

Mechanisms of Supportive Supervision and their effectiveness in Primary Health care of low and - and Middle-Income Countries: A systematic review

Anda Nindi-Nyondo¹, Felix Chisoni², Thomas Mildestvest³, Eivind Meland³, Luckson Dullie¹, & Eric Umar⁴

1. *Kamuzu University of Health Sciences-School of Medicine and Oral Health Department of Family Medicine, Malawi*
2. *Kamuzu University of Health Sciences-Library Department, Malawi*
3. *University of Bergen-Department of Global Public Health and Primary Care, Norway,*
4. *Kamuzu University of Health Sciences-School of Global and Public Health, Malawi*

ABSTRACT

Background Supportive supervision (SS) is a systematic approach used to assess health facilities' preparedness to provide quality healthcare service and support healthcare providers to identify and address barriers to the provision of quality health services. There is, however, inconclusive evidence of the full benefit and influence of SS on performance in different settings of primary health care (PHC). Additionally, not much is known about what constitutes an effective SS approach that can successfully improve service provision by influencing better problem solving. This review synthesised evidence on the effectiveness of mechanisms of SS in PHC in low- and middle-income countries (LMIC).

Methods

Search strategy: The first search was done in five relevant databases, then in the remaining database and finalised with a search in the reference list.

NOTE: This preprint reports new research that has not been certified by peer review and should not be used to guide clinical practice.

Selection criteria: Selection criteria were guided by population (primary health care providers), intervention (mechanism of supportive supervision) and outcomes (positive or negative) in the context of low- and middle-income countries. Selection was based initially on title and abstract, then full-text articles.

Data extraction and analysis: A data extraction tool was used to extract the relevant information to answer the review question. Studies were analysed through frequency counting of articles. And qualitative content analysis was used, and synthesised results were reported narratively.

Results: A total of 29 studies were identified, ranging from 2013 to 2023. Methodologies identified included 6 cluster randomised control trials, 15 quasi-experimental studies, 5 qualitative studies, 5 analytical cross-sectional studies and 3 cohort studies. The studies were from the following: Egypt, Ethiopia, Pakistan, India, Kenya, Zambia, Nigeria, Mozambique, Tanzania and Malawi.

Study results found multiple mechanisms used when conducting SS in PHC in LMIC. SS was either effective 69% (n=20), ineffective 3.5% (n=1) or had inconclusive 28% (n=8) results. The role of SS in primary care performance included improved attitudinal behaviour, knowledge, skills and practice, and health and patient outcomes.

Conclusion: There are multiple approaches to conducting SS, and the mechanisms yielded both positive, negative and inconclusive results, supporting evidence of inconsistencies in what constitutes an effective mechanism of SS. Multiple external factors such as incentive, training and transport logistics were seen to influence the role of SS in PHC.

INTRODUCTION

Provision of quality health services in low- and middle-income countries is faced with numerous challenges, with the most common ones being shortage of staff compared to the high volume of patients most facilities receive; shortage of equipment and supplies due to misallocations and/or competing needs; lack of motivation among staff due to poor working conditions, especially for those in hard-to-reach rural areas; and lack of effective performance management systems that ensure good performance among health care providers (6). There are many interventions that are put in place to work on these health system challenges, with supportive supervision being one of the most used tools in multiple low- and middle-income countries (7).

Supportive supervision (SS) is a systematic approach used to assess health facilities' preparedness to provide quality healthcare service, support healthcare providers to identify and address barriers to the provision of quality health services and ensure that the allocation of resources and services is done according to need (1). It is a process of helping staff to improve their knowledge, skills and work performance in a respectful and non-threatening manner (8). It focuses on monitoring performance towards set goals using data for decision-making and ensuring that services are provided according to the set standards.

There are different methods of providing supportive supervision that are used in primary health care facilities. The pattern tends to follow that a more experienced or higher-ranking or higher-qualified provider takes on the responsibility of providing oversight to someone in a lower-level facility. Since primary health care health professionals at times carry responsibilities that are above their level of training and/or experience (9) and are mostly manned by lower-level cadres in the health systems, supportive supervision is seen as a tool for ensuring performance according to the stipulated standard of practice.

This systematic review references the WHO 2008 module of supportive supervision as a gold standard on how supportive supervision is conducted. The WHO 2008 module looks at the following steps to approaching supportive supervision: 1) Setting up a supportive supervision system 2) planning regular supportive supervision visits 3) conducting a supervisory visit and 4) following up on activities. Setting up a supportive supervision system includes training a core set of supervisors, creating checklists and recording forms and ensuring appropriate resources are available. Planning regular supportive supervision visits includes scheduling the supervision mostly once a quarter. Conducting a supervisory visit which includes observation, use of data, problem-solving, on-the-job training and recording observation and feedback. And finally, follow up on agreed action items by the supervisor and supervisee, regular data analysis and feedback to all stakeholders.

The third and fourth steps are what this study considers as the approach to conducting SS. And from these 2 steps. The 6 components are considered as the components of supportive supervision. This includes: 1) Training the supervisor on how to conduct a supervision 2) Supervisors observing/monitoring supervisees using a checklist 3) The supervisor provides feedback to the supervisees. 4) The supervisor provides on-the-job training, mentoring and/or coaching in the areas that the supervisee falls short in. 5) Supervisor and supervisee developing an action plan on how to resolve the action items And 6) Reviewing of action items.

There is, however, not much known about what constitutes an effective SS approach that can successfully improve service provision by influencing better problem solving and better communication between the supervisor and supervisee (3–5). Additionally, there is inconclusive evidence of the full benefit and influence of supportive supervision on performance in different settings of primary health care (1,3,5). This systematic review

synthesised evidence on the effectiveness of mechanisms of supportive supervision in primary health care in low- and middle-income countries. The following review questions were answered: 1) What are the publication characteristics of identified evidence? 2) Which supportive supervision mechanisms are used by primary health providers? 3) What are the outcomes of supportive supervision mechanisms in terms of effectiveness? What role is played by supportive supervision in primary care performance?

2. METHODS

Design and Protocol registration

A systematic review design was followed according to JBI. The review protocol was developed and registered in PROSPERO in February 2024, registration number CRD42024498553. The reporting of this systematic review followed the guidelines stated by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

Eligibility criteria

The inclusion and exclusion criteria were guided by population, intervention and outcomes in the context of primary healthcare and low- and middle-income countries (Table 1).

Guiding characteristics	Inclusion criteria	Exclusion criteria
Population	Health care workers involved in supportive supervision (either as supervisors or supervisees) in low- and middle-income facilities at primary health care levels were included in the	Health workers in the ward

	study. This also included healthcare workers working in the community.	
Intervention	Mechanisms of Supportive Supervision	
Outcomes	Effective; ineffective; inconclusive	
Context	Studies published in English describing the mechanism of supportive supervision in the primary health care level, both at the facility and community levels, were included in the review.	All studies looking at supportive supervision conducted in a ward environment were excluded in the study.
	Low- and middle-income country	Outside LMIC
Type of studies	All qualitative, quantitative or mixed-method studies describing mechanisms of supportive supervision in primary health care in low- and middle-income countries were included in the studies.	Letters, correspondence, position papers, conference papers and unpublished data were excluded in the review. Publications unavailable in English were excluded. A study was also excluded if the full text was unavailable from online databases.

Timeline	The studies between 2013 to 2023 were included in the study for review.	Articles published before 2013

Information sources and search

A literature search was conducted from 12th to 16th February 2024 across the following databases: PubMed, Scopus, Embase, and Web of Science by the librarian (FC). The following search terms were used: "Supportive supervision", "supervision mechanisms", "supervision models", "mentorship", "supervision models", "primary healthcare", "primary level health facility", "health care providers". Search was restricted to low- and middle-income countries. Initially, articles were searched in two relevant databases, namely PubMed and Scopus, followed by the remaining ones (Embase and Web of Science) and finally the reference lists. The exact search string used for each database is available in Appendix 2.

Study selection

Prior to the selection process, duplicates were removed. Two reviewers (ANN and FC) independently screened the retrieved articles based on their titles and abstracts and full texts using a Google Spreadsheet form. At each stage, any disagreements were resolved through discussion and consensus between AN and FC, with input from a third reviewer (LWD) as needed.

Data extraction

Data extraction was conducted by ANN and reviewed by FC. As informed by the specific review questions, ANN extracted data under the following subheadings: author and year of publication, study design, health domain, study setting, mechanism of supportive supervision,

the effectiveness and the role of supportive supervision. FC verified the extracted data based on the subheading categories.

Risk of bias assessment

To attain data that is accurate and of good quality, the two independent reviewers (ANN and FC) went through the steps of the review independently (Bailey et al., 2015). However, due to limited resources for the study, the same reviewers who extracted the data cross-checked the data extracted to ensure that there were no errors. And the Joanna Briggs Institute (JBI), 2020 critical appraisal checklist was used for quality assessment.

Data analysis and synthesis

Evidence gathered from the included studies was analysed through frequency counting of articles. Qualitative content analyses were used, and synthesised results were reported narratively. Study results were presented as narratives and on tables.

Patient and public involvement

Patients and the public were not involved in the design, conduct, reporting or dissemination of this research.

RESULTS

Search results

The search yielded 1633 studies. After excluding duplicates, a total of 1355 studies proceeded to screening. Screening was conducted in two stages: 1) the title and abstract and 2) the full text screening, by AN and FC. After an independent review the differences between the two reviewers were later discussed. A total of 29 met the criteria for review. The results on the inclusion and exclusion are presented in a PRISMA diagram (Figure 1

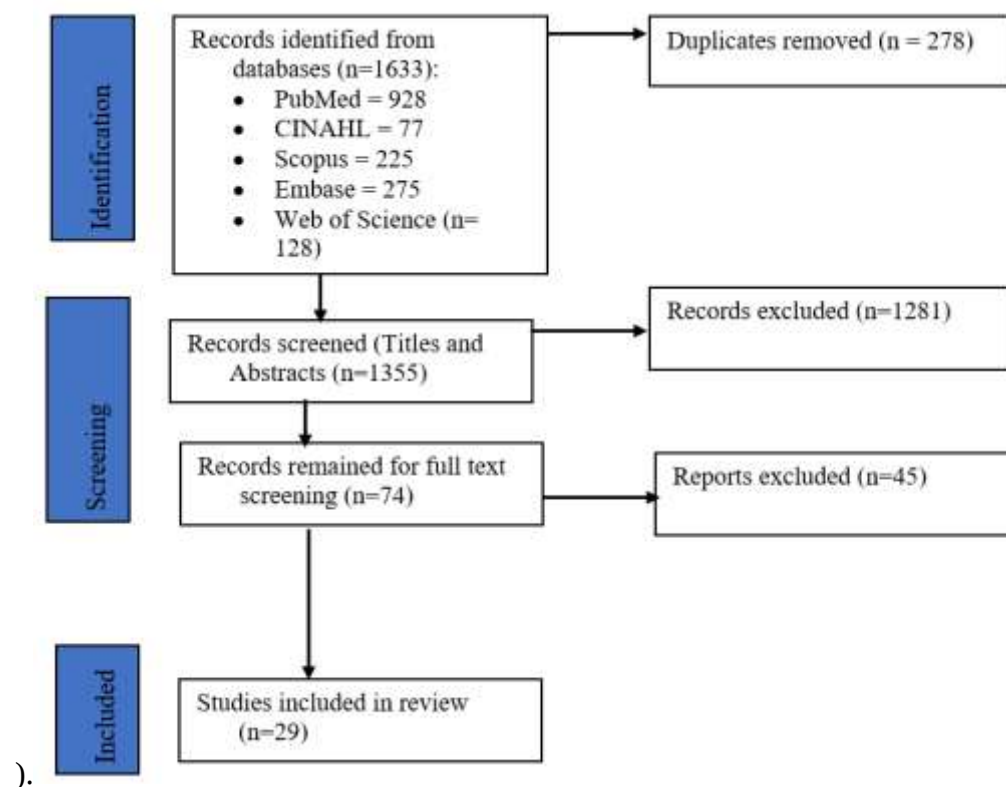


Figure 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow chart

Critical appraisal

The critical appraisal was done between 26th May to 27th June 2024. Twenty-four studies were appraised as high, 6 as moderate and 3 as low. There was a high risk of bias for these studies. The detailed critical appraisal findings are presented in Table 1.

Table 1: Joanna Briggs Institute Critical Appraisal of Eligible Studies

Cluster randomized control trial														
Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	
Aftab W et al 2021	Y	U	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High
Biemba et al 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High
Lazzerini.et al 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High

Rabani et al 2016	Y	U	Y											Low
Bello 2013	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High
Das et al 2015	Y	Y	U	N	N	Y	U	Y	Y	Y	Y	Y	Y	Moderate
Quasi experimental														
Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9					
Panda et al 2015	Y	Y	Y	Y	Y	Y	Y	Y	Y					High
Adefolarin et al 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y					High
Usman et al 2023	Y	Y	Y	Y	Y	Y	Y	Y	Y					High
Motaghi et al 2022	Y	N	Y	N	Y	Y	Y	Y	Y					Moderate
Subramaniam et al 2018	Y	N	N	Y	Y	Y	Y	Y	Y					Moderate
Aggarwal et al 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y					High
Eliades.et al 2019	Y	N	Y	Y	Y	Y	Y	Y	Y					High
Meribe.et al 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y					High
Das. et al 2018	Y	N	Y	Y	Y	Y	Y	Y	Y					High
Martin.et al 2019	Y	Y	U	Y	Y	Y	Y	N	Y					Modérate
Mudogo.et al 2023	Y	N	Y	Y	Y	Y	Y	Y	Y					High
Ameha et al 2015	Y	N	N/A	Y	Y	Y	Y	Y	Y					Moderate
Worges et al 2018	Y	N	N/A	Y	Y	Y	Y	Y	Y					Moderate
Renggli et al 2019	Y	N	N/A	Y	Y	Y	Y	Y	Y					Moderate
Ashton et al 2023	Y	N	N	U	Y	Y	Y	Y	Y					Low
Qualitative study														
Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
Lutwana et al 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High
Tanzil et al 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High
Karuga et al 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High
KoK et al 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High

Mudogo et al 2023	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				High
Analytical Cross sectional studies														
Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8						
Mendhe et al 2019	U	Y	Y	Y	Y	Y	Y	Y						High
Abdel -Razik 2021	Y	Y	Y	Y	Y	Y	Y	Y						High
Rabbani.et al 2016	Y	Y	Y	Y	NA	NA	Y	Y						High
Agoro. et al 2015	Y	Y	Y	Y	NA	NA	Y	Y						High
Kok.et al 2018	Y	Y	Y	Y	NA	NA	Y	Y						High
Cohort studies														
Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11			
Das et al 2018	U	Y	Y	Y	Y	U	N	Y	Y	Y	N			Low
Gopalakrishnan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			High
Ashton et al 2022	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			High
N, no; U, unclear; Y, yes; NA, not applicable.														

Study characteristics

Data from the review of 29 peer-reviewed papers (8,10–37) were included in this systematic review. The reviewed studies had diverse methodologies used (Table 1): Five (8, 23, 24, 26, 31) of the studies were qualitative studies, six were cluster randomised control trials (12, 17–19, 25, 34), three were cohort studies (16, 20, 22), five were analytical cross-sectional studies (10, 14, 24, 28, 34), and fifteen were quasi-experimental studies (11, 13, 15, 16, 19, 21, 27, 29–33, 35–37). All 29 papers were conducted in PHC facilities in low- and middle-income countries (Figure 2). The papers had a mix of supportive supervision conducted in a variety of programmes as follows: 5 Malaria (17,19,21,27,37), 4 Immunisation (8,20,28,32), 5 PHC (10,24,26,30,33), 4 Integrated Community Case Management (ICCM) (12,15,16,18), 2 Nutrition (22,25), 1 Maternal Newborn and Child Health (MNCH) (34), 1 Mental Health (11), 1 Community Health Services (23), 1 IDSR (36), 1 IMNCI (13), 1 WASH (35), 1 TB (29), 1 Health Products and Technologies (31) and 1 Medicine Management (14) (Table 4).

Country distribution of identified studies

The review of the studies identified that the studies were from the following: Egypt, Ethiopia, Pakistan, India, Kenya, Zambia, Nigeria, Mozambique, Tanzania and Malawi. Figure 2 shows the actual distribution of the studies.



Figure 2: Distribution of Studies

Mechanism of Supportive supervision

Data from the review of 29 papers showed that there were 8 different approaches/mechanisms used when conducting SS in PHC in LMIC. The 29 papers were distributed in the 8 mechanisms as follows: 14% [n=4] used mechanism 1 (11, 17, 28, 1(11,17,28,35), 14% [n=4] used mechanism 2 (12, 26, 32, 36), 10.5% [n=3] of the papers used mechanism 3 (10, 19, 29), 24.5% [n=6] used mechanism 4 (8, 13, 13, 18, 22, 37), [n=5] used mechanism 5 (16, 23, 24, 27, 33), 7% [n=2] used mechanism 6 (14, 36), mechanism 7 (21, 30, 31), 10.5% [n=3] and mechanism 8 (15, 25) 3% [n=1]. Table 2 details the mechanisms for each paper.

Table 2. Mechanisms of supportive supervision

WHO	Training	Observation (with checklist)	Provide Feedback	Develop action plan	On-the-job training/mentoring /coaching	Review of action item/plan
Mechanism 1	*	*	*	*	*	*
Mechanism 2	*	*	*	*	*	
Mechanism 3	*	*			*	*
Mechanism 4	*	*	*		*	
Mechanism 5	*	*	*	*		
Mechanism 6		*		*		*
Mechanism 7	*	*	*			
Mechanism 8	*	*			*	

Effectiveness of mechanisms of supportive supervision

The majority of papers reviewed (69% [n=20]) used a mechanism used for SS that was effective; 3.5% [n=1] of the results were ineffective, while 28% [n=8] of the study results were inconclusive (Table 2). Results on the effectiveness of mechanisms of SS per mechanism showed that in Mechanism 1, 10.5% [n=3] were effective while 3.5% [n=1] were inconclusive. Mechanism 2 results showed that 7% [n=2] of the papers had effective results, and 7% [n=2] were inconclusive. Mechanism 3 results showed 7% [n=2] were effective while 3.5% [n=1] were inconclusive. Mechanism 4 results showed 10.5% [n=3] were effective while 10.5% [n=1] were inconclusive. Mechanism 5 results showed 14% [n=4] were effective while 3.5% [n=1]. For Mechanism 6 results, 3.5% [n=1] were ineffective and 3.5% [n=1] were effective. Mechanism 7 results showed 10.5% [n=3] were effective, and so were mechanisms 8 results showed that 7% [n=2] (Table 3).

Table 3: Effectiveness of mechanism of supportive supervision

Mechanism	Ineffective	Effective	Inconclusive
1		(n=3) 10.5% (11,17,35)	[n=1] 3.5% (28)
2		(n=2) 7% (12,34)	[n=2] 7% (26,32)
3		(n=2) 7% (10,19)	[n=1] 3.5% (29)
4		(n=3) 10.5% (20,22,37)	[n=3] 10.5% (8,13,18)
5		(n=4) 14% (16,23,27,33)	[n=1] 3.5% (24)
6	[n=1] 3.5%(14)	(n=1) 3.5% (36)	
7		(n=3) 10.5% (21,30,31)	

8		(n=2) 7% (15,25)	
TOTAL	3.5% [n=1]	69% [n=20]	28% [n=8]

The role of supportive supervision in primary care performance

There are varying roles that SS plays in primary care performance (Table 4). This included improved knowledge, skills and practice in the different domains of programmes and improved health outcomes from service provision and treatment-seeking habits. It also was unable to confirm other positive roles of SS.

Table 4: Role of supportive supervision in PHC in LMIC

SN	Author and Year	Study design	Health domain	Setting	Mechanism of supportive supervision	Effectiveness	Main findings-ROLE of SS on PHC
1	Abdel-Razik.et al 2021	Cross-sectional analytical observational Mixed methods study	Primary Health Care (PHC)	Egypt Governorate, District & PHC facility	-Trained supervisors -Observation with an electronic checklist. -Provide on-the-job training. -follow up and problem solving	Yes	Reduced impact of staff turnover among physicians & 95% of physicians and nurses appreciated receiving on-the-job training from the district supervisory teams.
2	Adefolarin. et al 2021	A quasi-experimental study design.	Maternal Depression	Nigeria PHC	-Pre supervision assessment	Yes	Improved health workers (HW): knowledge /skills, competence to transfer

					-Recruited & trained supervisors. -Observation with a checklist. - Feedback and mentoring -Development of work plan -Review of work plan		knowledge of mental health services. The experimental group had higher knowledge gain than control (7.10 ± 2.4 vs -0.45 ± 2.37); $p < 0.01$). The rater supervisor observed better motivation in the supervised group.
3	Aftab.et al 2021	Cluster randomized control trials	integrated Community Case Management (iCCM)	India Rural Health Centers and Health Units	-Trained supervisors/supervisee -Observation with a checklist. -Provided feedback. -Mentorship -provided allowances	Yes	Improved in assessing dehydration, respiratory rate, classifying illness, advising correct treatment, counselling on seeking immediate care if a child has danger signs for diarrhea & pneumonia.

4	Aggarwal. et al 2018	Quasi experimental study design	IMNCI	India, Home visits, PHC & community	-Trained supervisor & supervisee -Observed consultation. -Feedback on service provision -Mentorship	Inconclusive	Increase skill scores from 2.1 to 7.0. Significant improvement in intervention in the number of children assessed.
5	Agoro. et al 2015	Analytical cross-sectional study	Medicine Management	Kenya Government Health Facilities	-Monitored with standard checklist - Developed action plan -Follow up on action plan	No	Workers were dissatisfied with the medicine management SS conducted in government health facilities. Only 54 (38.6%) respondents were satisfied with the levels of SS that they received,
6	Ameha. et al 2014	Quasi experimental study design	iCCM	Ethiopia Health Posts	-Trained supervisor -Supervisor observation	Yes	Increased management consistency in pneumonia,

					-Provided coaching		malaria, and diarrhea 3.0, 2.7 and 4.4-fold respectively. Significant dose-response relationships were observed between number of SS and Consistency of iCCM skills indicators
7	Ashton.et al 2023	Cohort Study	iCCM	Cameroon, Ghana, Niger & Zambia Health facilities	-Trained supervisor -Observe patient consultation with a checklist. -Provision of feedback -Action plan developed	Yes	HCW competencies increased by 4 times: Malaria-in-pregnancy (odds ratio (OR), 4.62; 95% CI, 3.62–5.88) & foregoing antimalarial prescriptions for patients who tested negative for malaria (OR, 3.80; 95% CI, 2.35–6.16). Improved linkage of patients.

8	Bello. et al 2013	A cluster randomized controlled trial	Malaria	Nigeria PHC	-Trained supervisor -Observed consultation using a checklist -Mentoring -Joint problem solving -Provision of incentives	Yes	Increased malaria case management knowledge and performance among PHC workers in control group. Given sufficient management support, malaria case management practices have the potential to improve following SS.
9	Biemba. et al	A cluster randomized controlled trial	iCCM	Zambia PHC	-Trained supervisors -Observed consultation with checklist. -Provided feedback -mentorship	inconclusive	This study was unable to determine whether using mHealth technology strengthened supervision, 18% improvement in SS, 21% improvement in

							treatment of pneumonia. Results were not statistically significant
10	Das et al 2015	A cluster randomized controlled trial	Malaria	India Community Level	-Trained supervisor -Observed with checklist -On the job training. -Follow up -Ensured availability of commodities	Yes	Improved in utilization of bed nets. While overall rates of treatment-seeking were equal across study arms. Fever cases were significantly more likely to visit a CHW and receive a timely diagnosis of fever in the intervention vs control arm.
11	Das. et al 2018	Quasi experimental study design	Immunization, cold chain points	India	-Trained supervisors -Observation of field visits using checklist	Yes	SS improves skills, attitudinal behavior of the

				Cold Chain point for routine supervision	-Provided on-the-job training. -Provided feedback		peripheral staff, logistics and record maintenance
12	Eliades.et al 2019	Quasi experimental study design	Malaria	DRC, Ghana, Kenya, Malawi, Mali, Zambia Mozambique, Tanzania Health Facilities	-Trained supervisors -Observed staff consultation using Checklist - Provided feedback	Yes	Increased proportion of HCWs performing each of the 12 steps correctly improved between 1.1 and 21.0% points between the 1 st and 3 rd visits. Increase facility average score from 85% 1 st visit to 91% in 3 rd
13	Gopalakrishnan. et al 2021	A longitudinal quantitative survey	Nutrition	India PHC	- Trained supervisor -Monthly visit/review of record -Problem solved with supervisor -On-the-job training.	Yes	Improved CHW performance in: accountability measures & increased knowledge and skills of CHWs, enabling them to serve their communities better.

					-Constructive feedback		
14	Karuga.et al 2019	Exploratory qualitative study	Community Health Services	Kenya Community Level	-Trained supervisors -Observation using a checklist -dialogue supervisor and supervisee -Action planning	Yes	Positive effects on supervision practices, helping supervisors shift from fault-finding to more SS.
15	Kok.et al 2018	A qualitative study	PHC	Ethiopia, Kenya, Malawi and Mozambique Community health & facility services	-Trained in group SS -Provided group supervision -Group problem solving. -Provided coaching & mentoring	Inconclusive	Improved CHW motivation and performance. No significant changes in job satisfaction in those assessed in Mozambique

16	Lazzerini.et al 2019	A cluster randomized trial Quantitative	Nutrition	Uganda Six high volume health centres	-Identified local staff -Trained supervisors -Monitoring service provision -Continuous on job mentorship	Yes	Improved cure rate of malnourished children in the intervention site vs control (83.8% vs 44.9%), the overall quality of care (Risk ratio (RR)=1.57, 95% CI: 1.01–2.44, p=0.035), and increase in enrollment of children by 38.6%
17	Lutwama.et al 2022	A qualitative study	PHC	South Sudan PHC facilities and Hospitals	-Trained supervisor -Monitoring using a checklist -Mentoring and coaching -Provision of feedback -Action plan	Inconclusive	Improved HR management, drug management, health data reporting, teamwork, and staff respect for one another.

					-NO clear follow up		SS remains a daunting task in the health sector due to protracted crises, rudimentary health infrastructure, and low health workforce capacity.
18	Martin.et al 2019	Quasi experimental	Malaria	DRC, Ghana, Kenya, Malawi, Mali, Mozambique, Tanzania, & Zambia Hospitals and HC	-Trained supervisor -Observed consultation with checklist -Individualized feedback -Developed joint action plan	Yes	Consistent OTSS improved the quality of clinical care for febrile patients in OPD, identifying signs of severe malaria (72.9– 85.5%), pregnancy (81.1– 87.4%), anemia (77.2– 86.4%). A regression analysis predicted

							overall improvement in clinical performance of 6.3%
19	Mendhe. et al 2019	Analytical cross-sectional study	Immunization	India Community Level	-Training -Root cause of immunization related issues/observation -Problem-solving and feedback -On job training -development of action items -Reviewed previous action items	Inconclusive	Improved cumulative scores of cold chain points (CCP) in PHC in 26 out of 39 CCPs. Vaccine management, equipment maintenance, temperature monitoring, and monitoring & supervision, but that of background information and HR components decreased.

20	Meribe.et al 2020	Quasi experimental study design	Tuberculosis (TPT)	Nigeria Military health facilities-PHC	-Root cause analysis -Trained supervisor -Monitored using a checklist -Review of action items	Inconclusive	Direct SS in IPT increased initiation and completion rates. Intervention increased TPT initiation rate of 79%. Completion rate reduced from 73% in 2018 to 70% in 2019.
21	Motaghi.et al 2022	A quasi-experimental, study design	Primary Health Care	India Health Centre level	-Trained supervisors -Observed service provision with checklist -Provision of feedback	Yes	STEM improved all indicators significantly except HC activity 180 to 200%.: Childcare 71.5 to 83.6%, Pregnancy activities 65.1 to 77.29%, medical care coverage 149.5 to 187.6%, death rate reports 10.9 to

							20.4%, mental health care 7.9 to 11.1%, postnatal care 75.0 to 84.9%, % of the covered population 66.2 to 80.6%.
22	Mudogo et al 2023	A qualitative study	Health Products and Technologies	Kenya Public Health Facilities	-Monitored using with checklist -Reviewed action items -Provision of job aides and guidelines	Yes	Improved resolving action items (46.75% - 81.88%), availability & use of commodity data MIS tools (74.4% -96.79), verification of commodity data (74.40% to 96.79%), availability of guidelines & job aids (36.56% to 82.93%), accountability (58.58% to 83.51%).

23	Panda. et al 2015	A quasi-experimental study design	Immunization	India Community Level	-Trained supervisor (on job) -Monitored using a checklist -On the job training/coaching- - Provision of feedback -Development of workplan	Inconclusive	The knowledge score of supervisors, logistics & vaccine availability in the Control group (CG) were significantly higher than intervention groups (IG). CG performed better solving certain hypothetical problems, whereas IG scored better in others. HW in IDs gave the supervisor a lower rate of knowledge, skill & frequency of SS.
----	-------------------	-----------------------------------	--------------	--------------------------	---	--------------	--

24	Renggli.et al 2019	A quasi-experimental study design	Primary Health Care	Tanzania PHC Facilities	-Observation with checklist -Provide constructive feedback -Dissemination of assessment findings -Development of action plan	Yes	Improved PHC quality standards across different health facility levels. It also managed to address several major quality issues.
25	Rabbani.et al 2016	Analytical cross sectional study design	MNCH	Pakistan PHC	-Trained supervisor -Active monitoring -Constructive feedback cycle -Joint problem solving -Mentoring	Yes	Lady Health Supervisors were motivated by both providing and receiving SS. Recognition, training, logistics and salaries were other motivating factors identified

26	Subramaniam.et al 2018	Quasi experimental research design	WASH	India PHC facilities	-Trained supervisor. -Observation using checklist - Onsite training -Provision of feedback -Development of action plan -Review of previous action item	Yes	Improved WASH facilities in PHC. Proportion of non-functional facilities dropped from 41.6% to 7.3%, an increase in the partially functional (52.6% to 71.5%) and fully functional facilities (5.8% to 21.2%)
27	Tanzil.et al 2021	Exploratory qualitative study	Immunization	Pakistan Community level	-Trained supervisors -Observing vaccinators in HF and community -Use of s checklist -Provision of mentorship	Inconclusive	Good acceptability among all EPI personnel. Program affected severely by lack of comprehensive policy & training guidelines. Supervisors lacked

					-Provision of feedback & reward		motivation due to the in availability of regular performance-based incentives and accountability.
28	Usman. et al 2018	A quasi-experimental study design	Integrated Diseases Surveillance & Response	Nigeria PHC facilities	-Observation with a checklist -identification of problem and solving - follow up	Yes	Increased knowledge (38% to 82.1%) & practices (25.8% to 63.6%) of Integrated Diseases Surveillance & Response among PHC workers
29	Worges. et al 2018	Quasi Experimental study design	Malaria	Zambia Health facilities	-Trained supervisor -Observed with checklist -Mentorship/on job training -Lessons learnt session -Provided feedback	Yes	62.1% of Health facilities improved Malaria diagnosis & clinical practice. Improved. RDT by 14.3%, blood slide preparation 14%.

							Fever case management 7.3% & adherence to negative diagnostic test 7.2%
--	--	--	--	--	--	--	---

DISCUSSION

This systematic review aimed to examine the various mechanisms of supportive supervision (SS) employed in primary care settings, assess their effectiveness, and explore the role SS plays in enhancing primary care performance. The findings revealed that 1) multiple mechanisms are used to conduct SS; 2) while many of these mechanisms were effective, some produced ineffective and inconclusive outcomes; and 3) SS contributed to improvements in attitudinal behaviour, knowledge, skills and practice, as well as in health and patient outcomes.

1. Mechanism of supportive supervision

The review analysed 29 studies employing quantitative, qualitative and mixed methods (Table 1) to examine the mechanisms of SS used in PHC in LMIC. Eight different approaches to conducting SS were identified. Despite some variations, the mechanisms mostly followed a similar pattern structure: PHC supervisors were external to the facility being assessed, and almost always the supervisors are affiliated with a higher-level institution such as district, regional or national level. Both supervisors and, in some cases, supervisees received training on how to conduct or engage in SS. Observation or monitoring was commonly guided by a checklist or standardised paper-based or electronic.

Variation in SS mechanisms is primarily observed in the steps following the observation or monitoring phase. In certain models, supervision ended after feedback was provided to supervisees. In others, supervisors provided additional support through mentorship, coaching or on-the-job training – although these activities were sometimes described without explicitly referencing the provision of feedback. In a third approach, supervision extended further to include joint development of action plans between supervisors and supervisees.

To assess alignment with the best practice, this review applied the World Health Organization's (WHO) 2008 module of SS as a benchmark/gold standard. The WHO module looks at four core components for setting up an SS programme: 1) Setting up an SS system 2) planning regular SS visits 3) conducting a supervisory visit and 4) following up on activities. This review focused on the third and fourth steps as they pertain directly to how SS is approached. From these two steps, six components are considered as essential to effective SS:

- i. Training the supervisor on how to conduct supervision
- ii. Use of checklist by Supervisors to observe and monitoring supervisee or facility performance
- iii. Provision of feedback to the supervisees
- iv. On the job training, mentoring, or coaching in the areas where performance gaps are identified.
- v. Joint development of an action plan between the supervisor and supervisee to address observed gaps
- vi. Review of previous action items, typically done at the beginning of the next supervision session.

Using these six components as a framework, the review compared the eight mechanisms identified against the WHO's guidance (Table 1). The analysis revealed inconsistencies in how SS is implemented across contexts, suggesting that the WHO framework is not uniformly applied. This divergence highlights a need for greater standardisation in operationalising supportive supervision in PHC systems in LMICs.

2. Effectiveness of Supportive Supervision in Primary Health Care

The review of SS effectiveness identified three categories of outcomes: effective, ineffective or inconclusive. Of the 29 studies reviewed, 69% [n=20] reported the SS mechanism as effective, 28% [n=8] as ineffective and 3.5% [n=1] as inconclusive. The review categorised the

studies based on SS impact on three domains: healthcare provider performance, health system strengthening and patient outcomes.

Mechanisms 1, 4, 5 and 7 were the most effective SS approaches, with Mechanism 5 showing the highest number (14%, n=4) of effective studies (Table 2). Notably, Mechanism 5 incorporated four of the six WHO components: training, observation, feedback and work plan development. Although it lacked two components, its effectiveness suggests that these four may be particularly influential. Interestingly, mechanism 1, which included **all six WHO components**, was also among the most effective, indicating that comprehensive approaches tend to yield better outcomes. However, the review also noted **variability in implementation**, with differences in how SS was conducted across mechanisms.

A key insight from the review was the **interchangeability** of certain components—particularly **feedback (component 3)** and **on-the-job training/mentoring (component 5)**. Feedback identifies areas for improvement, while mentoring addresses them directly. This suggests that these steps may be **functionally complementary** and not always required as separate actions.

Importantly, the review found that **effectiveness is not solely determined by the SS mechanism used**. For example, Mechanisms 1 through 5 showed both effective and inconclusive results, while Mechanism 6 had both effective and ineffective outcomes. This underscores the influence of **contextual factors**, such as time allocated for SS, consistency of supervision, availability of incentives (26, 21), and adequate human resources and medical supplies. However, one study (14) highlighted that **irregular supervisory visits, lack of standardised checklists**, and **poor follow-up on action items** contributed to poor outcomes. These are significant **barriers** to achieving positive results through SS.

In line with Donabedian's framework, achieving quality health outcomes requires both adequate inputs and appropriate processes. The findings reinforce the inconsistencies in what constitutes an effective SS process and suggest that contextual and implementation factors are critical to success.

3. The role of supportive supervision on primary care performance

This systematic review examined the effectiveness of SS in enhancing primary care performance. The evidence from the reviewed studies highlights three key areas where SS contributes positively. This includes 1) improvement in health workers' attitudinal behaviour, 2) enhancement of health workers' knowledge and skills, and 3) improvement in patient outcome. Nonetheless, a few studies showed how SS lacked the ability to change the health workers' behaviour or facility and patient health outcomes.

Improvement in health workers attitudinal behaviour; Supportive supervision was found to positively influence health workers' attitudes, including motivation and job satisfaction (24,34), interpersonal respect among staff (20,26,38), and mitigation of negative effects from staff turnover, particularly among physicians (10). Key SS components such as training, mentorship, on-the-job training and staff recognition were instrumental in fostering these improvements (10, 24, 34). Interestingly, even when Component 4 of the WHO SS guidelines—focused on mentoring and coaching—was excluded, 8 out of 10 studies still reported positive outcomes. Of these, eight measured effectiveness through improved knowledge and skills, while two assessed changes in attitude (14, 20, 26). Notably, Study (14) reported ineffective results, suggesting that Component 4 may play a critical role in bridging

gaps in attitude-related outcomes. Beyond SS processes, external factors such as logistics, incentives, and salary also significantly influenced attitudinal behaviour (34). Moreover, improved attitudes were observed not only among supervisees but also among supervisors (8). However, challenges such as lack of performance-based incentives and logistical constraints negatively impacted supervisors' motivation and ability to conduct SS, leading to reduced supervision frequency.

The second role of SS in primary care performance is its ability to **enhance health workers' knowledge and skills** (11, 17, 22, 36). SS contributed to improved knowledge and skills among health workers, demonstrated by improved knowledge manifested in health workers' ability to transfer knowledge to clients and/or fellow health workers (11), improved disease case definition and case management (17), and improved community health workers' ability to serve their catchment population (22). While improved skills in primary care performance were manifested by supervisees' improved ability to appropriately assess and diagnose conditions like pneumonia and dehydration (12, 13, 16, 20, 22). This is mainly linked to the third positive role of supportive supervision on primary health care performance.

The third role of supportive supervision on PHC performance is its ability to improve patient outcomes (27, 29, 30, 37). Improved patient outcome was seen as a result of improved clinical practice and improved service provision (12, 17, 26, 27, 30, 33, 36, 37). Improved service provision resulted from support and training for CHWs and supervisors' new skills, addressing fears of failing & establishing operational systems to address inefficiencies. Direct employment of CHWs and increased stipends further motivated and integrated them into local PHC teams. However, the nurse mentor could not establish a collaboration with local

structures, while excessive evaluation anxiety among Rwandan PHC providers posed challenges in establishing a supervisory relationship appropriate for generating professional development among providers. Madede et al. 2017

The third role of supportive supervision on PHC performance is its ability to improve patient outcomes (25, 27, 29, 30, 37). Improved patient outcome was seen because of improved clinical practice and improved service provision (12, 17, 26, 27, 30, 33, 36, 37). Improved service provision resulted from support and training for CHWs and supervisors' new skills, addressing fears of failing & establishing operational systems to address inefficiencies. Direct employment of CHWs and an increase in their stipend added to their motivation and integration into the local PHC team. However, the nurse mentor could not establish a collaboration with local structures, while excessive evaluation anxiety among Rwandan PHC providers posed challenges in establishing a supervisory relationship appropriate for generating professional development among providers.

Limitation of the review.

Limitations to the study included the restriction to only include English articles, which may have potentially excluded some relevant studies that were written in other languages. Additionally, despite a thorough search, some relevant studies may have been missing in the process.

CONCLUSION

The systematic review identified multiple approaches to conducting SS and that these mechanisms yielded positive, negative and inconclusive results, thus supporting evidence on inconsistencies in what constitutes an effective mechanism of supportive supervision in primary health care in the LMIC. This review looks at the following key information: A

mechanism has the possibility to yield effective, ineffective or inconclusive results, as there are multiple factors that affect outcomes. Multiple external factors such as time, consistency, incentives, material and human resources influence SS outcomes both negatively and positively. The six parameters discussed as a WHO mechanism of SS can be easily used. There is a need to understand if on-the-job training and mentoring may not be key in improving health outcomes and improved service provision. Feedback, on-the-job training and development of action items were steps that were missed by the supervisors.

ACKNOWLEDGEMENTS

Author affiliations

¹*Kamuzu University of Health Sciences-School of Medicine and Oral Health Department of Family Medicine, Malawi*

²*Kamuzu University of Health Sciences-Library Department, Malawi*

³*University of Bergen-Department of Global Public Health and Primary Care, Norway*

⁴*Kamuzu University of Health Sciences-School of Global and Public Health, Malawi,*

Contributors

ANN conceptualized the study, designing the methods and had access to all data. FC compiled and executed the search. ANN and FC screened the articles and curated data under the supervision of LWD and EU. ANN and FC performed the data collection and critical appraisal under the supervision of LWD and EU. ANN drafted the paper with reviews and edits from all authors for the final draft. All authors take responsibility for the submission and content of the paper.

Funding

The Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED) scholarship was the source of funding for this study.

Competing interests

None declared

Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting, dissemination plans of this research.

Ethics approval

Ethical review and approval was done by COMREC reference number **P.07/23-0141**.

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

Data are available on reasonable request. The data collected for this review is available from the corresponding author on request.

Reference

1. Bradley S, Kamwendo F, Masanja H, de Pinho H, Waxman R, Boomstrom C, et al. District Health managers' perceptions of supervision in Malawi and Tanzania. *Hum Resorces Health*. 2013;11(43):1–11.
2. Avortri GS, Nabukalu JB, Nabyonga-Orem J. Supportive supervision to improve service delivery in low-income countries: is there a conceptual problem or a strategy problem. *BMJ Glob Health*. 2018;2019(4:e001151).
3. Avortri GS, Nabukalu JB, Nabyonga-Orem J. Supportive supervision to improve service delivery in low-income countries: is there a conceptual problem or a strategy problem? *BMJ Glob Health* [Internet]. 2019 [cited 2025 July 16];4(Suppl 9). Available from: https://gh.bmj.com/content/4/Suppl_9/e001151
4. Nkomazana O, Mash R, Wojczewski S, Kutalek R, Phaladze N. How to create more supportive supervision for primary healthcare: lessons from Ngamiland district of Botswana: co-operative inquiry group. *Glob Health Action*. 2016 Dec 1;9(1):31263.

5. Rowe SY, Ross- Degnan D, Peters David H., Holloway Katheleen A., Rowe AK. The effectiveness of provision of supportive supervision strategies to improve health care provider practices in low-and middle income countries: Secondary analysis of a systematic review. *Hum Resour Health*. 2022;20(1):1–12.
6. Gondwe MJ, Henrion MYR, O’Byrne T, Masesa C, Lufesi N, Dube Q, et al. Clinical diagnosis in paediatric patients at urban primary health care facilities in southern Malawi: a longitudinal observational study. *BMC Health Serv Res*. 2021 Feb 15;21(1):150.
7. Bailey C, Blake C, Schriver M, Cubaka VK, Thomas T, Martin Hilber A. A systematic review of supportive supervision as a strategy to improve primary healthcare services in Sub-Saharan Africa. *Int J Gynecol Obstet*. 2016 Jan 1;132(1):117–25.
8. Tanzil S, Suleman Y, Akram D, Baig L, Khalid F. Strengthening supportive supervision: A case study of the Expanded Programme on Immunization in Sindh, Pakistan. *J Glob Health* [Internet]. 2021 Oct 9 [cited 2025 July 16];11. Available from: <http://jogh.org/documents/2021/jogh-11-06004.pdf>
9. Schriver M, Cubaka VK, Vedsted P, Besigye I, Kallestrup P. Development and validation of the ExPRESS instrument for primary health care providers’ evaluation of external supervision. *Glob Health Action*. 2018 Jan 1;11(1):1445466.
10. Abdel-Razik MS, El-Aguizy F, Wahby G, Elsayad AS, Elhabashi EM. Effective supervision model for improved primary healthcare services: case of Egypt. *Int J Health Plann Manage*. 2021 Mar;36(2):498–514.
11. Adefolarin AO, Gershim A, Sola AO, Oye G. The effect of training and supervision on primary health care workers’ competence to deliver maternal depression inclusive health

education in Ibadan, Nigeria: a quasi-experimental study. BMC Health Serv Res. 2021 Nov 30;21(1):1286.

12. Aftab W, Piryani S, Rabbani F. Does supportive supervision intervention improve community health worker knowledge and practices for community management of childhood diarrhea and pneumonia? Lessons for scale-up from Nigraan and Nigraan Plus trials in Pakistan. Hum Resour Health. 2021 Aug 17;19(1):99.
13. Aggarwal AK, Gupta R, Das D, Dhakar AS, Sharma G, Anand H, et al. An alternative approach for supportive supervision and skill measurements of health workers for integrated management of neonatal and childhood illnesses program in 10 districts of Haryana. Indian J Community Med. 2018;43(1):40–3.
14. Agoro OO, Osuga BO, Adoyo M. Supportive supervision for medicines management in government health facilities in Kiambu County, Kenya: a health workers' perspective. Pan Afr Med J [Internet]. 2015 [cited 2025 July 16];20(1). Available from: <https://www.ajol.info/index.php/pamj/article/view/114553>
15. Ameha A, Karim AM, Erbo A, Ashenafi A, Hailu M, Hailu B, et al. Effectiveness of supportive supervision on the consistency of integrated community cases management skills of the health extension workers in 113 districts of Ethiopia. Measurements. 2013;52:65–71.
16. Ashton RA, Worges M, Meka AZ, Yikpotey P, Kammogne ID, Chanda-Kapata P, et al. Can outreach training and supportive supervision improve competency in malaria service delivery? An evaluation in Cameroon, Ghana, Niger, and Zambia. Am J Trop Med Hyg. 2023;110(3 Suppl):10.

17. Bello DA, Hassan ZI, Afolaranmi TO, Tagurum YO, Chirdan OO, Zoakah AI. Supportive supervision: an effective intervention in achieving high quality malaria case management at primary health care level in Jos, Nigeria. *Ann Afr Med*. 2013;12(4):243–51.
18. Biemba G, Chiluba B, Yeboah-Antwi K, Silavwe V, Lunze K, Mwale RK, et al. Impact of mobile health-enhanced supportive supervision and supply chain management on appropriate integrated community case management of malaria, diarrhoea, and pneumonia in children 2-59 months: a cluster randomised trial in Eastern Province, Zambia. *J Glob Health*. 2020;10(1):010425.
19. Das A, Friedman J, Kandpal E, Ramana GNV, Gupta RKD, Pradhan MM, et al. Strengthening malaria service delivery through supportive supervision and community mobilization in an endemic Indian setting: an evaluation of nested delivery models. *Malar J*. 2014 Dec 8;13(1):482.
20. Das B, Bora P. Effect of mobile-based supportive supervision on cold chain point management and routine immunization service delivery. *Int J Med Sci Public Health*. 2019;8(1):1–5.
21. Eliades MJ, Wun J, Burnett SM, Alombah F, Amoo-Sakyi F, Chirambo P, et al. Effect of supportive supervision on performance of malaria rapid diagnostic tests in sub-Saharan Africa. *Am J Trop Med Hyg*. 2019;100(4):876.
22. Gopalakrishnan L, Diamond-Smith N, Avula R, Menon P, Fernald L, Walker D, et al. Association between supportive supervision and performance of community health workers in India: a longitudinal multi-level analysis. *Hum Resour Health [Internet]*. 2021 Dec [cited 2025 July 16];19(1). Available from: <https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-021-00689-7>

23. Karuga RN, Mireku M, Muturi N, McCollum R, Vallieres F, Kumar M, et al. Supportive supervision of close-to-community providers of health care: Findings from action research conducted in two counties in Kenya. PLoS One. 2019;14(5):e0216444.
24. Kok MC, Vallières F, Tulloch O, Kumar MB, Kea AZ, Karuga R, et al. Does supportive supervision enhance community health worker motivation? A mixed-methods study in four African countries. Health Policy Plan. 2018;33(9):988–98.
25. Lazzerini M, Wanzira H, Lochoro P, Muyinda R, Segafredo G, Wamani H, et al. Supportive supervision to improve the quality and outcome of outpatient care among malnourished children: a cluster randomised trial in Arua district, Uganda. BMJ Glob Health [Internet]. 2019 [cited 2025 July 16];4(4). Available from: <https://gh.bmj.com/content/4/4/e001339>
26. Lutwama GW, Sartison LJ, Yugi JO, Nehemiah TN, Gwang ZM, Kibos BA, et al. Health services supervision in a protracted crisis: a qualitative study into supportive supervision practices in South Sudan. BMC Health Serv Res [Internet]. 2022 Oct 14 [cited 2025 July 16];22(1). Available from: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-08637-4>
27. Martin T, Eliades MJ, Wun J, Burnett SM, Alombah F, Ntuny R, et al. Effect of supportive supervision on competency of febrile clinical case management in sub-Saharan Africa. Am J Trop Med Hyg. 2019;100(4):882.
28. Mendhe HG, Makade KG, Kamble N, David R, Singh D, Chandrawanshi L. Supportive supervision of routine immunization in Rajnandgaon district of Chhattisgarh. J Fam Med Prim Care. 2019;8(2):385–9.

29. Meribe SC, Adamu Y, Adebayo-Abikoye E, Lawal I, Amazue-Ezeuko I, Okeji N, et al. Sustaining tuberculosis preventive therapy scale-up through direct supportive supervision. *Public Health Action*. 2020;10(2):60–3.
30. Motaghi M, Tavakoli M, Shahabi S. The Effect of Supportive Supervision on Improving the Health Indices of Health Centers in Khomeinishahr, Iran. *J Soc Behav Community Health* [Internet]. 2022 [cited 2025 July 16]; Available from: <https://publish.kne-publishing.com/index.php/SBRH/article/view/11139>
31. Mudogo MC, Jerusa O, Eric S, Justus MI, Mary A, Mercy A, et al. Routine Supportive Supervision and Management of Medicines and Other Health Products and Technologies in Vihiga County, Kenya. *Pharmacol Pharm*. 2023;14(2):43–57.
32. Panda B, Pati S, Nallala S, Chauhan AS, Anasuya A, Som M, et al. How supportive supervision influences immunization session site practices: a quasi-experimental study in Odisha, India. *Glob Health Action*. 2015 Dec;8(1):25772.
33. Renggli S, Mayumana I, Mboya D, Charles C, Mshana C, Kessy F, et al. Towards improved health service quality in Tanzania: contribution of a supportive supervision approach to increased quality of primary healthcare. *BMC Health Serv Res* [Internet]. 2019 Dec [cited 2025 July 16];19(1). Available from: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4648-2>
34. Rabbani F, Shipton L, Aftab W, Sangrasi K, Perveen S, Zahidie A. Inspiring health worker motivation with supportive supervision: a survey of lady health supervisor motivating factors in rural Pakistan. *BMC Health Serv Res* [Internet]. 2016 Dec [cited 2025 July 16];16(1). Available from: <http://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-016-1641-x>

35. Subramaniam S, Selvavinayagam TS. Supportive supervision as an effective intervention in improving water, sanitation and hygiene facilities in government health facilities of Tamil Nadu. *Int J Community Med Public Health*. 2018 Feb 24;5(3):1082.
36. Usman US, Kurfi AM, Misau YA, Bello UL, Maigoro AM, Abdullahi AI. Effect of training and supportive supervision on knowledge and practice of integrated diseases surveillance and response among primary health care workers in Kano State, Nigeria. *Ann Afr Med Res [Internet]*. 2018 Dec 19 [cited 2025 July 16];1(2). Available from: <https://africa.pagepress.net/aamr/article/view/457>
37. Worges M, Whitehurst N, Yamo E, Moonga H, Yukich J, Benavente L. Outreach training and supportive supervision for malaria case management in Zambia: the effects of focused capacity building on indicators of diagnostic and clinical performance. *Malar J [Internet]*. 2018 Dec [cited 2025 July 16];17(1). Available from: <https://malariajournal.biomedcentral.com/articles/10.1186/s12936-018-2589-6>
38. Weldearegay HG, Kahsay AB, Godefay H, Petrucka P, Medhanyie AA. The effect of catchment based mentorship on quality of maternal and newborn care in primary health care facilities in Tigray Region, Northern Ethiopia: A controlled quasi-experimental study. *Plos One*. 2022;17(11):e0277207.

Joanna Briggs Institute (JBI). (2024). *Critical appraisal tools*. JBI. <https://jbi.global/critical-appraisal-tools>