DETERMINANTS OF KNOWLEDGE, ATTITUDE, AND PRACTICE LEVEL AMONG COMMUNITY HEALTH WORKERS: A SCOPING REVIEW

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ABSTRACT

Background: Community Health Workers (CHWs) play a vital role as frontline actors in strengthening public health delivery within primary healthcare systems. Beyond program implementation, CHWs contribute significantly to health literacy promotion and preventive health behaviors at the community level. However, variations in knowledge, attitude, and practice (KAP), shaped by individual, social, and structural factors, influence their effectiveness in delivering community-based health interventions. Understanding these determinants is essential for strengthening primary healthcare, particularly in developing countries such as Indonesia. Objective: This study aimed to map the key factors influencing the knowledge, attitude, and practice (KAP) of community health workers in primary healthcare settings. Methods: This study employed a scoping review design based on the Arksey and O'Malley framework and guided by the PRISMA-ScR guideline. The review followed the Population, Concept, and Context (PCC) approach. Literature searches were conducted in PubMed, Scopus, and ScienceDirect for studies published between 2019 and 2024, complemented by gray literature. The review process included systematic screening, data charting, thematic synthesis, and expert consultation to ensure methodological rigor. Results: A total of 246 articles were identified, of which seven met the inclusion criteria for final analysis. The synthesis revealed four key determinants influencing CHWs' KAP: (1) continuous training and education, (2) social capital and community support, (3) individual and contextual characteristics, and (4) utilization of digital technology. Conclusion: Enhancing the KAP of CHWs requires a comprehensive, multi-level approach integrating continuous capacity building, digital literacy development, and supportive social and policy environments. This review highlights the strategic importance of technology-based training and cross-sectoral collaboration in strengthening the role of CHWs within Indonesia's primary healthcare system and similar community health contexts.

Keywords: Community Health Workers; Knowledge–Attitude–Practice; Health Literacy; Scoping Review; Primary Healthcare

BACKGROUND

Community health volunteers serve as critical links between the public and healthcare professionals, functioning as the frontline of primary healthcare services. At the community level, they engage in a range of preventive, promotive, and curative activities that support the delivery of essential health programs. The effectiveness of their role largely depends on their levels of knowledge, attitude, and practice (KAP)—three interrelated components that collectively determine the quality and success of public health program implementation.

However, KAP levels among community health volunteers vary considerably, particularly in developing countries such as Indonesia. While some volunteers demonstrate strong competencies, motivation, and commitment, others exhibit limited knowledge and insufficient technical skills. This disparity can negatively affect service quality and program outcomes, especially in critical activities such as data collection, health reporting, and household outreach.

Empirical evidence suggests that education, training, and work experience have a positive impact on community health volunteers' knowledge levels (Wulandari et al., 2019). Their attitudes are shaped by social support systems and enabling policy environments (Purnomo et al., 2017), aligning with Bandura's Social Cognitive Theory (1986), which emphasizes the central role of self-efficacy in influencing behavior. More recent studies (Mwenda et al., 2024) demonstrate that community-supported and culturally tailored training programs effectively enhance volunteers' practices, particularly in the prevention and control of noncommunicable diseases (NCDs).
Nevertheless, most existing studies examine KAP factors in isolation, without integrating the interrelationships among knowledge, attitudes, and

practices within a broader conceptual or theoretical framework. Moreover, no systematic or scoping review to date has compared KAP determinants across different primary healthcare settings to identify efficient and sustainable patterns. Mapping such evidence is crucial for designing strategies that can effectively and sustainably strengthen the capacity and performance of community health volunteers.

Accordingly, this study employed a scoping review approach, guided by the methodological framework proposed by Arksey and O'Malley (2005), to systematically synthesize existing evidence. The initial stage of this framework emphasizes the formulation of a clear and focused research question to guide the review process. In line with this, the central research question of the present review was defined as follows: "What are the determinants of Knowledge, Attitude, and Practice (KAP) levels among community health volunteers in primary healthcare settings?"

The objective of this scoping review is to provide a comprehensive overview of the key determinants influencing Knowledge, Attitude, and Practice (KAP) among community health volunteers, identify existing research gaps, and establish an empirical foundation for designing evidence-based interventions and policies aimed at strengthening volunteer capacity.

Beyond mapping these determinants, the review also incorporates a reflective dimension examining how community health volunteers adapt to dynamic social, technological, and policy transitions within evolving primary healthcare systems. Volunteers not only implement programs but also play a crucial role in contextualizing medical knowledge within local cultural frameworks, ensuring that health interventions remain relevant and acceptable at the community level.

Strengthening volunteer capacity therefore contributes to building social resilience and community self-reliance in health promotion amid ongoing digital transformation and national health system reform. Consequently, this review extends beyond descriptive synthesis; it reaffirms the pivotal role of community health volunteers as the cornerstone of community-based healthcare

METHOD

This study employed a scoping review design, guided by the methodological framework proposed by Arksey and O'Malley (2005) and subsequently refined by the Joanna Briggs Institute (JBI). The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines developed by Tricco et al. (2018). The methodological process comprised six structured stages, as outlined below.

success in Indonesia and provides insights applicable to other low- and middle-income settings worldwide.

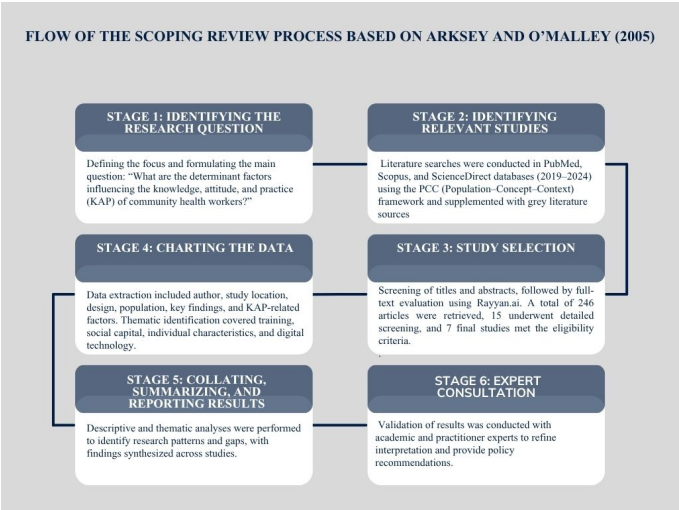
Stage 1: Identifying the Research Question

The review commenced with the formulation of a clear and focused research question: "What are the determinants of Knowledge, Attitude, and Practice (KAP) levels among Community Health Workers (CHWs) in primary healthcare settings?" This stage was designed to define the scope and direction of the inquiry, ensuring that the review process remained aligned with its primary objective—to systematically map and synthesize the determinants influencing KAP among CHWs across diverse primary healthcare contexts.

Stage 2: Identifying Relevant Studies

This stage aimed to identify relevant and representative literature addressing the determinants influencing the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs). The principles of transparency and replicability were applied throughout the search process, and all procedures were carefully documented to ensure methodological rigor and reproducibility.

A comprehensive literature search was conducted using three major international databases PubMed, Scopus, and ScienceDirect—which collectively cover a broad range of peer-reviewed publications in global health and primary healthcare research. The search period was restricted to January 2019 through December 2024 to ensure the inclusion of the most recent and relevant evidence.



Source: Adapted from the framework of Arksey and O'Malley (2005) and refined according to the PRISMA-ScR guidelines developed by Tricco et al. (2018).

The search strategy was developed based on the Population–Concept–Context (PCC) framework recommended by the Joanna Briggs Institute (JBI), defined as follows: Population: Community Health Workers (CHWs), health cadres, or community health volunteers. Concept: Determinants influencing Knowledge, Attitude, and Practice (KAP) levels. Context: Primary healthcare (PHC) services at the community level.

Keywords and Boolean operators were systematically combined using standardized syntax to capture variations across databases. An example of the core search string is presented below:

("community health worker" OR "health volunteer" OR "health cadre") AND ("knowledge" OR "attitude" OR "practice" OR "KAP") AND ("determinant" OR "factor" OR "influence") AND ("primary health care" OR "community health" OR "public health service").

In addition to peer-reviewed journal articles, gray literature sources were also explored through Google Scholar and national research repositories containing relevant reports and unpublished studies, thereby broadening the scope of available evidence. To facilitate an organized and transparent screening process, all retrieved citations were first imported into a reference management system and subsequently uploaded to the Rayyan.ai platform for systematic review management, duplication removal, and blinded screening by independent reviewers.

Stage 3: Study Selection

The study selection process was conducted in two sequential stages: initial screening and full-text review. To minimize potential selection bias, both stages were carried out independently by two reviewers. During the initial screening, all records retrieved from the database search were examined based on their titles and abstracts, and subsequently evaluated against predefined inclusion and exclusion criteria that had been mutually agreed upon by the reviewers. This dual-review process ensured that only studies deemed relevant, valid, and contextually aligned with the objectives of the review were included for full-text assessment.

The inclusion and exclusion criteria were designed to maintain the review's focus on the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs) within primary healthcare settings, while also accounting for diversity in study design, research context, and geographic scope. The detailed inclusion and exclusion criteria are summarized in Table 1 below.

Table 1. Inclusion and Exclusion Criteria in the Study Selection Stage

Aspects	Inclusion Criteria	Exclusion Criteria
Type of Study	Primary research employing cross-sectional, observational, or quasi-experimental designs	Systematic reviews, meta-analyses, editorials, or letters to the editor
Population / Subjects	Community health workers (CHWs) or health cadres involved in primary healthcare service delivery.	Studies involving professional healthcare workers (e.g., physicians, nurses, or midwives) without the participation of community health workers or cadres
Research Focus	Studies examining the KAP of community health workers.	Studies that do not assess or include KAP components in their analysis
Publication Period	Articles published between 2019–2024, representing the most recent scientific evidence.	Articles published before 2019 or after 2024.
Publication Language	Articles written in English or Indonesian.	Publications written in other languages (e.g., Mandarin, Spanish, Arabic, etc.).
Accessibility and Data Completeness	Articles available in full text and containing relevant data for extraction.	Articles not available in full text or presenting abstract-only information.

The inclusion criteria were developed to ensure thematic relevance to the primary research objective, namely to identify and compare the determinants of Knowledge, Attitude, and Practice (KAP) levels among Community Health Workers (CHWs) in primary healthcare settings. This approach was also intended to minimize potential methodological bias that could arise from inappropriate study designs or limited data accessibility. The process was guided by the principles of transparency, rigor, and reproducibility recommended by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews

(PRISMA-ScR) and the Joanna Briggs Institute (JBI).
Furthermore, the use of clear, structured, and contextually appropriate language was emphasized to ensure that readers can easily follow the systematic flow of the literature selection process, thereby strengthening the clarity and reliability of the review methodology.

Stage 4: Data Charting

After the eligible articles were selected, the next stage involved data charting, which aimed to systematically extract and organize key information from each included study. The primary purpose of this process was to describe how each study addressed the main research question and to identify overarching patterns, characteristics, and variations within the existing body of evidence.

For each included article, the following information was extracted and charted in a standardized data-extraction form:

1. Author(s) and year of publication
2. Country or study location
3. Research design and methodological approach
4. Participant characteristics (e.g., sample size, gender distribution, age, and cadre experience)
5. Main variables investigated
6. Principal findings related to determinants influencing the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs).

This structured approach facilitated consistency and comparability across studies, enabling an in-depth synthesis of the evidence in later stages of analysis.

RESULTS

The purpose of this stage was to synthesize and present the findings from the seven studies that met the inclusion criteria. To identify the factors influencing the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs), both descriptive and thematic analyses were conducted. The included studies originated from seven different countries, each characterized by distinct social contexts and healthcare systems, reflecting the diversity of CHWs' roles within primary healthcare (PHC) services.

From the initial literature search, a total of 246 scientific articles were identified during the screening phase. To assess their relevance to the focus of the review, each article was thoroughly examined based on its title and abstract. As a result, 15 studies met the preliminary inclusion criteria and advanced to the full-text review stage.

During the full-text evaluation, each study was carefully assessed for compliance with the established inclusion criteria, including research design, target population (CHWs), and the measurement of KAP components. Following this systematic and iterative selection process, seven studies were determined to be the most relevant and fully met all inclusion standards.

To visually summarize the process of identification, screening, and inclusion, a PRISMA-ScR flow diagram was developed (see *Figure 1*). This diagram provides a concise overview of the progression of studies from initial database retrieval to final inclusion thereby illustrating the rigor, transparency, and credibility of the review's methodological process.

After the entire process of article identification and selection was visualized using the PRISMA-ScR flow diagram, the subsequent stage involved data charting for the seven studies that met the inclusion criteria. This step aimed to systematically organize and synthesize essential information from each study, providing a comprehensive overview of the research context, design, and key findings relevant to the objectives of the review.

The data charting process was conducted using a data-extraction template developed in accordance with the principles of the Joanna Briggs Institute (JBI). Each included study was reviewed to extract the following elements: (1) author(s) and year of publication, (2) study location, (3) research design and methodology, (4) participant characteristics, (5) research focus, and (6) principal findings related to improving the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs) within primary healthcare settings.

This process not only provided a structured descriptive summary of the extracted data but also facilitated the identification of patterns, relationships, and recurring themes across studies, forming the empirical foundation for the subsequent thematic synthesis. The following table presents the data-charting summary of the seven selected studies, which served as the basis for thematic analysis in the next stage.

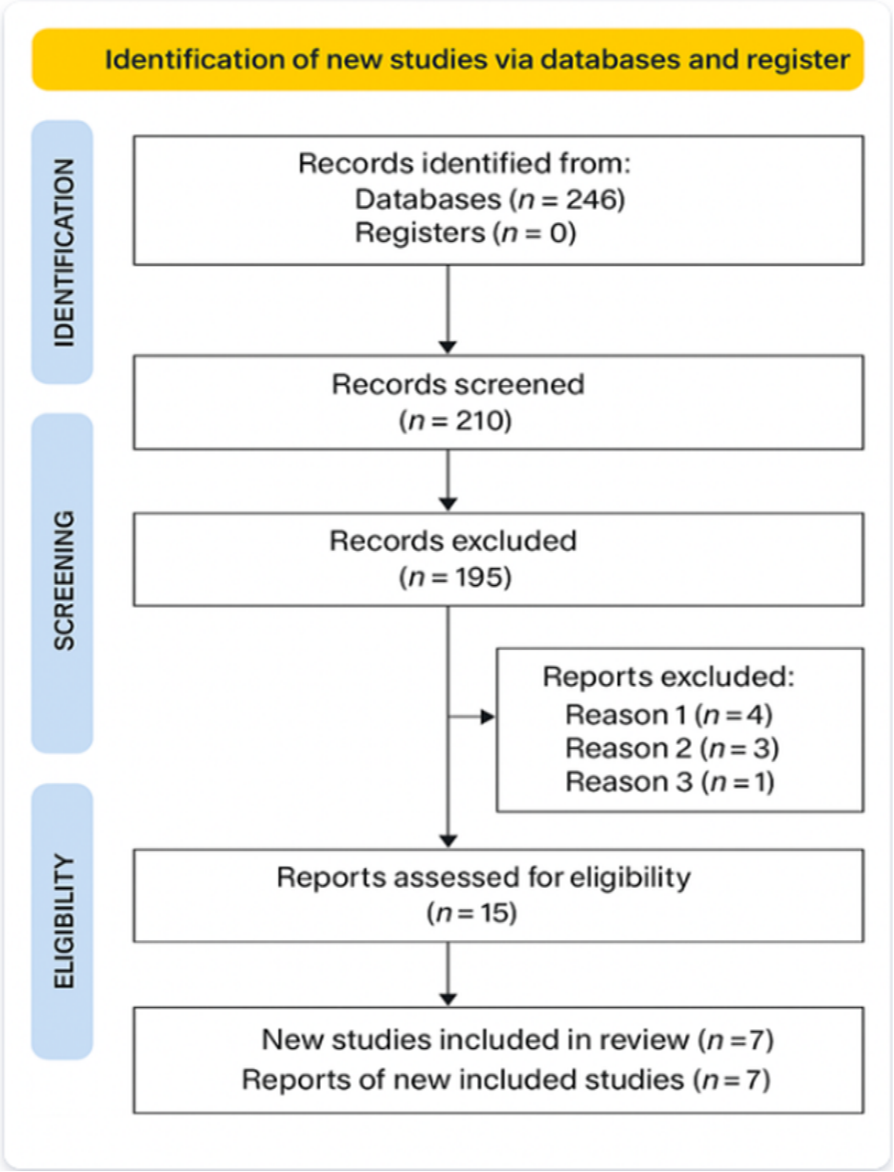


Figure 1. PRISMA-ScR Flow Diagram

Table 2. Summary of Data Charting and Key Findings (n = 7)

Author(s) & Year	Country / Location	Study Design	Population / Sample	Research Focus	Key Findings	Key Aspects of KAP
Bin *et al*. (2021)	Bangladesh	Cross-sectional	325 community health workers (CHWs)	KAP related to cancer awareness in the community	Knowledge and practice levels were relatively low; lack of formal training was identified as a key limitation	Training, age, experience, gender, and workplace location.
Cumbe *et al*. (2022)	Mozambique	Cross-sectional	135 CHWs	KAP toward epilepsy	Knowledge about the causes of epilepsy was low; local cultural beliefs strongly influenced understanding and perceptions	Culturally tailored training and community support.
Renjith *et al*. (2023)	India	Cross-sectional	510 CHWs	Awareness and knowledge about stroke	Participants demonstrated positive attitudes; the ASHA training program was effective in supporting secondary prevention efforts.	Accredited training, work experience, and supportive policy environment.
Gadsden *et al*. (2022)	Indonesia	Cross-sectional	478 community health cadres	Social capital and KAP related to COVID-19	Higher levels of social capital were associated with higher KAP; rural cadres demonstrated greater confidence in community engagement	Cognitive and structural social capital, workplace location.
Benedict *et al*. (2023)	South Africa	Cross-sectional	548 primary healthcare workers (including 149 CHWs)	KAP regarding prostate cancer screening	Knowledge levels were low; the study emphasized the need for continuous and interactive training programs.	Formal education, ongoing training, and supportive health policy.
Ghaffari *et al*. (2020)	Iran	Quasi-experimental	25 female CHWs	WHO-based educational intervention on food safety	The intervention significantly improved KAP scores in the intervention group compared to the control group.	WHO guideline-based training and work experience
Gyee *et al*. (2022)	Myanmar	Longitudinal quasi-experimental	76 CHWs and 50 physicians	KAP on mental health and digital technology	Digital training significantly improved KAP levels and enhanced community-based diagnosis.	Digital technology utilization and continuous training.

KEY FINDINGS

The synthesis of results identified four major themes consistently reported across all included studies:

1. Continuous Training and Education
   All studies underscored the critical role of both formal and informal training in improving the knowledge and practical competencies of Community Health Workers (CHWs). Hands-on field practice, case-based learning, and participatory training approaches were shown to enhance CHWs' confidence, competence, and problem-solving abilities. Regular refresher sessions and mentoring mechanisms also contributed to sustained improvements in performance.

2. Social Capital and Community Support
   CHWs with strong social support networks and higher levels of community engagement demonstrated better KAP outcomes. Cognitive social capital—including trust, reciprocity, and sense of belonging—was found to influence attitudes, whereas structural social capital, encompassing peer networks and community organizations, had a stronger impact on practical performance and field-based activities.

3. Individual and Contextual Characteristics
   Variations in KAP were associated with individual attributes such as age, gender, education, and years of experience, as well as contextual factors including geographic location and workload. Notably, female and rural CHWs tended to exhibit greater confidence, stronger commitment, and more consistent field practices than their male and urban counterparts, highlighting the influence of sociocultural and environmental contexts on performance.

4. Utilization of Digital Technology
   The integration of digital tools, including mobile-based reporting systems, electronic learning platforms, and digital supervision mechanisms, expanded access to continuous training and facilitated skill development among CHWs operating in resource-limited settings. Technology-enabled platforms were also reported to improve data accuracy, reduce communication gaps, and support knowledge sharing within CHW networks.

Collectively, these findings indicate that improving Knowledge, Attitude, and Practice (KAP) among CHWs cannot be achieved through a single, isolated intervention. Building resilient and competent cadres in primary healthcare requires a multi-level and sustainable strategy that combines social support, institutional policy reinforcement, and technology-driven training innovations to ensure long-term impact and equity in community health service delivery.

DISCUSSION

The findings of this scoping review deepen the understanding of the multiple factors influencing the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs) within primary healthcare (PHC) settings. This review highlights not only individual determinants but also social, structural, and technological factors that collectively shape cadre behavior. Overall, the analysis demonstrates that improving KAP requires a multidimensional approach encompassing personal capacity building, social support, and enabling health system policies that ensure the sustainability and continuity of the CHWs' role.

A review of the included literature identified ten key elements influencing the KAP of CHWs:

1. Continuous training and education
2. Social and community support
3. Individual characteristics
4. Work context and environmental support
5. Organizational and policy reinforcement
6. Domain of health programs implemented
7. Use of technology and digital literacy
8. Diversity in KAP measurement instruments
9. Predominance of cross-sectional research designs
10. Outcomes of intervention implementation

Although these ten elements have been recognized, several methodological and conceptual challenges remain to be addressed in future research. These limitations do not only reflect gaps in the current evidence base but also provide a clear roadmap for developing contextualized, sustainable, and evidence-driven frameworks for policy, instrument development, and capacity-building interventions. The primary gaps identified include:

1. Limited causal evidence due to the predominance of cross-sectional study designs
2. Scarcity of mixed-methods research
3. Absence of validated and culturally adapted local KAP instruments
4. Lack of implementation fidelity assessments
5. Insufficient analysis of gender dynamics and intersectionality
6. Weak linkage between KAP outcomes and health program indicators

7. Absence of cost-effectiveness evaluations
8. Limited cultural adaptation of intervention models
9. Persistent digital literacy disparities
10. Lack of standardized supervision and incentive systems

These methodological limitations suggest that current research and policy on CHWs remain largely descriptive and exploratory, with limited progress toward evidence-based interventions and sustainability assessments. However, these gaps simultaneously create opportunities for future studies to develop standardized, digital, and context-specific training models that align with the ongoing transformation of Indonesia's primary healthcare system and global health system strengthening initiatives.

Interestingly, several studies revealed contradictory findings—for instance, improved knowledge does not always translate into behavioral change. Mubin et al. (2021) reported that cadres play a strong social role within communities, yet their knowledge and practical skills remain limited. This finding suggests that social engagement alone is not sufficient to achieve technical competence; behavioral change also requires self-efficacy, motivation, and experiential learning. This interpretation aligns with the Health Belief Model (HBM), which posits that behavior change is facilitated when individuals perceive high personal susceptibility, recognize the benefits of action, and possess confidence in their ability to perform the behavior (Rosenstock, 1974).

In this context, the Social Cognitive Theory (Bandura, 1986) also offers a valuable lens for understanding how CHWs' self-efficacy and social reinforcement influence their health behaviors. Strengthening KAP among CHWs therefore necessitates interventions that address both cognitive and contextual determinants—through sustained mentorship, peer learning, and policy mechanisms that reinforce confidence and accountability.

Cultural and contextual barriers were also evident across the reviewed studies. Cumbe et al. (2022) found that cultural beliefs and local norms often hindered the acceptance of scientific health information, resulting in limited translation of knowledge into practice among Community Health Workers (CHWs). This phenomenon illustrates that socio-cultural factors may impede behavioral change not because of a lack of knowledge per se, but because community values and traditional belief systems are not yet fully aligned with modern health concepts. Accordingly, culturally sensitive and dialogue-based training approaches may serve as more humanistic and effective strategies for capacity building and behavioral transformation.

Similarly, Renjith et al. (2023) demonstrated that positive attitudes following training did not automatically lead to improvements in practical behavior. According to Social Cognitive Theory (SCT) (Bandura, 1986), behavioral change is determined not only by internal attitudes but also by environmental supports, reinforcement mechanisms, and social modeling. Therefore, training initiatives should be complemented with peer supervision, structured mentoring, and periodic feedback loops to ensure that knowledge and attitudes are effectively translated into consistent and sustained practice.

In the Indonesian context, Gadsden et al. (2022) reported that social capital plays a dual and paradoxical role. On one hand, it strengthens motivation, community trust, and participation; yet on the other, it can constrain innovation due to social pressure to conform to traditional norms. This dynamic underscores the complex interplay between social cohesion and adaptive change within community-based health systems. Implementing reflective peer learning and participatory supervision models can therefore help stimulate innovation while maintaining social solidarity and collective identity among CHWs.

Gyee et al. (2022) reported that although digital-based training significantly improved Knowledge, Attitude, and Practice (KAP) among Community Health Workers (CHWs), its impact was uneven due to disparities in internet connectivity and digital literacy levels. This finding suggests that the effectiveness of technology-driven interventions depends not only on the design and content of the program but also on user access, technological readiness, and contextual infrastructure. Implementing a blended learning model—combining face-to-face sessions with offline learning modules may provide a practical and inclusive solution for CHWs operating in areas with limited digital access.

Taken together, these seemingly contradictory findings should not be viewed as weaknesses but rather as reflections of the complex and multifaceted nature of CHW behavior within social, cultural, and structural contexts. This complexity underscores the continued relevance of the Social Cognitive Theory (Bandura, 1986), the Health Belief Model (Rosenstock, 1974), and the Social Ecological Model (McLeroy et al., 1988) each emphasizing that behavior results from dynamic interactions between personal, social, and environmental determinants. Accordingly, strategies aimed at enhancing KAP must be multilevel, adaptive, and contextually responsive,

integrating behavioral, social, and system-level perspectives.

Based on the synthesis of evidence, KAP among Community Health Workers can be strengthened through the following strategies:

1. Structured and continuous training programs that emphasize experiential and problem-based learning.
2. Consistent social support and peer supervision mechanisms to sustain motivation and accountability.
3. Evidence-informed cadre development policies aligned with national health priorities and workforce standards.
4. Integration of digital technology to support training, monitoring, communication, and reporting.
5. Cross-sector collaboration among government agencies, communities, and academic institutions to ensure sustainability and innovation.

These strategic directions are consistent with the four major thematic findings identified in this review continuous training and education, social capital and community support, individual and contextual characteristics, and utilization of digital technology each of which is discussed in detail below.

First, continuous and participatory training both face-to-face and digital has been consistently shown to enhance knowledge, foster positive attitudes, and improve field practice competencies among Community Health Workers (CHWs) (Ghaffari et al., 2020; Renjith et al., 2023). This finding supports both Adult Learning Theory and Social Cognitive Theory (Bandura, 1986), which emphasize that reflective learning and experiential processes are key drivers of behavioral change. Reflective learning strengthens self-efficacy, and CHWs with higher confidence in their abilities are more likely to apply sound health practices consistently and autonomously in the field.

Second, social capital and community support play pivotal roles in building confidence, motivation, and positive attitudes toward CHWs' responsibilities. Gadsden et al. (2022) demonstrated that CHWs embedded within strong social networks are better equipped to adapt to local challenges and participate actively in health programs. The relationship between CHWs, communities, and health institutions is central to ensuring program sustainability and mutual accountability. With robust community support, collective efficacy the shared belief in a group's collective capacity can meaningfully transform community health outcomes and reinforce trust in primary healthcare systems.

Third, individual and contextual characteristics significantly influence KAP outcomes. Factors such as age, work experience, gender, and geographic location contribute to variations in knowledge, confidence, and practical performance (Bin et al., 2021; Benedict et al., 2023). Female and rural CHWs frequently exhibit greater empathy, engagement, and perseverance compared to their male or urban counterparts. These differences suggest that social norms, cultural values, and gender role perceptions continue to shape performance dynamics within community-based health programs. Recognizing and integrating gender-sensitive approaches in training and policy frameworks is therefore essential for equitable cadre development.

Fourth, the use of digital technology has become an increasingly essential strategy for strengthening CHW capacity and system connectivity (Gyee et al., 2022). Digital platforms facilitate communication between CHWs and healthcare professionals, support continuous learning, and function as real-time monitoring and supervision tools. Moreover, these technologies expand access to training resources and data management in remote or resource-limited settings. This aligns with the World Health Organization's Global Strategy on Digital Health (2020), which underscores the integration of technology as a means to accelerate progress toward achieving Universal Health Coverage (UHC) and improving equity in health service delivery.

From a theoretical perspective, these findings reinforce the notion that improving the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs) requires a multilevel and interactive approach that integrates individual learning, institutional support, and social reinforcement. This perspective also suggests that the health literacy system should acknowledge CHWs as agents of change within the broader ecosystem of community health literacy and behavior transformation.

From a policy perspective, the review underscores the importance of developing technology-enabled training programs that are context-sensitive and responsive to local needs. Strengthening social support systems through community networks and providing formal recognition, equitable incentives, and career pathways for high-performing CHWs are also essential. Local governments and health institutions should ensure that training programs extend beyond technical capacity-building to

include awareness-raising, behavioral reinforcement, and cross-sectoral collaboration between healthcare, education, and social service sectors.

Although this review provides a broad synthesis of evidence, it is limited by the predominance of cross-sectional study designs, which restrict the ability to establish causal relationships among determinants of KAP. Future research should adopt longitudinal and mixed-methods designs to capture gradual behavioral changes and contextual adaptations among CHWs. Additionally, further studies should explore psychosocial factors—such as self-efficacy, intrinsic motivation, cultural norms, and values—that shape the sustainability and effectiveness of the CHW role.

Overall, this synthesis emphasizes that empowering Community Health Workers extends far beyond enhancing knowledge or skills alone. It involves cultivating adaptive capacity, confidence, digital competence, and social engagement—all of which are critical for building resilient and community-centered primary healthcare systems. By strengthening these dimensions, CHWs can serve not only as program implementers but also as transformative agents of change, bridging the gap between health systems and communities to achieve equitable and sustainable health outcomes.

CONSULTATION

Within the review process, the consultation stage served as a critical component that facilitated expert interpretation, stakeholder engagement, and validation of findings. In accordance with the recommendations of Arksey and O'Malley (2005), this stage was conducted in a reflective and collaborative manner to ensure that the review results were contextually relevant and applicable to both public health practice and policy.

In this study, academics, public health experts, and primary healthcare practitioners collaborated in designing and implementing the consultation process. Three major discussion points were addressed:

1. Whether the review findings had been interpreted accurately;
2. The extent to which the results were relevant to the implementation of primary healthcare programs in Indonesia; and
3. The potential application of the findings in developing capacity-building interventions for cadres, particularly those focused on health literacy and digital technology integration.

The consultation process yielded four primary themes—continuous training, social capital, individual characteristics, and digital technology utilization—which experts agreed accurately reflected the actual needs and field realities of Community Health Workers (CHWs). Experts emphasized that cadre capacity could be enhanced through the expansion of social networks, culturally adaptive training programs, and stronger policy support at the local and national levels. They also highlighted the strategic importance of digital learning platforms to improve training efficiency, facilitate performance monitoring, and sustain engagement in the post-pandemic era.

Furthermore, experts agreed that improving KAP should focus not only on technical proficiency but also on strengthening health literacy, autonomy, and empowerment, enabling cadres to play a more active role in promoting behavior change within their communities. CHWs with strong health literacy are better equipped to filter information, communicate effectively, and serve as trusted health advocates in local settings.

Through this expert feedback, the review findings became more coherent, grounded, and aligned with both academic frameworks and practical field realities. The consultation stage not only enhanced the validity and applicability of the review but also served as a bridge between empirical evidence and actionable knowledge. This participatory approach is expected to inform context-specific, sustainable, and cadre-centered policy recommendations aimed at strengthening Indonesia's primary healthcare system.

CONCLUSION

This scoping review provides a comprehensive synthesis of the key determinants influencing the Knowledge, Attitude, and Practice (KAP) of Community Health Workers (CHWs) across diverse primary healthcare contexts. Based on the analysis of seven included studies, four major factors were identified as central to improving KAP outcomes: (1) continuous training and education, (2) social capital and community support, (3) individual and contextual characteristics, and (4) the use of digital technology to strengthen CHW capacity.

Structured and participatory training programs were shown to enhance not only knowledge but also CHWs' confidence, motivation, and self-efficacy. Variations in CHW performance were influenced by individual attributes—such as experience, age, and gender—while the integration of digital technology created new opportunities for continuous learning, remote supervision, and improved health literacy.

Conceptually, these findings underscore that CHW empowerment must extend beyond technical skill

development to include reflective capacity-building, health literacy enhancement, and self-efficacy strengthening to drive behavioral change at the community level. Health-literate and empowered CHWs are better equipped to adapt to evolving public health challenges and to serve as transformative agents of change within resilient and equitable primary healthcare systems.

RECOMMENDATIONS

1. Field Practice
   Cadre training should be conducted continuously using participatory learning approaches and digital technology integration to strengthen both theoretical knowledge and practical field competencies of Community Health Workers (CHWs).
2. Policy
   Governments and health institutions should provide sustained institutional support through equitable incentive systems, structured supervision, and formal recognition of CHWs' contributions to primary healthcare delivery. Strengthening these mechanisms ensures motivation, accountability, and long-term retention.
3. Research
   Future research should employ longitudinal and mixed-methods designs to evaluate the long-term effects of KAP-related determinants, particularly those related to self-efficacy, intrinsic motivation, and contextual adaptation among CHWs. Comparative and intervention-based studies are also recommended to build stronger causal evidence.
4. Health Literacy Strengthening
   CHW development programs should emphasize health literacy enhancement, equipping cadres to act as credible facilitators of behavior change and community health educators. Strengthening health literacy enables CHWs to communicate effectively, counter misinformation, and foster community empowerment.

STRENGTHS AND LIMITATIONS OF THE REVIEW

This scoping review demonstrates several methodological strengths and practical contributions.

First, it was conducted using the Arksey and O'Malley (2005) framework and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco et al., 2018), ensuring that the processes of identification, selection, and data synthesis were carried out systematically, transparently, and reproducibly.

Second, the review incorporated studies from diverse geographic regions and research designs, thereby enriching the understanding of the determinants influencing Knowledge, Attitude, and Practice (KAP) among Community Health Workers (CHWs) operating within different primary healthcare systems.

Third, the findings of this review possess both academic and practical significance, offering context-specific insights that can inform policy development, training programs, and intervention strategies aimed at enhancing CHW capacity and performance in community health settings.

However, several limitations should be acknowledged. Most of the included studies employed cross-sectional designs, which limit the ability to infer causal relationships among KAP determinants. Additionally, the review included only publications written in English and Indonesian, which may have excluded relevant studies from other linguistic or regional contexts. Furthermore, gray literature was not comprehensively explored, potentially omitting additional relevant evidence from non-indexed sources.

Despite these limitations, the key strength of this review lies in its ability to synthesize cross-context evidence and generate thematic conclusions that are both academically rigorous and practically applicable. The identified gaps highlight opportunities for future longitudinal and mixed-methods research focusing on the psychosocial and digital dimensions of CHW capacity building, which are essential for designing sustainable and empowering strategies to strengthen community-based primary healthcare systems.

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