Supervision and Support Interventions Targeted at Community Health Workers in Sub-Saharan Africa: A Systematic Review to Identify Characteristics Associated with Successful Outcomes

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Abstract

Background

Community Health Workers (CHWs) are crucial in extending healthcare to underserved areas in sub-Saharan Africa (SSA), but they often face challenges like limited training, resources, and support. Effective supervision and support interventions are essential for enhancing CHW performance and improving health outcomes. This study therefore explores the characteristics of supervision and support interventions targeted at CHWs in SSA that contribute to successful outcomes.

Methods

A search of four electronic databases (MEDLINE, EMBASE, Web of Science and Global Index Medicus) and grey literature sites was done for studies published between January 2013 and January 2024. Eligible studies were those focusing on CHWs and interventions involving supervision and support in SSA. The methodological quality of the included studies was assessed, and data extracted were analyzed using thematic and content analyses.

Results

Of 4,169 articles identified, fifty-five were included in the synthesis. Four main intervention types were identified: supervision, job aids, incentives, and training. Successful outcomes were measured through service delivery, program, and staff metrics. Fifty-two studies were assessed to have successful outcomes, and these were marked by ten key characteristics. These included material resource allocation, training and continuing education, stakeholder engagement, integration into existing systems, proper administration and logistics, supportive supervision, quality management, digitization, incentivization, and the enhancement of existing modalities. Leadership, governance and environmental factors emerged as important contextual factors in intervention success.

Conclusion

This study highlights the multifaceted nature of supervision and support interventions, highlighting essential characteristics for successful outcomes. Considering these characteristics during program design can enhance success rates. Future research should prioritize the cost-effectiveness, long-term impact, and sustainability of CHW programs in SSA.

INTRODUCTION

Over the past three decades, sub-Saharan African (SSA) countries have made progress in reducing premature death and disability,[1,2] yet the region still faces significant health challenges, accounting for

24% of the global disease burden, despite comprising 11% of the world's population.[3] Despite ongoing investments, feeble health systems, workforce shortages, and limited healthcare access persist.[4–6] Community-based primary healthcare and task-shifting to community health workers (CHWs) are recommended strategies to enhance accessibility.[7]

CHWs, diverse frontline healthcare providers, play a pivotal role in extending healthcare to underserved areas, in both infectious and non-communicable diseases (NCDs) program areas. [8–13] However, CHWs in SSA often face challenges such as limited training, resources, and overall support. Given their complex roles across different countries, insufficiencies in supervision and system support can adversely affect CHW service quality.[14,15]

Supervision and support interventions have therefore emerged as crucial strategies for enhancing CHW performance and overall health outcomes.[15,16] Supervision involves guiding, monitoring, and coaching CHWs as well as providing psychological support and career advancement opportunities.[15,17] For this review, support interventions were considered in terms of in-service professional support rendered to CHWs to improve their knowledge, skills, and ease of work such as continuing education, job aids, and incentives among others.[18,19]

This systematic review aims to identify characteristics of successful CHW supervision and support interventions in SSA. The study addresses the need for scalable and affordable strategies, considering the proliferation of CHW programs in the region. Previous reviews have touched on related topics but lack a focus on CHWs in SSA, necessitating an updated and comprehensive analysis.[18,20,21] By understanding the characteristics associated with improved CHW performance, policymakers can tailor interventions to enhance the overall quality of healthcare services provided by CHWs across various primary healthcare programs.

The objectives of this review are:

1. To identify and describe supervision and support interventions targeted at CHWs in SSA.
2. To identify and describe the outcomes of supervision and support interventions targeted at CHWs in SSA.
3. To identify the characteristics of the supervision and support interventions for CHWs in SSA that contribute to successful outcomes.

METHODS

Study Design

This review followed the 2020 update of the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (see Supplementary file 1).[22]

Search Strategy

We conducted a comprehensive search across MEDLINE, Web of Science, EMBASE, and Globus Index Medicus for relevant articles first on June 11th, 2023, and then updated on January 22nd, 2024. Grey literature searches were performed on the Africa Centre for Disease Control and the Global Health Workforce Alliance websites. Additionally, we hand-searched bibliographies of included articles. The search strategy was developed following consultation with the library team at London School of Hygiene and Tropical Medicine. It involved combining key terms, their free text synonyms, and medical subject heading (MeSH) terms in three categories: Population - CHWs, Intervention – Support and supervision, and Setting - SSA. The search terms were combined using Boolean connectors and optimised for each database use (see Supplementary file 2).

Study Selection and Eligibility Criteria

Two reviewers independently screened titles and abstracts to identify articles for full-text assessment (VE, HE). Studies were included if they 1) focused on community health workers, defined as healthcare providers who live in the community they serve and receive lower levels of training than professionals. They should be supported by the health system but may or may not be a part of its organizational structure.[23] 2) focused on supervisory and support interventions and clearly explained the interventions provided. 3)Were set in SSA. 4) were published in the last 11 years (Jan 2013 to Jan 2024). 5) were interventional studies or evaluations of interventions including randomized controlled trials (RCTs), quasi-experimental studies, longitudinal studies, and qualitative studies. Gray literature such as program reports were included. 6) Published in English.

Studies were excluded if they focused on the healthcare workforce without reporting separately on CHWs, and if they focused on only knowledge outcomes (improvement in knowledge alone). Observational studies, editorials and literature reviews were excluded as well.

Methodological Quality of Included Studies

We assessed study quality using a validated checklist developed by Croucher et al.,[24] covering relevance, reliability, validity, and applicability (Additional file 2). Studies with no quality concerns on any of the essential criteria were classified as high-quality, the remainder being classified low-quality. The results of the appraisal were used to inform data synthesis and interpretation of the results of the study

Data Extraction

We extracted data using a pre-tested data extraction form with the following domains: Author and year of publication, Country/region, Study design, Sample size, Participant characteristics, Description/ components of Intervention, Context, Outcome measures, Findings and Reported limitations

Data Analysis and Synthesis

Firstly, a narrative synthesis of the different intervention types and the outcomes was conducted (objectives 1 and 2). Similar interventions and outcomes across the different studies were grouped together to form distinct categories. As the primary interest of this review was qualitatively exploring and

mapping the features of successful support and supervision interventions in the context of SSA, the magnitude of the effect of the intervention itself was not assessed.

For objective 3, successful interventions were defined as those that positively influenced study outcomes. In quantitative studies, this meant a having strong evidence of a difference between intervention and control groups or before and after the intervention (p value < 0.05). In qualitative studies, success was based on reported improvements. Data from successful interventions were extracted and analyzed using a combination of thematic and content analysis.[25] Thematic analysis categorized data by prevalent themes, while content analysis determined the frequency of these categories, ensuring validity and transparency. Interventions were thoroughly evaluated to summarize their inputs, activities, processes, and outcomes. As themes developed, studies were allocated into their thematic categories accordingly with findings displayed in tables and figures.

RESULT

Study selection process

The title and abstracts of 4,169 retrieved articles were screened and screened, and 140 full texts were reviewed for potential inclusion. 55 studies were included for result synthesis. Figure 1 illustrates the study selection process.

Figure 1: *Data selection process*[26]

Characteristics of Included Studies

The studies, published between 2013 and 2023, covered twenty-three countries, with the highest number from Uganda (12), South Africa (12) and Kenya (8) (see Fig. 2). There was considerable variation in the design of included studies. Twenty studies were quasi-experimental (seven before and after design). Thirteen cluster-RCTs[27–39] and one cross-sectional study nested within a cluster-RCT[40] were included. Similarly, three cross-sectional studies were nested within RCTs,[41–43] and four of the included studies used an RCT design.[44–47] Twelve studies were longitudinal.[48–57] Henry et al. utilized an exploratory research design to evaluate a mobile learning intervention aimed at strengthening supervisory support for CHWs,[58] while Asiki et al. used a non-randomized controlled design to assess the feasibility of using smartphones by village health workers. Twenty-two studies used quantitative data, fourteen used qualitative data and nineteen used a mixed approach (Supplementary file 4).

CHW nomenclature varied, with terms like community health volunteers,[28,50,59–61] health extension workers,[53,56,62] and others. Some studies also collected data from community members [27,30,34,38,45,47,48,60,63–67] and CHW supervisors or higher cadre staff.[31,40,45,50,63] The studies spanned four distinct program areas: thirty-seven focused on maternal and child health (MNCH), with twelve on

maternal health, eleven on child health, and fifteen on both. Additionally, two studies each focused on malaria [54,68] and HIV,[29,38] while nine studies did not focus on any specific program area.

Figure 2: *Map of SSA showing locations of included studies*

Methodological Quality of Included Studies

Overall, the majority of the studies were considered to have high quality (46), while nine studies were of low quality [28,48,51,60,61,64,66,69,70] (supplementary file 3). All included studies clearly defined their research questions and settings. Two studies had inappropriate designs, using cross-sectional surveys without pre-intervention data or comparison groups, limiting their ability to measure intervention effects.[66,70] Data collection was well-described, but some studies had issues with sample size justification, potential sampling bias, and high attrition rates. Most studies did not explicitly state theoretical or ideological perspectives, though authors generally declared no competing interests.

Supervision and Support Interventions Targeted at CHWs in SSA

Four main types of interventions were identified: supervision, job aids, incentives, and training (Table 1). Some studies utilized more than one intervention strategy, while some compared strategies.

Supervision and support interventions identified include supportive, traditional, peer, group supervision, community supervision, supervision/training of supervisors. Supportive supervision combined traditional methods with frequent meetings, performance-based feedback, joint problem-solving, participatory decision-making, and provision of work tools. Traditional supervision involved provision of administrative oversight via centralized infrequent meetings. For instance, Mkumbo et al., quarterly meetings were comprised of plenary discussions and review of each volunteer's work over the three months.[59]

Peer supervision involved CHWs selecting leaders for motivation, performance review, and supply chain management, e.g. Henry et al. used a WhatsApp group for multi-way communication including feedback and motivation from peers and supervisors as well information sharing and education.[58] Training for supervisors emphasized supportive supervision methods. One study used a senior nurse to train and supervise two junior nurses who in turn supervised teams of CHWs in their respective villages. The senior nurse moved between the villages training junior nurses and troubleshooting problems.[48]

Job aids included mobile applications for decision support and data collection, paper-based tools for guidelines and data collection, and video aids for client education or as decision support for the CHWs. Incentives included performance-based stipends, monthly remuneration, and entrepreneurial schemes. In Wagner et al., the researchers introduced an entrepreneurial scheme where CHWs were given oral rehydration salts and zinc for free to sell at market price during home visits and keep the proceeds.[30] Training interventions featured initial and refresher sessions with standard training tools.[28,64,71,72]

Table 1
Summary of intervention strategies

Type of intervention	Number of studies	General description of interventions
Supervision		
Supportive supervision	Sixteen [27,28,32,34,35,43,48,51–53,58,71–75]	Generally included regular supervision meetings, accompaniment to CHWs on home visits, two-way communication, mentorship, provision of support materials, peer-learning, participatory problem-solving and decision-making, use of supervision tools or daily logs and coaching of CHWs based on their performance.
Traditional supervision	Six[59,69,71,74,76]	Generally included administrative oversight (examining CHWs' documentation and sending the data gathered to higher levels of the health system), centralized and less-frequent supervision contacts (mainly quarterly meetings).
Peer supervision	Three[58,69,73]	Characterized by feedback, motivation, and performance review by peers. Dual-tier systems where peer supervisors were supervised by higher-level supervisors.
Group supervision	Three[49,51,58]	Characterized by regular group supervision meetings between a group of CHWs and one or more supervisors, use of structured supervision tools, quality improvement techniques, and joint problem-solving.
Community supervision	Two[59,75]	Regular supervision contacts with community leaders to discuss community-related issues affecting CHW's work. Combined with facility-led supervision.
Supervision/training of supervisors	Two[48,50]	Supervisors were trained and supervised on provision of supportive supervision to CHWs. Training/supervision goals included problem-solving, advocacy, educative and administrative roles.
Job aids		
Mobile applications	Seventeen [29,31,38–40,44,46,55–57,62,65,66,70,77–79]	Mostly used as decision support systems. Other uses include continuous learning, data collection, task planning, tracking of clients, reminders, referrals, and text message-based management tools.
Paper-based tools	Four[37,60,61,77]	Used for decision support, tracking of clients and planning.
Video aids	Four[41,42,54,74]	Short, animated videos shown to clients during home visits or used as decision support for CHWs.
Telemedicine	Three[45,67,80]	CHWs who conducted home visits were equipped with phones for consultation with professional

Type of intervention	Number of studies	General description of interventions
Supervision		
		health workers for real-time advice.
Incentives		
Financial incentives	Seven[30,63,64,72,81,82]	The various types included performance-based, monthly remuneration and an entrepreneurial model where CHWs sold supplies to clients and kept the proceeds.
Non-financial incentives	Two [36,63]	Included community recognition, health insurance for CHVs and 3 family members and routine performance-based awards.
Training	Eight [28,33,64,71,72,76,81,83]	Short (5–7 days) initial training, refresher training and use of standardised training modules.

CHW: Community health worker; CHV: Community health volunteer

Measures of Success (Outcomes)

Success was measured in various ways, and this was grouped into 3 major outcomes: Service, program, and staff outcomes (Table 2).

Service outcomes

These were mostly service delivery outcomes such as improvements in household coverage rate, safety and quality of care delivered by CHWs. For instance, Ferla et al. assessed the quality of early childhood development counselling by CHWs who used their video aid. This was done using a scoring system developed by the researchers.[74] Some other studies assessed their outcomes using population-level health indices. For example, in Rogers et al., the outcomes were immunisation coverage rate and antenatal care attendance of four or more times.

Program outcomes

These were outcomes that directly measured the implementation of the intervention. They included ease of use, perceived benefit, acceptability, feasibility, and engagement with the program. An example is Coeztee et al., which assessed the acceptability of their video job aid using qualitative methods.[41] In Karuga et al., the supervision frequency was assessed following supervisors' training on supportive supervision methods.[50]

Staff outcomes: were measured most frequently through self-report measures such as self-reported gains in knowledge, competence, skill, job satisfaction, motivation, and improved wellbeing. Other staff

outcomes included: CHW commitment, retention, and collaboration with other staff.

Table 2
Summary of outcomes

Outcomes	Number of studies	Data collection tools
Service outcomes		
Service delivery outcomes (coverage, quality, and safety)	Twenty [28,30,33–35,39,44,48,53,62–64,67,69,70,73,74,76,79,81]	Survey - structured questionnaires,[28,30,35,44,48,64,67,70,74,79] Observation,[48,53,74] Program data/routine records [33,34,39,62,67,69,70,73,76,79,81] FGDs/KIIs/IDIs,[33,62,63,73,74] Case records.[53]
Population health indices e.g., increased facility delivery	Twelve [27–29,36,37,47,60,65,72,77,82]	Survey - structured questionnaires,[27–29,36,37,60,65,72,77] biological sample,[82] Routine records,[36,47,72] KII,[77]
Client-reported outcomes e.g., client satisfaction	Three [30,63,66]	Survey-structured questionnaire, [30,66] FGDs/IDIs.[63]
Program outcomes		
Satisfaction with intervention (ease of use, perceived benefit, usefulness, and acceptability)	Thirteen [38–43,45,49,54,61,63,70,76]	FGDs/IDIs,[38–43,45,49,54,61,63,76] Survey - structured questionnaires.[40,70]
Engagement with intervention (attendance and participation levels)	Seven [50,56,58,59,71,74,80]	FGDs/IDIs,[50,56,71,80] Observation,[74] Program data,[50,56,58,59,80]
Feasibility and cost-effectiveness	Five [31,41,43,49,55]	FGDs/IDIs,[41,43,49,55] Program data,[31,55]
Staff outcomes		
Self-efficacy and knowledge gains	Ten [32,40,42,46,49,52,64,72,81,83]	Survey - structured questionnaires[40,64,72,83] FGDs/KIIs/IDIs,[32,42,46,49,52,81] Observation,[52,83] OSA.[46]
Job satisfaction, motivation, conscientiousness, wellbeing	Seven [32,36,49,51,56,57,64]	FGDs/KIIs/IDIs,[32,49,51,56] Survey - structured questionnaires[36,51,57,64]
CHW commitment, retention, and collaboration among staff	Four [28,36,51,58]	FGDs/KIIs/IDIs,[51,58] Survey - structured questionnaires[51] Program data.[28,36]

CHW: Community health worker; FGD: Focus group discussion; IDI: In-depth interview; KII: Key informant interview; OSA: Objective Structured Assessment

Characteristics of Supervision and Support Interventions that Associated with Successful Outcomes

All but three studies [27,37,57] were considered to have successful outcomes and analysed for objective 3. Eleven broad themes were identified, and these were divided into 3 areas: inputs, processes, and context (Fig. 3). Supplementary file 4 outlines the characteristics identified within each study.

Figure 3: *Characteristics of successful supervision and support interventions identified from evidence synthesis*

Inputs

Inputs for successful CHW supervision and support interventions identified during the review were personnel, material resources, and training and continuing education.

Personnel

Firstly, in nearly all studies, CHWs had low educational attainments with the majority having a high school degree or less. One study found a tenuous relationship between education and their study outcomes, where some outcomes were significantly associated with the educational level of the CHWs and others were not.[72] CHW supervisors included facility staff,[49,50,58,59,71,73] clinicians,[69,76] project staff,[34,35,48,52,53] experienced CHWs,[35] peers,[69,73] and community members.[59,75] Mkumbo et al., compared a facility-led supervision strategy to a community-linked strategy where village leaders supervised CHWs in addition to staff of the nearest health facility. The latter approach was seen to significantly improve supervision contact and reduce CHW-supervisor ratio.[59] In some studies, employing a cascading supervision structure, where health professionals supervised higher-tier CHWs like community health assistants (CHAs) and community health extension workers (CHEWs), proved effective in reducing the required CHW-supervisor ratio.[28,48,52,72,84] Using peer supervisors also reduced the CHW-supervisor ratio to as low as 8–10 CHWs per supervisor.[73] In Karuga et al., although their intervention was successful in changing the supervision approach from administrative to supportive, the supervisors complained of increased workload due to having too many CHWs under them.[50]

Material resources

this was focused on supplies and consumables provided to CHWs for proper execution of their tasks. Twenty-three studies clearly outlined the resources used for their interventions.[28,29,31,34,39,41–43,54–56,58,61,63,64,66,67,69,71,73,74,82,83] The resources included work supplies like backpacks, bicycles, raincoats, mobile phones or tablets, projectors, flip charts, training materials, guidelines and consumables like data, airtime, and medications. The provision of mobile phones or tablets was a key characteristic of successful interventions.[28,31,38,39,41,54,55,58,63,64,66,67,69,71,73,74,78,79] For instance, in Henry et al., mobile phones were provided for the participants even though the intervention was on WhatsApp, an application

already used by a high proportion of the population. This ensured the project phones were dedicated to project activities.[58] CHWs and supervisors in Ndima et al. complained about a lack of resources to carry out their tasks which limited the success of the program.[85]

Training and Continuing Education

In all successful studies, an initial training session was provided for both CHWs and their supervisors where relevant. Initial training was either general CHW training, program-specific training or both in most cases. Generally, the training sessions lasted less than two weeks, except for two interventions.[27,32,42] In Adam et al., CHWs received 9 weeks of training and reported a high perception of credibility following the intervention.[42] The duration of training was 4 weeks in another South African intervention.[27,32] Several studies highlighted continuing education as part of their intervention, and this was mostly in the form of periodic refresher training,[28,48,49,51,58,64,69,72,73] and skill sharing/cross-learning among peers.[35,48,51,86] In O'Donovan et al, 2 weekly trainings were held on WhatsApp, however, as the program progressed, CHWs' engagement with the training declined.[69]

Processes

Stakeholder engagement in intervention planning, design and implementation

In nine studies, stakeholders were involved in planning and designing interventions during needs assessments,[48,82] intervention design,[51,54,60,62,74] or both.[44,50] For example, Scott et al. introduced customised video aids across four countries with national malaria program coordinators' help, with implementation aligning with local contexts and guidelines in each country.[54] Karuga et al. used an action research approach in Kenya, conducting context and root cause analyses with stakeholders, leading to an intervention that addressed CHV supervision gaps.[50] Furthermore, community participation in selecting CHWs[36,41,42,45,72,75] and implementing interventions,[40,64,75] along with engagement activities, fostered a sense of ownership and improved outcomes.[40,83] In Kawakatsu et al., community leaders helped find training venues, reducing program costs.[64]

Integration into existing systems

Thirteen studies with successful outcomes reported ways in which their intervention was integrated into the existing health systems, by using the existing CHW program and supervisory channels or by using tools and guidelines already in place before the intervention.[28,37,43–45,51,53,59,65,67,68,71,72] In Uganda, a robust network of CHWs - village health teams were utilised in several studies.[28,45,65,71] This reduced the need for prolonged training of the CHW and created employment opportunities as one study reported that the village health teams were inactive before their intervention.[28] Similarly, in Kenya, already existing CHWs were utilised.[72] Nevertheless, integrating interventions into established systems is not without drawbacks, as demonstrated by Ayiasi et al. Their study revealed challenges due to the pre-existing

workload of staff members. These professionals were expected to provide immediate phone guidance to CHWs during home health visits, which increased their workload.[45]

Administration and Logistics: these refer to the planning of processes to optimize the use of the human, material, and technological resources available. Three subthemes were identified: supply chain management,[31,73,82] transportation,[28,74] and technological support.[31,40,55,56,69,74] The importance of inventory management was highlighted in two studies where CHWs used mobile applications to make drug and supply requisitions when their supplies were exhausted. This made the process more efficient and improved CHW performance and program outcomes.[31,73] In Ferla et al., transportation for supervisory visits was reimbursed to supervisors. Supervisory contacts and accompaniment of CHWs on home health visits increased by 24% and 29% respectively.[74] The provision of a means to charge devices provided was praised by CHWs in Ferla et al.,[74] whereas, in Boene et al., the lack of technological support was reported by the CHWs as a drawback of the intervention.[40]

Quality assurance and control

These included the use of structured tools like checklists, guidelines and decision support systems;[29,39–42,44,50,53,54,59,66,67,74,77] and logging of activities for monitoring, performance review and feedback.[31,35,42,48,53,59,60,62,65,67,72,74,79,81] Using structured tools brought about uniformity while CHWs carried out their activities and supported supervisors during supervision. Ameha et al., developed a supportive supervision tool that led to an increase in consistency of integrated community case management of childhood illnesses (iCCM) skills among CHWs even when the number of supervisory contacts was controlled for.[53] Decision support systems also boosted CHW self-efficacy and performance.[29,40,66,77] One study emphasised that monitoring of performance was basic to the effective implementation of CHW programs as failure to any monitoring or performance review strategies led to problems during implementation and poorer outcomes.[30]

Supportive Supervision

Frequent supervisory contacts, good supervisory relationships, and field supervision (accompaniment) were associated with successful outcomes.[28,43,48,52,53,58,59,69,71,73–76] Some studies used more than one supervision modality such as peer supervision [58,73] and community-linked supervision [59,75] in addition to supportive supervision. These were seen to be more effective than supportive supervision alone. Goudge et al. highlighted the importance of a good supervisory relationship. In one team, a young supervisor from a neighbouring province struggled to oversee older, local CHWs, leading to high CHW attrition at that site.[48] In Horwood et al., continuous mentorship of CHW teams, consisting of 4 CHWs and a supervisor, led to sustained quality improvement and significant improvements in health service delivery.[35]

Digitisation

Several studies explored using digital technologies to change or improve existing models.[28,29,31,38–43,45,46,54,56,58,66,67,69,70,73,74,78,79] Digital tools were used for supportive supervision, data collection, quality assurance, client tracking, inventory management, and communication among CHWs. This digitisation was seen to enhance CHW knowledge, self-efficacy, job satisfaction, service delivery and population health outcomes. Boyce et al. found that CHWs using digital decision support adhered better to the iCCM protocol than those using the standard paper-based tool.[77] However, the studies found that digitisation introduced technical challenges like the need for charging sources, connectivity, and ongoing technical support. Some studies mitigated these in their design, for instance, by using offline functionality, storing data on devices, and uploading it when connectivity was available.[31,66,79]

Incentivisation

Various incentivisation models were used in interventions with successful outcomes including compensation,[30,52,64,72,74,82] non-financial incentives such as honorifics, community recognition, and health insurance,[36,63] and performance-based financial incentives.[63,64,73] Compensation in the form of remuneration or stipends was seen to be associated with improved staff outcomes. For example, in Kawakastu et al., monthly compensation was the only intervention that improved job satisfaction among CHWs, although a combination of four interventions (training, provision of work tools, supportive supervision and compensation) improved home visit rates and population health indices.[64] When asked to rank different types of interventions, CHWs in Sakeah et al., preferred stipends to awards, community recognition and health insurance, and those who preferred other forms stated that they did so because the stipend was too small.[63] In all studies that used performance-based financial incentives, there was also a baseline stipend which was not performance-based.[63,64,73]

Improvement of existing modalities

Interventions were successful when they were perceived as beneficial and easy to use by CHWs, supervisors and the community compared to the previous modalities.[29,31,38,40–42,44,53,54,59,65,66,74,77] In some studies, the use of different types of tools improved CHW self-efficacy and performance[29,40,65] and simplified the work.[41,44,66] A recurring theme among interventions that used video aids was that they were short and easy to understand, improving their uptake among the CHWs.[41,42,54,74]

Context

Leadership, Governance and Environmental factors

Leadership and governance emerged as a key theme in a few studies.[48,49,53,80,81] Effective leadership was demonstrated in Goudge et al., where a roving nurse conducted community entry activities before junior nurses and CHWs began their work, leading to better community relations and increased home visits.[48] Conversely, Rabie et al. highlighted poor leadership, where an NGO-led project faced conflict with facility health workers, resulting in poor supervision and high CHW attrition.[49] Programs aligned with

government priorities saw better implementation,[51,53,81] as seen in Ethiopia's national iCCM strategy, which invested heavily in supportive supervision to maintain CHW proficiency. Hence, Ameha et al. easily integrated their intervention into the existing system.[53] In one study, the volatile community conditions challenged the success of the intervention, in addition, the CHWs unionised and underwent a strike action for better pay, which when resolved, increased their motivation.[52]

DISCUSSION

This systematic review included 55 studies (2013–2023) on supervision and support interventions for CHWs in SSA. These interventions included supervision, job aids, incentives, and training. Successful interventions featured stakeholder engagement, training and continuing education, integration into existing systems, effective logistics and administration, supportive supervision, quality assurance and control, digitisation, and incentives. These characteristics led to improved service delivery, population health indices, CHW knowledge and self-efficacy, job satisfaction, well-being, retention, and overall satisfaction with the intervention.

Maternal and child health initiatives emerged as the predominant focus within this review, aligning with the region's prevailing health concerns.[3,87] This highlights the importance of choosing an appropriate program area that aligns with the needs of the target population. This also emphasises the need for stakeholder engagement to identify the needs of target populations. Engaging stakeholders in program development and implementation emerged as a critical element of successful interventions in this study, agreeing with findings from other research.[18,88] Moran et al., reported that actively involving stakeholders in programme design, implementation and evaluation resulted in sustainable supervision programs and positive shifts in organisational supervision culture.[18]

Continuing education for CHWs emerged as another theme. Given the low educational requirements for CHW recruitment in many SSA countries, ongoing in-service and refresher training are crucial.[89] Similarly, another review recommended ongoing, current, and professionalised training for CHWs that can adapt to emerging needs.[90] Regarding training approaches, most studies in this review had short training durations for CHWs. In contrast, Adam et al. employed an extended training duration, resulting in heightened CHW self-efficacy; but did not improve health outcomes compared to controls.[42] In one study, CHWs were seen to lose interest in the continuous education initiative overtime.[69] This draws attention to the significance of meticulously designing, scheduling, delivering, and sustaining continuing education approaches. Training supervisors in effective supervision methods also featured prominently in successful interventions, agreeing with previous research findings.[20]

The review found strong support for the integration of interventions into established systems. This fosters an enabling environment for the intervention. This agrees with the findings in other reviews.[91,92] Nevertheless, the process of integrating interventions into established systems demands careful

consideration, as demonstrated by Ayiasi et al.[45] Here, the intervention brought an additional layer of strain for healthcare professionals who already had strenuous tasks, leading to increased burnout.

Another key finding was that providing ongoing, supportive supervision to CHWs is critical and can improve CHW motivation and engagement. This has also been highlighted in previous reviews.[18,20,91,93] Such models aimed to increase problem-solving abilities, collaboration among CHWs and staff wellbeing. However, challenges arose when external input was needed to address identified issues. For example, in Rotheram-Borus et al., the program faced difficulties holding CHWs accountable as they were employed by the local government. Despite adequate supervision strategies in place, there was a low coverage of home visits by CHWs and very weak evidence of a difference in outcomes between the intervention and control groups.[27] In addition, it is recommended that adequate human resources and time be dedicated to supervision. This is exemplified in Karuga et al., where the improved supervision approach was hindered by supervisors handling excessive CHEW caseloads, leading to increased workload and burnout.[94] Roberton et al in their study emphasised that one-on-one supervision of CHWs was not feasible or sustainable in their low-resource setting.[75]

Quality management was also a characteristic of interventions with successful outcomes. This is supported by previous reviews.[91,95] Utilising quality assurance techniques like checklists and decision support systems enhanced consistency and guideline adherence for CHWs and supervisors. In agreement with this, the lack of supervisory guidelines was highlighted in a previous review carried out in humanitarian settings as a significant challenge to supportive supervision.[96] However, Hill et al., stressed the fact that checklists may be time-consuming and difficult to implement in busy settings if lengthy.[95] Similarly, Braun et al. found that CHWs considered their mobile app-supported family planning protocols time-consuming due to their comprehensiveness.[66] Quality control modalities, including data-informed supervision and support approaches, improved CHW skills, self-efficacy, and service delivery outcomes. Furthermore, continuous monitoring of CHWs helped provide reminders for tasks that were overdue and addressed underperformers, agreeing with findings in other studies.[93]

The use of technological tools was another characteristic of interventions with successful outcomes. This was associated with improved adherence to guidelines, reduced workload, and improved job satisfaction. Other studies have also reported the use of mobile technologies to support continuing education, supervision, service delivery and surveillance.[69,97,98] Nevertheless, to realize these advantages, careful attention must be given to the design and timing of technologically oriented support strategies. These strategies must be both user-friendly and sufficiently adaptable, enabling participants to access them at their convenience.[97] Some challenges identified during this review were a lack of power supply and limited connectivity.[29,40]

Financial incentives, including salaries and performance-based incentives, were found to enhance CHW performance and retention. This aligns with recent evidence.[51,99,100] In Glen et al., the removal of financial incentives was seen to have negatively impacted CHWs' desire to perform tasks and their level

of effort.[100] Financial incentives could take the form of salaries, performance-based incentives, or both, depending on available resources and specific contexts. There was not enough evidence to determine the effect of non-financial incentives on outcomes, however, previous studies have found incentives such as community recognition and awards to be effective in improving service delivery and staff outcomes.[63,101]

The sustainability of public health interventions hinges on community ownership, continuous learning, and leveraging existing systems, yet faces challenges like financial constraints, political will, and personnel shortages.[91,102] While sustainability wasn't explicitly highlighted, his review identified key factors for sustaining successful CHW programs. Leadership and governance play pivotal roles in sustenance, at program, community, and national levels.[103] Notably, program-level governance often overlaps with management functions – the day-to-day running of programs or administrative duties, however, this points to the fact that CHW programs require engaging a more complex and plural set of actors for successful implementation and sustained impact. The review also echoed concerns about external funding reliance, a known challenge to sustainability.[103] Most interventions were externally funded and program-specific, suggesting the need for promoting country-led initiatives to bolster sustainability.

Strengths and Limitations

While the review offers a broad perspective across 23 SSA countries, most studies were from East, South, and West Africa. However, similar health systems across sub-Saharan Africa suggest its findings may still be generally applicable to settings across the continent. The review is timely, aligning with current research demands as CHW programs are integrated into formal health systems.[89] Furthermore, the review employed a structured and rigorous methodology enhancing credibility. The thematic analysis used allowed extraction of valuable information from both quantitative and qualitative studies while content analysis improved transparency and reproducibility.[25]

Nevertheless, this study has limitations that may impact the interpretation of the results. Firstly, although no formal bias test was conducted due to the qualitative nature of most studies, the high percentage of studies with successful outcomes could suggest some publication bias. Moreover, the quality of included studies directly influences the reliability and validity of the findings. Some studies included in the synthesis were of poor methodological quality, hence findings should be interpreted with caution.

While analysing the data, a limitation emerged concerning certain studies that lacked comprehensive descriptions of their contexts, posing challenges in extracting their characteristics accurately.[33,40,45,47,53,57,58,61,66,78,80] Across the studies, there is also concern about the choice and validity of outcome measures. For instance, many studies utilized client reports to assess the quality of care provided by CHWs. Whereas the use of more rigorous and validated tools, as used in Rotheram-Borus et al.,[27] would have been preferred. In addition, program data is a transparent way to measure

CHW activity and was utilised by only a few of the studies. Furthermore, the complexity of interventions and potential confounders complicated linking intervention components to outcomes. Nevertheless, the review highlighted complementary aspects of support and supervision interventions necessary for quality improvements.

CONCLUSION AND RECOMMENDATIONS

CHW programs have the potential to improve health service, programme and staff outcomes. The review offers valuable guidance for policymakers, program designers and researchers who aim to optimize CHW interventions in SSA. Optimizing CHW programs in SSA requires a multi-pronged approach including stakeholder engagement, ongoing training, supportive supervision with digital tools, quality management, and financial incentives for CHWs. Integration into existing health systems and strong governance are key for efficiency and sustainability. Future research should explore the long-term impact and cost-effectiveness of these interventions, alongside the effectiveness of non-financial incentives. Validated outcome measurement tools are crucial for evaluating CHW interventions. By implementing these learnings into future programmes, CHWs can be empowered to achieve their full potential for improved health outcomes in SSA.

Abbreviations

CHA – Community Health Assistant

CHV – Community Health Volunteer

CHW – Community Health Worker

CHEW – Community Health Extension Worker

FGD – Focus Group Discussion

HIV – Human Immunodeficiency Virus

iCCM – Integrated Community Case Management

IDI – In-depth Interviews

KII – Key Informant Interviews

MNCH – Maternal, Neonatal and Child Health

NCD – Non-Communicable Diseases

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-analysis

RCT – Randomized Controlled Trial

SSA – Sub-Saharan Africa

UHC – Universal Health Coverage

WHO – World Health Organization

Declarations

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Figures

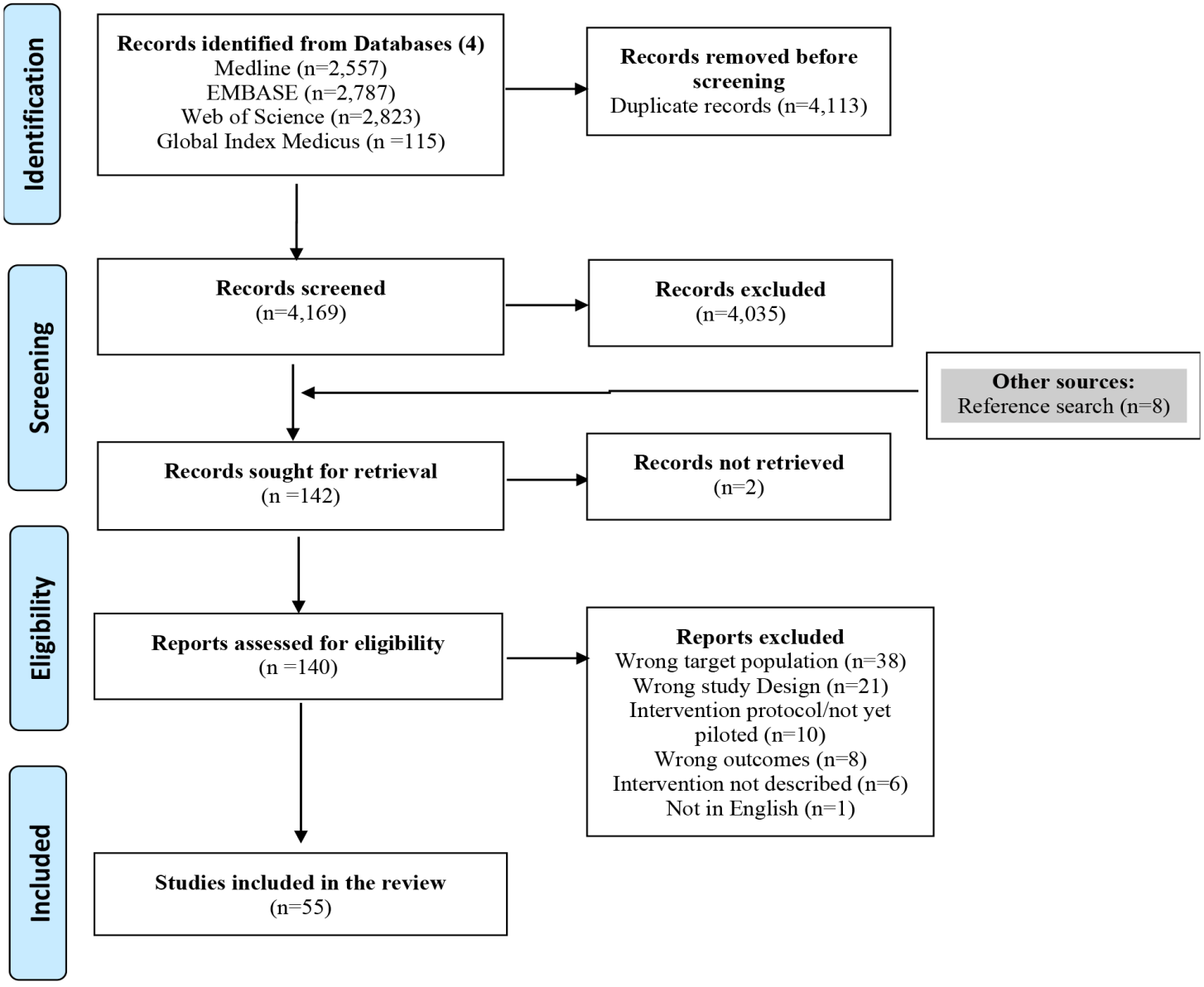

Figure 1

Data selection process[26]

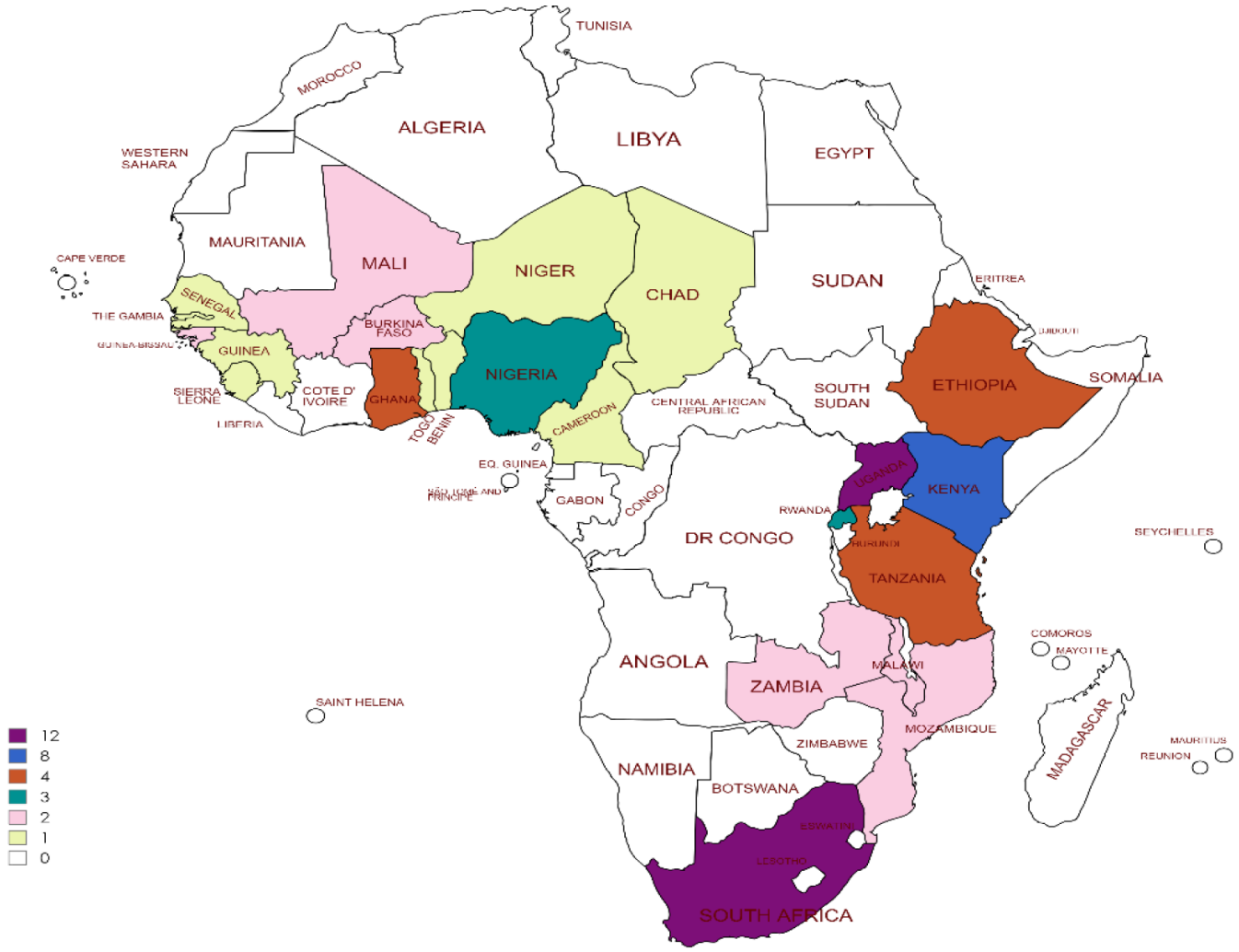

Figure 2

Map of SSA showing locations of included studies

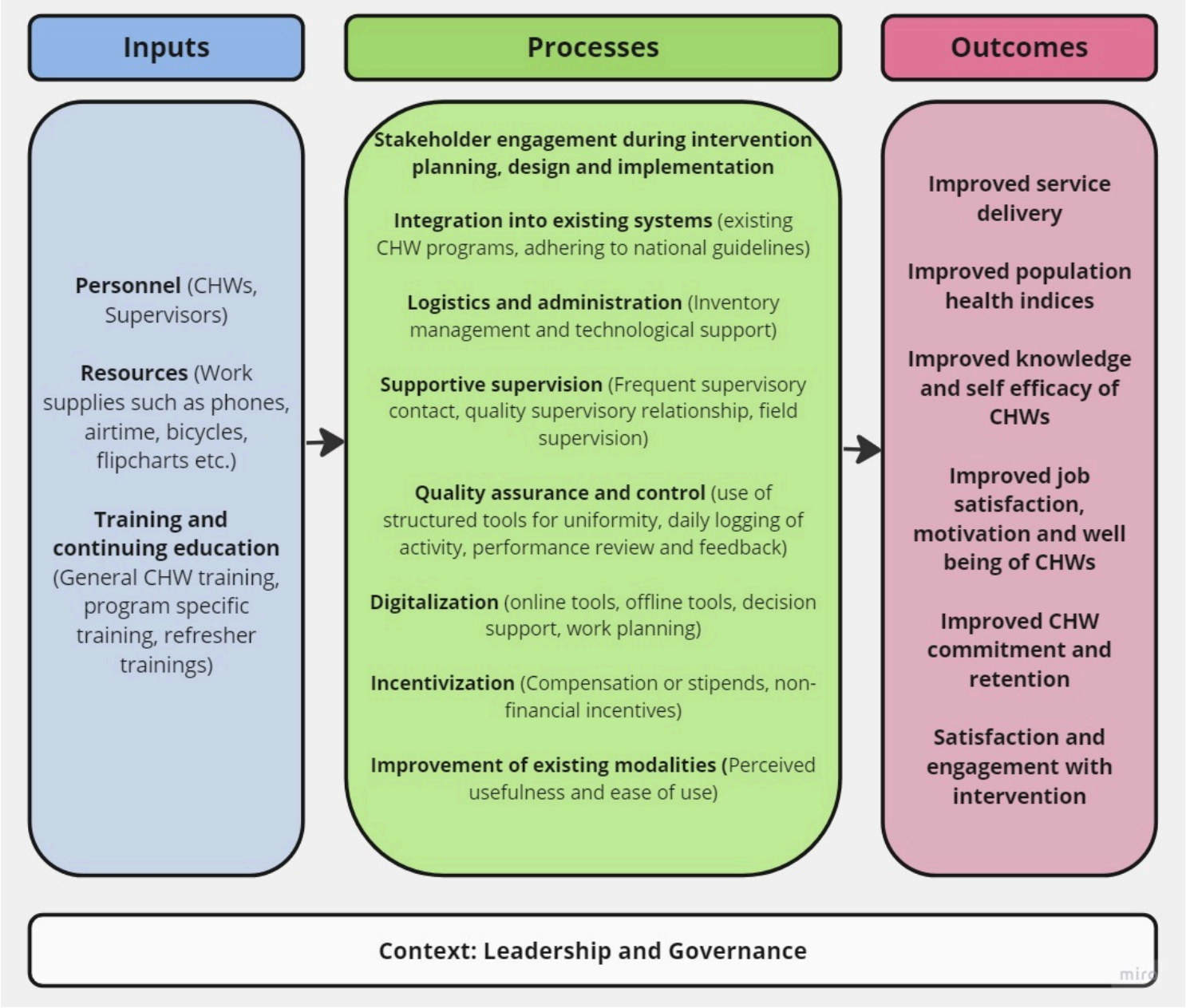

Figure 3

Characteristics of successful supervision and support interventions identified from evidence synthesis

Supplementary Files

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- Supplementaryfile1PRISMAChecklist.docx
- Supplementaryfile2Searchstrategy.docx
- Supplementaryfile3Qualityappraisal.docx
- Supplementaryfile4Summaryofallstudies.docx

- Supplementaryfile5CHARACTERISTICSOFSUCCESSFULINTERVENTIONS.docx