased in the intervention zone. For children under 5 years of age (U5C), TPT initiation increased with a treatment completion rate of 99%. The community-based intervention model showed significantly better results than the control zone.
10	Abongo, et. al. (16)	The population was all index TB cases visited by CHVs for contact investigation during January-December 2016. Data were collected from 26,307 index patients whose households were visited.	CHVs undergo a 3-day training covering TB basics, TB/HIV management, infection control, and community reporting tools. CHVs visit households for health education, contact screening, and referrals.	The main variable was the number of reported TB cases. Additional variables included number of households visited, number of contacts screened, number referred, and demographic characteristics.	CHVs screened 44,617 household members, with 19.6% referred to health facilities. The percentage of TB cases identified through contact investigations and TB cases reported through community referrals increased.
11	Harahap, et. al. (2)	The population included communities, TB cadres, and	The TB CEPAT program includes cadre training, distri-	Main variables: TB-related knowledge, attitudes and practic-	Knowledge, attitudes, and practices were better in program areas than in non-

Table 2: Continued …

		TB patients in Medan City. A sample of 300 respondents (100 each from the community, TB cadres, and TB patients) was selected by purposive sampling. Qualitative data were collected from 3 key informants.	bution of IEC materials (leaflets, booklets, videos), outreach through traditional arts, and improved access to health services. Cadres are trained to find TB cases, accompany patients to health facilities, and provide education.	es. Additional variables: Comparison of outcomes between program and non-program areas.	program areas. Cadres identified 5,215 TB suspects with 598 positive TB cases. The CEPAT TB program increased community awareness, supported TB eradication, and reduced stigma.
12	Singh, et. al. (17)	The population consisted of 41 ASHA (Accredited Social Health Activist) workers in the rural area of Chiklod PHC, Raisen district, India, between January-September 2015.	ASHAs are responsible for providing TB treatment, conducting sputum smears, recording data, and supporting patients in rural communities. Most ASHAs have not received adequate training in the last three years.	Quantitative main variables: Knowledge and practice levels. Qualitative findings: Barriers such as poor payment systems, low capacity, geographical issues, and patient stigma.	Quantitative: 34% of ASHAs had adequate knowledge and 32% had satisfactory practice. Qualitative: Major barriers included limited training, lack of health system support, distance to health facilities, and lack of financial incentives. Only a small proportion of patients completed treatment through ASHA assistance.
13	Ong'ang'o, et al. (18)	The study involved 2,778 TB patients in purposively selected health facilities in Kenya.	CHWs were given a 3-day training on their role in TB care. CHWs supervise directly observed therapy (DOTS), provide patient education, support treatment adherence, and document their activities.	Main variable: TB treatment adherence. Other variables: Patient demographics, TB classification, HIV status, and patient location (urban/rural).	Adherence was higher in patients who used CHWs compared to those who did not. In urban settings, adherence was higher compared to rural settings. The use of CHWs significantly improved treatment adherence, especially in urban settings. Logistic regression analysis showed that the use of CHWs remained significant in improving medication adherence.
14	Uwimana, et. al. (19)	The study involved various stakeholders, including representatives from NGOs, CCWs, and health workers at the community level in Sisonke district.	This research highlights the importance of systematic training for CCWs, expansion of their scope of practice, consistent supervision, and reliable referral and monitoring systems to increase their involvement in integrated services.	Variables measured include the level of engagement of NGOs and CCWs in TB/HIV/PMTCT collaborative activities, barriers faced in integrated service delivery, and factors that could improve CCW engagement.	The involvement of NGOs and CCWs in the implementation of collaborative TB/HIV/PMTCT activities remains suboptimal despite the significant potential benefits. Effective interventions are needed through a combination of skills training, expanded scope of practice, consistent supervision, and reliable referral and monitoring systems.
15	Herce, et al. (20)	The sample consisted of 38 community health workers working in a rural area of Chiapas.	Community health workers receive training in various medical aspects, including the use of basic medicines and traditional Mayan medicinal plant therapies. Some have access to botiquín (medicine boxes with basic supplies).	Variables measured included health workers' level of experience in managing various diseases, access to medical equipment, and their perception of the prevalence of TB in their community.	More than 50% of community health workers identify TB as a major problem in their communities. However, limited resources, lack of TB-specific training, and socio-political barriers hinder their effectiveness in controlling TB in rural communities.

Table 2: Continued …

16	Khan, et. al. (21)	The sample consisted of 20 LHWs involved in the TB case-finding pilot program and 12 health program managers responsible for managing the LHW program at the district level.	The pilot program provided financial incentives for LHWs who successfully referred TB patients, as well as social recognition in the form of an award ceremony for those who referred the most TB patients.	The variables measured include internal and external motivation and program managers' views on the sustainability of the incentive scheme.	The study found that while financial incentives were important, internal motivations such as religious beliefs and intrinsic satisfaction were more instrumental in increasing LHW engagement. Program managers recommend strategies that focus more on social recognition and non-financial support such as transportation assistance for TB patients.
17	Balogun, et al. (22)	The sample consisted of 252 adult respondents selected through a stratified sampling technique in Idi Araba community, Lagos. Ten community volunteers (CVs) were trained as interventionists.	Ten CVs were trained over two days using national training modules. The CVs conducted educational activities in markets, places of worship, households and occupational groups.	Variables measured included knowledge, attitude, and TB prevention practice scores. Data were collected through pre- and post-intervention surveys.	Average knowledge and attitude scores improved. There was no significant improvement in TB prevention practices. Eight TB suspects were referred to the clinic, with one case confirmed positive for TB.
18	Kok, et al. (23)	The study involved 44 semi-structured interviews and 16 focus group discussions with HSAs, community members and managers in Mchinji and Salima districts.	This research highlights the importance of support and accountability structures that facilitate communication and dialogue, increase trust, and manage expectations to improve interpersonal relationships between HSAs and actors in the community and health sector.	Factors that facilitate and hinder interpersonal relationships between HSAs and actors in the community and health sector, and how these factors affect HSAs' performance.	Factors influencing relationships with community and health sector were explored. Trust, communication, and expectations were key factors affecting relationships.
19	Addy, et al. (24)	The study involved 24 TB stakeholders, including 7 health workers, 9 TB patients, 4 community health volunteers, 2 treatment advocates, and 2 opinion leaders in the community.	This study highlights the importance of education and training for treatment supporters and community health volunteers to increase their participation in TB care.	Variables explored included the level of community involvement in TB care, the process of selecting treatment supporters, and the knowledge and role of treatment supporters in supporting TB patients.	Low community involvement in TB care in Krachi West District. Community members lack knowledge on TB care and management. Health workers initiate treatment and locate caretakers for patients.
20	Gebretnsae, et al. (25)	Quantitative data was collected from 68 randomly selected HEWs. Qualitative data was obtained through focus group discussions (FGDs) and interviews with HEWs, community volunteers and other stakeholders.	This study highlights the importance of implementing Community-Based Directly Observed Treatment Short-course (CB-DOTS) and engaging community volunteers in community-based TB care (CBTC) activities to increase HEWs' contribution to TB case notification.	Variables measured included the contribution of HEWs in TB case notification, implementation of CB-DOTS, involvement of community volunteers in CBTC, and factors influencing referral of TB cases by HEWs.	34% of TB cases notified by HEWs. CB-DOTS and community volunteers significantly associated with HEWs' contribution. Qualitative findings identified high workload on HEWs, lack of access to TB diagnostic services, and transportation and examination costs as barriers to TB case referrals by HEWs.

Discussion

This scoping review highlights the important contribution of cadres in tuberculosis (TB) programs, revealing their integral role in community empowerment initiatives aimed at controlling and reducing TB prevalence. The studies analyzed highlight various dimensions of cadre involvement, emphasizing effectiveness, challenges, and areas for improvement. Cadres have been shown to play an important role in supporting TB detection and management, particularly in resource-limited settings. For example, research conducted in Makassar showed that the role of TB cadres in the community, although present, is underutilized, mainly due to a lack of systematic integration with health care facilities and limited resources allocated to their tasks. This suggests the need for structured support to strengthen the contribution of cadres in the TB program (8). Another study from Nigeria highlights how community-based tuberculosis (CTBC) services benefit significantly from cadre involvement, with cadres effectively bridging the gap between patients and health services, thereby improving TB case detection and treatment adherence rates (10).

In the context of multidrug-resistant tuberculosis (MDR-TB), cadres also play an important role. In Indonesia, cadres provide important psychosocial support to MDR-TB patients, encouraging adherence to lengthy and often challenging treatment regimens. By facilitating communication between patients, families, and healthcare providers, cadres help overcome barriers such as stigma and misinformation that typically impede treatment outcomes (9). Despite these successes, there are challenges that undermine the full potential of cadres. Many studies, including those conducted in South Africa, note that cadres often lack adequate training and resources to carry out their duties effectively. Limited access to diagnostic tools and lack of financial incentives further reduces their motivation and efficiency. In addition, the stigma associated with TB remains a major challenge, requiring cadres to possess not only technical knowledge but also strong interpersonal skills to effectively educate and engage communities (12).

To improve the contribution of cadres, several recommendations emerged from the study. Structured and locally designed training programs are essential to equip cadres with the skills needed to effectively perform their roles. These programs should emphasize practical aspects such as community engagement, case detection, and patient counseling. In addition, integrating technology, such as mobile apps for case reporting and follow-up, can simplify cadre operations and increase their impact. For example, cadres in Nigeria benefited from a simplified reporting tool, which enabled them to monitor patient progress and communicate effectively with healthcare providers (10). Community empowerment is another important aspect of cadre engagement. By engaging local leaders and families in TB programs, cadres can create a supportive environment that encourages early case detection and reduces stigma. Such programs have shown success in fostering a sense of ownership among communities, thereby increasing program sustainability (2).

Conclusion

Cadres play an indispensable role in TB programs by bridging the gap between healthcare systems and communities. Their contributions significantly enhance TB detection, management, and treatment adherence, particularly in underserved areas. However, to maximize their impact, it is crucial to address the challenges they face through comprehensive training, resource allocation, and community engagement strategies. This scoping review underscores the importance of strengthening cadre roles as part of broader efforts to combat TB globally.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or

falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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