



## The preparedness and readiness of rural and remote primary care midwives working in low- and middle-income countries: A scoping review

Kristen Graham <sup>a,\*</sup> , Samantha Colquhoun <sup>a</sup> , Christine LaBond <sup>a</sup> , Tambri Housen <sup>a,b</sup> ,  
Hlengiwe Mohale <sup>c</sup> , Sai Campbell <sup>a,d</sup> , Linda Sweet <sup>e,f,1</sup> 

<sup>a</sup> National Centre for Epidemiology and Population Health, The Australian National University, Australia

<sup>b</sup> School of Medicine and Public Health, The University of Newcastle, Australia

<sup>c</sup> School of Nursing and Midwifery, Southern Africa Nazarene University, Swaziland

<sup>d</sup> Nuffield Department of Population Health, University of Oxford, UK

<sup>e</sup> School of Nursing and Midwifery, Centre for Quality and Patient Safety Research in the Institute for Health Transformation, Deakin University Geelong, Victoria

<sup>f</sup> Western Health, St Albans, Victoria

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### ABSTRACT

**Background:** A well-prepared and supported midwifery workforce is essential to providing quality maternal and neonatal health care in rural and remote communities in low- and middle-income countries.

**Aim:** To identify the extent and type of research related to the preparedness and readiness of primary care midwives working in rural and remote settings in low- and middle-income countries.

**Methods:** We conducted a scoping review of primary research literature published between 2010 and 2023.

**Findings:** We identified 62 papers for inclusion, reported in two sections. Section 1 scopes the 52 papers discussing midwives' preparedness and readiness challenges, enablers and recommendations for the rural and remote context in low- and middle-income countries. We report the findings under four categories: 1). Professional preparation and competence; 2). Supportive work environments; 3). Ready, willing, and able; and 4). Governance, policy, and regulation. Section 2 scopes the 16 papers that evaluated strategies to strengthen midwives' preparedness and readiness in rural and remote contexts of low- and middle-income countries. We report these findings under three categories: 1). Education, training, and mentoring; 2). Readiness through technology; and 3). Midwifery workforce. Six papers are relevant to both sections.

**Discussion:** There is limited research evidence on primary care midwives' rural and remote preparedness and readiness in low- and middle-income countries. However, the existing literature demonstrates that midwives need contextually relevant education, training, and support in providing quality care in rural and remote health care environments in low- and middle-income countries.

**Conclusion:** Further investments are required to improve primary care midwives' preparedness and readiness for rural and remote low- and middle-income country settings.

\* Correspondence to: National Centre for Epidemiology and Population Health, The Australian National University, Canberra, ACT 2600, Australia.

E-mail address: [Kristen.Graham@anu.edu.au](mailto:Kristen.Graham@anu.edu.au) (K. Graham).

<sup>1</sup> @ProfLindaSweet

Statement of Significance

**Problem or issue:** The scope and nature of research evidence specific to the preparedness and readiness of primary care midwives working in rural and remote communities in low- and middle-income countries has not been comprehensively mapped.

**What is already known:** Current literature recognises the challenges midwives face working in rural and remote communities in low- and middle-income countries.

**What this paper adds:** This review emphasises the complexities of challenges and enablers specific to primary care midwives' preparedness and readiness in rural and remote contexts across different world regions. We identify key research gaps and propose priorities for future studies based on researcher recommendations and areas lacking in current literature.

1. Introduction

Despite considerable progress toward improving global maternal and neonatal health outcomes, preventable maternal and neonatal mortality, morbidity, and disability remain a significant public health concern, particularly in low- and middle-income countries (LMICs) [1]. Ensuring quality health services by a well-prepared, equipped, and supported health workforce is essential to addressing this ongoing issue [2,3]. Improving health services and preparing and supporting health workers is particularly important in rural and remote LMIC settings, where the challenges can be considerable and complex [4,5].

Midwives are essential to the health and well-being of rural and remote communities [6], which comprise over 50% of LMIC populations [7]. However, midwives deployed to rural and remote communities often have limited professional contextual experience and understanding of the community's specific socio-cultural needs [6]. Pre-service education and ongoing training may not fully equip them for the demands of this highly autonomous primary health care role [6]. Midwives face significant challenges in providing quality care across the full sexual, reproductive, maternal, newborn, child and adolescent health (SRMNCAH) scope of practice [8]. Inadequate health systems, infrastructure, and professional support impede quality care, with midwives often working alone or in small teams in minimally resourced clinics [8]. Resulting delays and inappropriate or poor-quality care in responding to maternal or neonatal emergencies is a precursor to morbidity, disability, and mortality [9] and, therefore, a public health priority [10,11].

Despite the importance of midwives and the complexities of providing quality midwifery care to rural and remote communities in LMIC settings, the research evidence regarding midwives' preparedness and readiness for this context is not well-documented. To our knowledge, no previous reviews have investigated primary care midwives' preparedness and readiness for rural and remote practice in LMICs. Our review addresses this gap by summarising and synthesising the literature exploring the preparedness and readiness of primary care midwives in rural and remote LMIC contexts. Additionally, we map the challenges and scoped recommendations to empirically evaluate strategies for strengthening midwives' preparedness and readiness to identify priorities for future research.

2. Aim and review questions

This review aimed to systematically identify the scope of research literature related to the preparedness and readiness of primary care midwives working in rural and remote settings in low- and middle-income countries. The scoping review questions were:

1. What are the challenges and enablers for primary care midwives' preparedness and readiness for rural and remote practice in low- and middle-income countries?
2. What are researchers' recommendations for strengthening primary care midwives' preparedness and readiness for rural and remote practice in low- and middle-income countries?
3. What is the scope of research that evaluates strategies to strengthen primary care midwives' preparedness and readiness for rural and remote practice in low- and middle-income countries, and how do these strategies align with researcher recommendations?

3. Methods

3.1. Study design

We conducted a scoping review informed by the JBI methodology for scoping reviews [12]. Scoping reviews enable the study and mapping of a diverse and extensive range of evidence [13] to identify gaps that warrant further research focus [14]. A scoping review was appropriate for this literature synthesis due to the broad focus of the review questions and the need to inform further research on this topic. We report the results using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-Scr) checklist [15].

3.2. Protocol and registration

We registered an *a priori* scoping review protocol with the Open Science Framework (OSF) (<https://doi.org/10.17605/OSF.IO/XEADP>). See Appendix A for amendments to the original scoping review protocol and decision justifications.

3.3. Eligibility criteria

The inclusion and exclusion criteria were defined using the Participants, Concept, and Context (PCC) approach [12]. Table 1 summarises the inclusion and exclusion criteria for the review.

**Table 1**  
Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
P = PARTICIPANTS	
Midwives and nurse-midwives	Nurses without midwifery training, auxiliary midwives and nurse-midwives, midwifery students, medical officers, community health workers, and traditional birth attendants
C = CONCEPT	
Related to preparedness and readiness (including preparation for practice, workforce readiness, birth preparedness and complication readiness of health workers, facility readiness, and emergency preparedness)	Unrelated to preparedness and readiness
C = CONTEXT	
Rural and remote healthcare settings; Primary healthcare settings; Low- and middle-income countries	Urban healthcare settings; Secondary or tertiary hospital settings; High-income countries
TYPES OF EVIDENCE SOURCES	
Published January 2010 to December 2023; Literature available in the English language; Full text available; Primary peer-reviewed research publications	Published before January 2010; Literature not available in the English language; Abstracts available only; Theses, secondary research, discussion papers, commentaries, and grey literature and information

**Participants:** We used the International Confederation of Midwives (ICM) international definition of the midwife [16]. We excluded literature focused on auxiliary midwives or nurse-midwives, general nurses, medical officers, community health workers or traditional birth attendants due to their different scopes of practice and levels of responsibility [17,18]. To differentiate between midwives and auxiliary midwives, we reviewed the cohort definitions and descriptions provided in each article under consideration. When these descriptions were unclear, we consulted *The State of the World's Midwifery 2021* [2] country profiles or other country-specific resources to determine suitability for inclusion.

**Concepts:** To enable a thorough exploration of the literature related to the review questions, we used broad inclusion criteria for the terms preparedness and readiness based on composite definitions from multiple sources and specific to the midwife health provider context. We defined preparedness as the knowledge, capacities, and systems developed to effectively anticipate, plan, and respond to the health care needs of women and neonates. We defined readiness as being prepared, capable, willing, and able to effectively and promptly respond to the health care needs of women and neonates.

**Context:** Our search focused on low-and middle-income countries (LMICs) as defined by the World Bank's country classification by income [19]. While midwives in rural and remote primary areas of high-income countries (HICs) may face similar preparedness and readiness challenges, we limited our review to LMICs. This decision reflects the unique complexity and intensity of challenges faced by midwives in LMIC settings and enabled a more focused analysis of the literature.

We limited our search to literature published from 2010 onwards, as this year marked a significant milestone when the United Nations and international partners issued a global call to action to strengthen midwifery for improving maternal and newborn health outcomes [20]. This timeframe also ensures our review reflects contemporary literature.

### 3.4. Information sources and search strategy

A preliminary search of PubMed, using keywords 'midwife', 'readiness', 'preparedness', 'rural', and 'low-income countries', identified relevant articles to inform a comprehensive search strategy. Search terms relating to 'challenges' and 'enablers' were excluded as their inclusion yielded over 50,000 articles in PubMed, making further pursuit unfeasible. The final PubMed search strategy is detailed in Appendix B.

We searched electronic databases to identify literature published between January 2010 and December 2023. We adapted search strategies to each database's requirements, including search term strings, truncations, Boolean operators, language, and publication date parameters. Our search included the following databases: PubMed, Medline (via OVID), Maternity and Infant Care (via OVID), CINAHL (EBSCO), Cochrane Library, World Health Organization (WHO) Institutional Repository for Information Sharing (IRIS), WHO Global Index Medicus, United Nations Digital Library, and the search engine Google Scholar. To identify additional relevant literature, we manually searched reference lists of included papers, citation links in PubMed and Connected Papers, and key international agency websites.

### 3.5. Selection of sources of evidence

Titles and abstracts were imported into Covidence systematic review software [21] for duplicate removal, screening and data extraction. The primary reviewer (KG) initially screened 10 percent of the titles and abstracts. Concurrently, this same portion of citations was divided among other team members to reach a consensus on the application of the inclusion criteria. KG then screened the remaining titles and abstracts to determine which publications would proceed to full-text review. All full-text articles were reviewed by KG and distributed amongst the team members for independent second review. Any decision discrepancies were resolved through discussion or engaging a third reviewer.

### 3.6. Data charting

Data from the included articles were charted in Covidence using a pilot-tested extraction tool designed for this review. KG and a second reviewer (SC or SCa) independently reviewed ten percent of papers to determine charting consensus. KG then completed data extraction for the remaining papers. The extracted data was exported into an Excel spreadsheet and abridged for presentation in summary tables (Appendices C and D).

### 3.7. Analysis of the evidence

KG analysed the data using Microsoft Excel and NVivo 12 Pro software [22]. Data were classified according to publication year, country/region of focus, sample size, publication type, and review question alignment. A frequency analysis of this data was undertaken for tabular and narrative reporting. A broad deductive coding framework of challenges, enablers, recommendations, and strategies was used to structure a subsequent inductive process to create original codes [23], and identify and map key concepts for a meaningful representation of the evidence relevant to preparedness and readiness. Team members reached a consensus on the findings.

## 4. Results

Sixty-two papers were included in the review. The search process and results are reported in a PRISMA-ScR flow diagram [15] (see Fig. 1). We present the findings in two sections: the first scoping articles relevant to research questions one and two ( $n = 52$ , 84%), and the second scoping articles relevant to question three ( $n = 16$ , 26%). Six articles (10%) were relevant to both the first and second sections. We have grouped questions one and two together as they focus on identifying the challenges, enablers and resulting recommendations for midwives' preparedness and readiness, while question three specifically addresses evaluated strategies, allowing us to compare recommended approaches with those that have been empirically assessed. The Summary table of Section 1 articles (Appendix C) summarises the challenges, enablers, and recommendations identified in publications that were scoped to answer questions one and two. The Summary table of Section 2 articles (Appendix D) summarises the findings of the evaluated strategies in publications scoped to question three. The following narrative describes the scope of the articles and key findings.

### 4.1. Section 1. Challenges, enablers, and researcher recommendations

We identified 52 papers for inclusion relating to review question one, of which 51 (98%) included recommendations related to review question two. Sub-Saharan Africa was the region of greatest representation in the literature ( $n = 29$ , 56%), followed by Eastern and South-Eastern Asia ( $n = 11$ , 21%), Central and Southern Asia ( $n = 9$ , 17%), Oceania ( $n = 2$ , 4%), and Northern Africa and Western Asia ( $n = 1$ , 2%). Ghana was the country most represented in the literature ( $n = 7$ , 13%), followed by Indonesia ( $n = 6$ , 12%), Nigeria, Pakistan, South Africa and Uganda (each  $n = 4$ , 8%), and Afghanistan ( $n = 3$ , 6%). The Democratic Republic of Congo, Burkina Faso, Ethiopia, Kenya, Papua New Guinea, Tanzania, and Vietnam were each represented with two articles (4%). Bangladesh, Benin, Cambodia, India, Liberia, Mozambique, Morocco, Mongolia, and the Philippines were each represented in one article (2%). Fig. 2 presents a global map of the country representation in the included literature.

The majority of the primary research articles reported using a qualitative research design ( $n = 37$ , 71%), with eight (15%) using a mixed-methods study design and five (10%) using a quantitative research design. Almost half of the publications ( $n = 24$ , 46%) were published between 2020 and 2024, and the majority ( $n = 44$ , 85%) used interviews as a data collection method. Table 2 summarises the

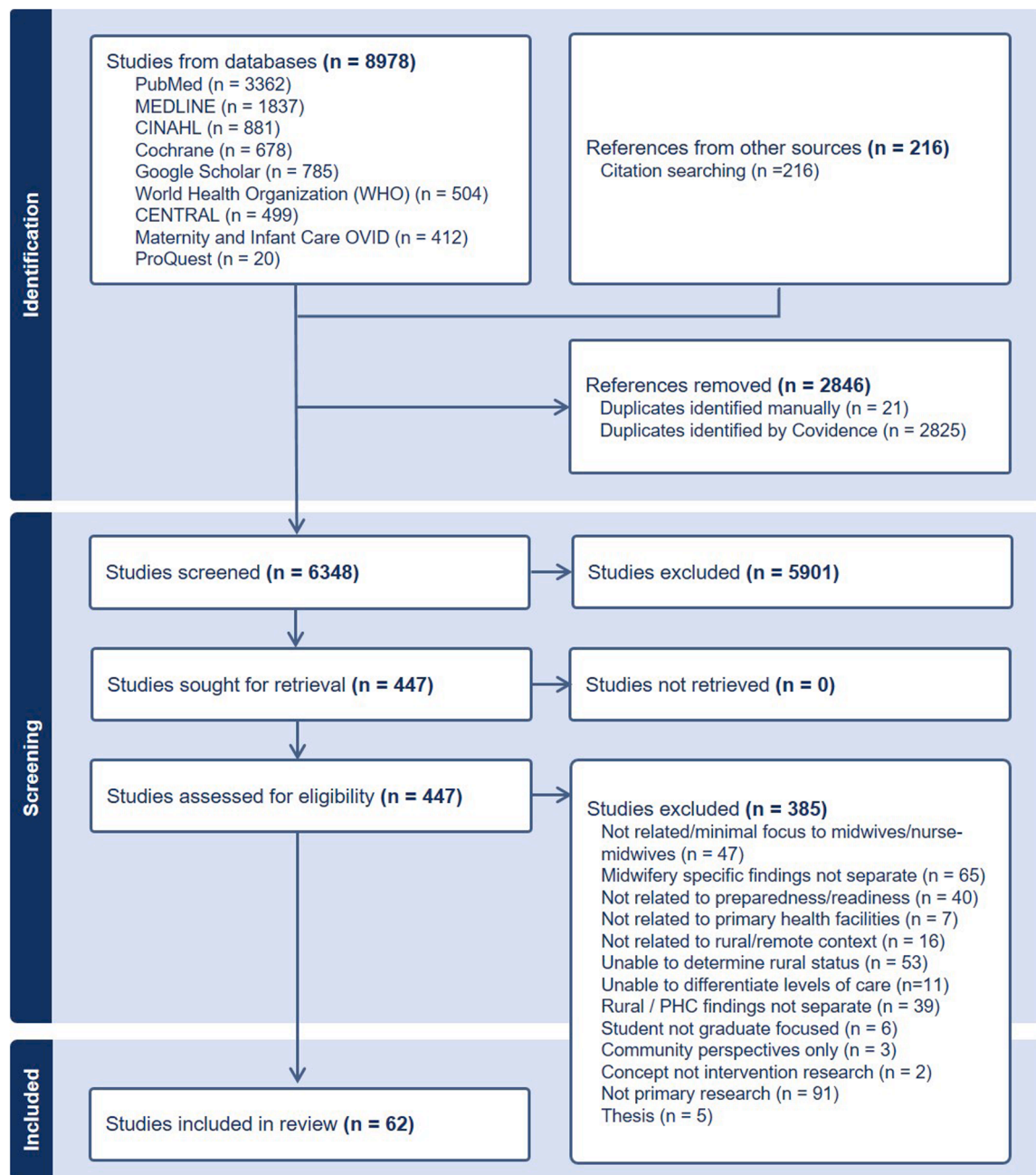


Fig. 1. PRISMA-ScR flow diagram.

world region representation, year of publication, research methodology, and data collection methods of the included papers.

We identified four main categories and seven sub-categories to meaningfully represent our preparedness and readiness definitions (Fig. 3). The main categories are: 1). Professional preparation and competence; 2). Supportive work environments; 3). Ready, willing, and able, and 4). Governance, policy, and regulation. We mapped the papers to the sub-categories, using different icons to indicate whether each item was discussed as a challenge, enabler, or recommendation, or any combination of these (see Table 3). The Section 1 article summary table (Appendix C) reports each article's primary author, year of publication, country of focus, aim, methodology and methods, participants, concept and context, and findings relating to review questions one and two.

#### 4.1.1. Professional preparation and competence

Midwives working in rural and remote primary care require

contextually appropriate pre-service education, continued training, and experience to prepare and develop professional competencies specific to this work context. Fifty articles (96 %) included data or discussions relevant to professional preparation and competence. The literature exploring these concepts is presented under two sub-categories: i. Education and training, and ii. Experience, knowledge, skill, and confidence.

##### i. Education and Training

Forty-two articles (81 %) explored education and training. These were grouped into two sub-categories based on primary focus: a). Pre-service education, and b). Pre- and early employment training and continued professional development.

##### a. Pre-service education

Ten articles (19 %) discussed challenges in preparing midwives for working in rural or remote contexts through pre-service education [24–33]. Challenges included inconsistencies in education standards, scope, and quality due to insufficient regulation or policy requirements

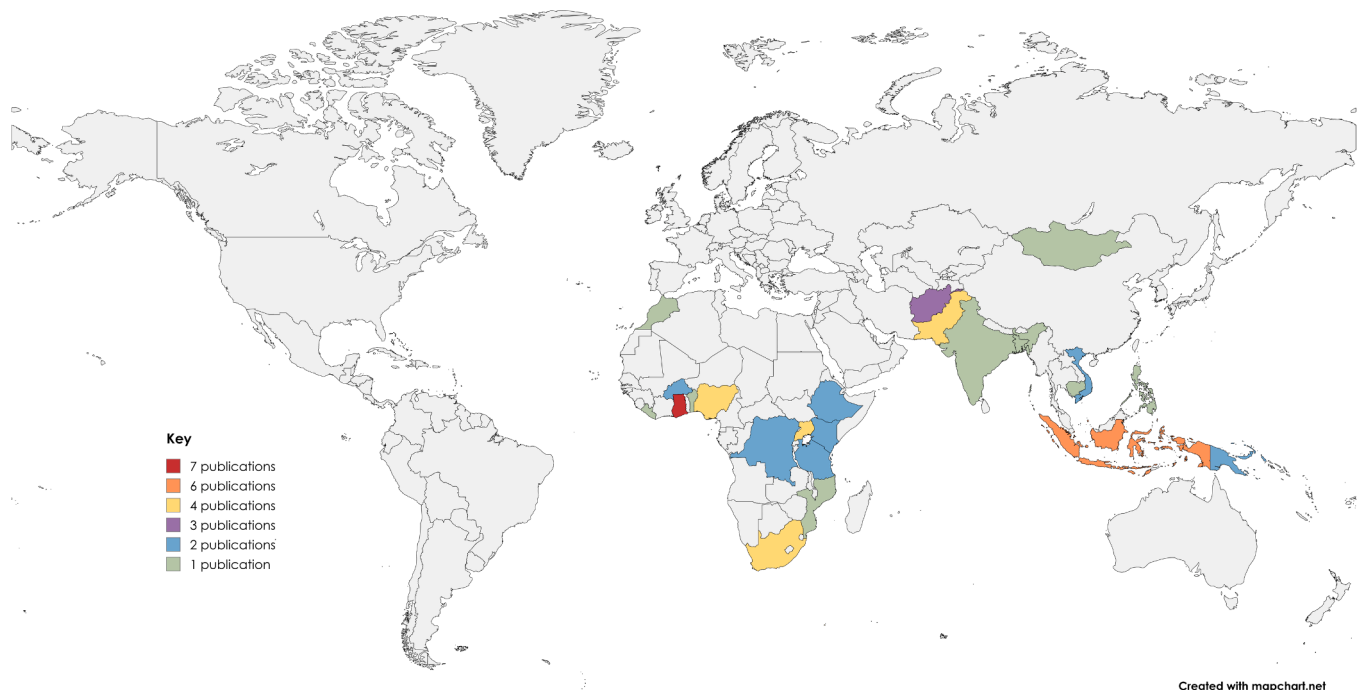


Fig. 2. Section 1. Global map of literature country representation.

**Table 2**  
General characteristics of Section 1 articles (N = 52).

Study characteristics	Category	Frequency	%
World Region	Sub-Saharan Africa	29	56
	Northern Africa and Western Asia	1	2
	Central and Southern Asia	9	17
	Eastern and South-Eastern Asia	11	21
	Latin America and the Caribbean	0	0
	Oceania	2	4
	Year of publication	2010-2014	13
	2015-2019	15	29
	2020-2024	24	46
Methodology	Qualitative	37	71
	Quantitative	5	10
	Mixed methods	8	15
	Other	2	4
Method of data collection*	Interview	44	85
	Focus Group Discussion	20	38
	Survey/Questionnaire	10	19
	Facility Assessment	5	10
	Observation	4	8
	Record review/audit	2	4
	Workshops	1	2

Note\* The method of data collection total is > 100 % as some studies used multiple methods

[24,26,27,32]. Other challenges were the lack of contextually relevant content and skill development opportunities for rural practice [27], absence of rurally based midwifery schools [24], non-midwife educators [30,32], short program durations [33], and limited time for teaching and consolidating clinical skills [33].

Five articles (10 %) discussed enablers related to preparedness for rural practice [28,33–36]. Enablers included curricula specific to rural contexts [33,34], quality pre-service education [28], supportive learning environments [35], and competency-based curricula [33].

Twelve articles (23 %) offered recommendations for pre-service education relevant to the preparedness context [24,25,30,32,33,35,

37–42]. Recommendations included incorporating rural-specific content in curricula [38], recruiting students from rural areas [25,32], establishing rurally based midwifery schools [24], and engaging political leaders to scale up education [37].

**b. Pre- and early employment training and continued professional development**

Six articles (12 %) discussed pre- or early employment training related to midwives’ preparedness for rural primary health care practice, focusing on enablers and recommendations [30,33,36,43–45]. New graduates in Papua New Guinea felt consolidating emergency obstetric and neonatal skills in a hospital environment would prepare them better for rural deployment [33,44]. Internships enabled graduate rural primary care preparedness in Ghana [43] and Pakistan [36]. Recommendations included implementing pre- or early deployment orientation, training and internship programs to prepare health workers for rural practice [30,43,45].

Twenty-four articles (46 %) included challenges of midwives accessing continued professional development (CPD) in the rural or remote context [24,27,28,30,32–34,40,42,44–58]. Challenges included insufficient CPD and training opportunities [32,34,45,48–50,54,56,58], while staffing and logistical constraints hindered access to existing professional development activities [24,27,33,40,44,46,51,53,55].

Sixteen articles (31 %) discussed enablers related to CPD and training relevant to midwives’ preparedness for the rural and remote work context [24,34,36,37,39,43,45,46,48,49,51,53–55,59,60]. Enablers included access to informal and formal learning opportunities [39,45,59] and midwives’ agency in arranging local training sessions [24].

More than half of the articles in the review (n = 28, 54 %) offered midwifery CPD recommendations relevant to preparedness and readiness [24,25,27,28,30,32–35,37,39–47,50,52,54,55,61–65]. Researchers recommended ensuring access to training in emergency obstetric and neonatal health care [44,52], socio-culturally acceptable care provision [41,55], perinatal mental health [27], and coping with death and dying in midwifery practice [40]. Additional recommendations included equipping primary health facilities for emergency drills [65], supporting midwives to undertake post-graduate education [39], and engaging

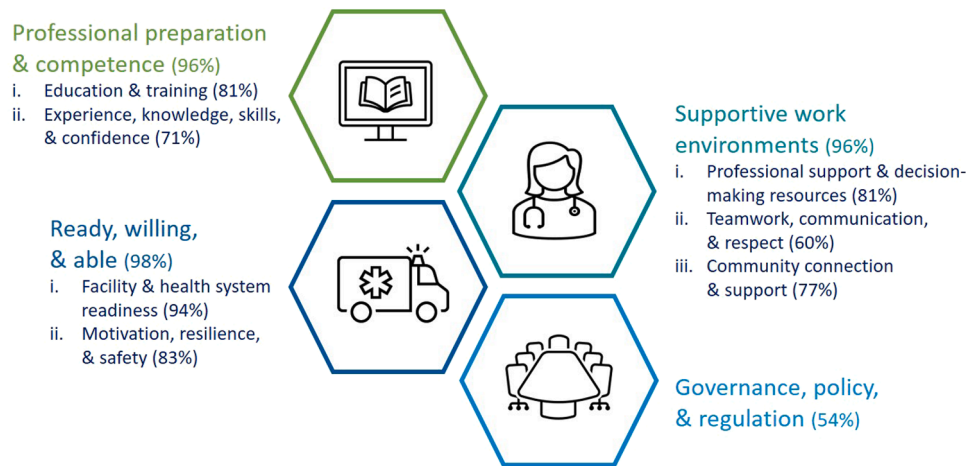


Fig. 3. Section 1. Categories and sub-categories.

Note: Percentages (%) indicate the proportion of included articles containing content related to each category or sub-category.

political leaders in scaling up training programs and increasing funding [37].

#### ii. Experience, knowledge, skills, and confidence

Thirty-seven articles (71 %) were relevant to experience, knowledge, skills, and confidence. Twenty-six articles (50 %) discussed the challenges related to professional experience, knowledge, skill, and confidence (see Table 3). A lack of experience, knowledge, and skill contributed to midwives' actual and perceived preparedness and readiness for practice, resulting in anxiety [40], not knowing what to do in an emergency [66], and panicking when things went wrong [67]. Studies reported that graduates sometimes felt [35] and were perceived by professional counterparts and the community [31,68], as being under-prepared for rural primary health care demands. Reduced exposure to clinical care in rural community health settings, such as emergency management [34,50,58] and new instruments and equipment [50,58,66,67] were reported as challenges to readiness to provide quality care.

Enabling professional experience factors were discussed in 19 (37 %) articles [26,28,30,34–37,43,44,47,51,52,55,62,63,66,69–71]. In addition to internships, training, and mentoring mentioned elsewhere, enablers included positive peer influence [26,70], agency for self-development [52], and attributes of flexibility, problem-solving, and resilience [63,66]. Experienced midwives reported the benefit of learning contemporary midwifery practices from junior midwives with more recent training [47].

Recommendations were proffered in eight articles (15 %) [30,43,44,52,54,62,64,70], including those provided by Okeyere et al. [43], who recommended internship and orientation programs to prepare Ghanaian midwives and other health workers psychologically and physically for rural practice.

#### 4.1.2. Supportive work environments

Supportive work environments are essential to midwives' ability to prepare, plan, and appropriately respond to the needs of women and babies in rural and remote communities. Supportive supervision, access to decision-making resources, and partnership with other community, clinic, and referral hospital colleagues are essential aspects of preparedness and readiness. Fifty articles (96 %) included data or discussions relevant to supportive work environments. We present the scoped literature relating to these concepts in three sub-categories: i. Professional support and decision-making resources, and ii. Teamwork, communication, and respect, and iii. Community connection and

support.

#### i. Professional support and decision-making resources

Forty-two articles (81 %) were relevant to professional support and decision-making resources. Challenges related to professional support and decision-making resources for midwives' preparedness and readiness in rural and remote contexts were reported in 28 articles (54 %) (see Table 3). Seventeen sources (33 %) reported inadequate supervisory support of midwives in rural and remote primary health clinics [24,26,28,30,31,33,39,43,46,49,51,54,56,60,61,65,71]. Inadequate support or mentoring by senior midwives [33,34,46,65,68,69], and lack of clinical guidelines to aid decision-making were additional challenges to midwives' provision of quality care [24,25,34,39,42,44,47,48,51,52,56,63,69]. Midwives with access to guidelines were challenged by having multiple versions [53], a lack of time to refer to the guidelines during care provision [53], and not having the necessary medications or supplies to follow the guideline instructions [52]. Inability or difficulties accessing advice from referral hospital medical staff was an additional challenge [66,69].

Twenty-three publications (44 %) identified professional support and decision-making resource enablers [26,33,34,36,39,44,45,47,48,51–53,55,59,61,63,65,66,69,70,72–74]. Nine articles (17 %) identified supportive supervision as an enabler relevant to midwives' preparedness and readiness in rural and remote contexts [36,39,51,54,55,61,65,72,74]. Two sources [55,69] discussed mentoring from senior midwives as an enabling factor in supporting midwives to develop capacities and confidence in rural and remote practice. Advice from hospital medical staff, supervisors, or senior midwives [39,59,66,69], and access to guidelines to guide care [63] were also identified as enabling factors relevant to midwives' preparedness and readiness.

Twenty articles (38 %) [24,25,34,35,39–41,43–46,50–52,54,55,61,62,65,70] provided recommendations relevant to this sub-category, including supportive supervision [24,25,35,39,41,43,44,46,50,54,61,62,65], and mentor support [39,40,46,50,55]. Improving access, use, and training on guidelines were also recommended [41,52,62,65].

#### ii. Teamwork, communication, and respect

Thirty-one articles (60 %) were relevant to teamwork, communication, and respect. Challenges related to teamwork, communication, and respect pertaining to midwives' preparedness and readiness to provide care were reported in 18 articles (35 %) [28,29,31,33–37,41,42,47,51,55,58,64,68,69,72]. Challenges included a lack of collegial support, collaboration, peer respect, and a culture of mistrust and criticism [37,42,69].

**Table 3**  
Literature mapped to [Section 1](#) categories and sub-categories.

**Symbol Key:** ▼ Challenging factors ▲ Enabling factors △ Recommendations

World region (UN SDG) Country(s) Author, Publication date	1. Professional preparation & competence			2. Supportive work environments			3. Ready, willing & able				4. Governance, policy & regulation
	Education & training		Experience, knowledge, skill & confidence	Professional support & decision-making resources	Teamwork, communication & respect	Community connection & support	Facility & Health System Readiness			Motivation, resilience & safety	
	Pre-service Education	Pre- and early employment & CPD training					Systems & processes	Infrastructure & resources	Staff capacity, scope & responsibility		
<b>Sub-Saharan Africa</b> Benin/Burkina Faso Jaffré 2021 <sup>71</sup>	-	-	-	▼	-	▼▲	▼	▼	▼	▼▲△	-
Burkina Faso/Ghana/ Tanzania Prytherch 2013 <sup>61</sup>	-	△	-	▼▲△	▲	▼▲	▼	▼	▼	▼▲	-
Congo, Dem Rep of Baba 2020 <sup>24</sup> Baba 2020 <sup>25</sup>	▼▲ △ ▼▲ △	▼▲△ ▲	- -	▼▲ △ ▲	▲△ -	▼▲ △ -	▼▲ -	▼▲△ -	▼▲△ ▼▲△	▼▲△ ▼▲△	▼▲ △ ▼▲ △
Ethiopia Bergen 2019 <sup>37</sup> Mordal 2021 <sup>75</sup>	▲ -	▲△ -	▲ -	- -	▼ -	- ▼▲	▲△ ▼▲	▼▲△ ▼▲△	▼▲ △ ▼	▼ ▼	▲ -
Ghana Adatará, 2021 <sup>46</sup> Afari 2014 <sup>47</sup> Ani-Amponsah 2021 <sup>67</sup> Choi 2022 <sup>45</sup> Dalinjong 2018 <sup>48</sup> Okyere 2021 <sup>43</sup> Oppong-Darko 2017 <sup>62</sup>	- - - - - -	▼▲△ ▼▲ △ - ▼▲△ ▼▲△ ▲△ ▲△	- ▼▲ ▼ - - ▼▲△ ▼▲△	▼▲ △ ▼▲△ - ▼▲△ ▼▲△ ▼▲ △ ▼▲ △	- ▼ ▲ - - - -	- - ▼▲△ - - ▼▲ ▼▲ △	- - ▼▲ △ ▼▲△ ▼▲△ ▼▲ △ -	▼ - ▼ ▼▲△ ▼ ▼	▼ - ▼ - - ▼▲△ -	▼▲△ ▼▲△ - ▼ - ▼▲△ ▼▲△	- - ▲△ ▲△ ▲△ ▼▲ △ ▲△
Kenya Mannah 2014 <sup>49</sup> Matiang'i 2020 <sup>50</sup>	- -	▼▲ ▼▲ △	▼ ▼	▼ ▲	▲ -	▼▲ -	▼▲ △ -	▼▲△ ▼▲△	▼▲ △ -	▼▲△ ▼▲△	▼▲ △ -
Liberia Reynolds 2023 <sup>72</sup>	-	-	▼	▼▲	▼▲	▼▲	▼▲△	▼	-	-	-
Mozambique Adolphson 2016 <sup>66</sup>	-	-	▼▲	▼▲	▲	▲	▼	▼	▼▲	▼▲△	-
Nigeria Adegoke 2015 <sup>39</sup> Akin-Otiko 2013 <sup>63</sup> Okeke 2017 <sup>64</sup>	▲ - -	▲△ ▲△ ▼▲ △	- ▼▲ ▼▲ △	▼▲△ ▼▲△ -	▲ ▼ -	▼▲ ▼▲ △ ▲	▼▲△ - ▼▲ △	▼▲△ ▼▲△ ▼▲ △	▼▲ △ ▼▲ ▼▲	▼▲△ ▼▲△ ▼▲△	▲△ ▲△ ▼▲ △
South Africa Ramavhoya 2020 <sup>51</sup> Ramavhoya 2021 <sup>52</sup> Ramavhoya 2022 <sup>65</sup> Ximba 2021 <sup>69</sup>	- - - -	▼▲ ▼▲ △ ▲ -	▼▲ ▼▲△ ▼▲ ▲	▼▲△ ▼▲△ ▼▲△ ▼▲△	▼▲ △ ▼▲ △ - ▼▲ △	▼▲ △ ▼▲ △ ▼▲ △ ▼▲ △	▼▲△ ▼▲△ ▼▲△ ▼▲ △	- ▼▲ △ - -	▼▲ △ ▼▲ △ ▼▲ △ -	- ▼▲ △ - -	▲△ - - -
Tanzania Spangler 2012 <sup>26</sup>	▼	-	▼▲	▼▲	-	-	▼▲ △	▼	▼	▼	▼▲ △
Uganda Muliira 2015 <sup>40</sup> Nakku 2016 <sup>27</sup> Namutebi 2023a <sup>53</sup> Namutebi 2023b <sup>73</sup>	▼ ▲ ▼ - -	▼▲ △ ▼▲ △ ▼▲ -	▼ ▼ ▼ -	▲ - ▼ ▲	- ▲ - - -	- ▲ ▼ ▲ ▼ -	- ▼ ▲ ▼ ▲ ▼ ▲	- - ▲ ▼ ▲ ▼ ▲	- ▼ ▼ ▼	▼▲ △ ▼▲ △ ▼ -	▲△ - - -

Table 3 (continued)

World region (UN SDG) Country(s) Author, Publication date	1. Professional preparation & competence			2. Supportive work environments			3. Ready, willing & able				4. Governance, policy & regulation
	Education & training		Experience, knowledge, skill & confidence	Professional support & decision-making resources	Teamwork, communication & respect	Community connection & support	Facility & Health System Readiness			Motivation, resilience & safety	
	Pre-service Education	Pre- and early employment & CPD training					Systems & processes	Infrastructure & resources	Staff capacity, scope & responsibility		
<b>Northern Africa and Western Asia</b> Morocco Louazi 2022 <sup>54</sup>	-	▼▲▲	▲	▼ ▲	▲▲	▼▲	▼ ▲	▼ ▲	▼ ▲	▼▲▲	▲
<b>Central &amp; Southern Asia</b> Afghanistan Mansoor 2013 <sup>34</sup> Turkmani 2013 <sup>35</sup> Wood 2013 <sup>28</sup>	▲▲▲ ▼▲▲	▼▲▲ ▼▲▲	▲▲ ▼▲	▼▲ ▼▲	▼▲▲ ▼▲	▼▲ ▼▲▲	- -	▼ ▼▲	▼▲ ▼▲	▼▲ ▼▲	▲ -▲
Bangladesh Byrskog 2019 <sup>29</sup>	▼	-	-	-	▼▲	▼	▼	▼	▼▲	▼	▼▲
India Morgan 2018 <sup>55</sup>	-	▼▲▲	▼▲	▼▲▲	▼▲	▼▲	-	▼	▼▲	▼	-
Pakistan Ahmed 2017 <sup>74</sup> Jan 2019 <sup>36</sup> Khowaja 2022 <sup>30</sup> Kumar 2023 <sup>57</sup>	- ▲▲ ▼▲	- ▲▲ ▼▲	- ▲▲ ▼▲	▲▲ ▲▲	▼▲ ▲▲	▼▲▲ ▼▲▲	▼▲ ▼	- -	▼ ▼▲	▼▲ ▼▲	- ▲▲
<b>Eastern &amp; South East Asia</b> Cambodia Abe 2021 <sup>59</sup>	-	▲	-	▲	▲	▼▲	▼	▼▲	-	▼▲▲	▲
Indonesia Baker 2020 <sup>56</sup> Lee 2011 <sup>70</sup> Manuama 2022 <sup>31</sup> Probandari 2017 <sup>41</sup> Rambu Ngana 2012 <sup>60</sup> Situmorang 2022 <sup>68</sup>	- - ▼▲ -	▼ - - ▲	▼ ▲▲ ▼ -	▼ ▲▲ ▼ ▼	- ▲▲ ▼ -	▼▲ - ▼▲ ▼▲	▼▲ - ▼▲ ▼▲	- - ▼▲ -	▼ - ▼ ▼	- - ▼▲ ▼	▼▲ - ▲ - ▲
Mongolia Kildea, 2012 <sup>32</sup>	▼▲	▼▲	▼	-	-	-	▼▲▲	▼▲▲	▼▲▲	▲	▲
Philippines Felipe-Dimog 2023 <sup>38</sup>	▲	-	-	-	-	▼▲	▼	▼	▼▲	▲	▲
Vietnam Eriksson 2011 <sup>58</sup> Graner 2010 <sup>42</sup>	- ▲	▼ ▼▲	▼ ▼	▼ -	▼▲ ▼	▼ ▼▲	- -	▼ ▼▲	▼▲ ▼▲	- ▼▲	- ▲
<b>Oceania</b> Papua New Guinea Moore's 2016 <sup>44</sup> Moore's 2016 <sup>33</sup>	- ▼▲▲	▼▲▲ ▼▲▲	▲▲ ▲	▼▲▲ ▼▲	- ▼▲	- -	- ▲	▼ ▼▲▲	▲	▼▲ ▼▲	- -

Fifteen articles (29 %) discussed the enabling effects of teamwork, communication, and respect relevant to midwives' preparedness and readiness [24,34,36,39,45,49,54,55,59,61,66,67,70,72,74]. Regular team meetings [72], support of auxiliary health staff [67,74], communication between midwives and community health educators [72], interprofessional training [55], and sharing resources between facilities [49] enabled midwives' preparedness and readiness.

Researchers of 13 articles (25 %) provided recommendations related to teamwork, communication, and respect [24,27,29,33–35,51,52,54,58,68–70]. Examples include recommendations to integrate midwives into inter-disciplinary teams and to promote recognition of the importance of their work in a Moroccan study [54].

### iii. Community connection and support

Forty articles (77 %) were relevant to this sub-category. Community connection and support challenges relevant to midwives' preparedness and readiness were discussed in thirty-five articles (67 %). Socio-cultural, language, and communication challenges were identified as significant issues in establishing community connections for midwives recruited from outside the community to which they are deployed [24,28,29,34,39,41,43,47,63,64,67,71]. Community gender norms and expectations were significant challenges to midwives working in communities [24,25,35,59,71,74].

Community connection and support enablers relevant to midwives' preparation and readiness were reported in 19 (37 %) studies [24,28,30,35,36,38,42,43,49,54,59,61,65–67,71,72,74,75]. Enablers included community student selection processes [28], midwives working in their own communities [28,49], community assistance with referral motorcycle taxis in the Democratic Republic of Congo [24], midwives' accommodation in Cambodia [59], and use of mobile phones to connect with women in Liberia for advanced warning of their impending arrival for emergency care [72]. Engaging with women in the community through multiple primary health programs [38] and the support of community collaborators to identify women requiring care [38] were additional enablers that promoted trust and connection with women in the community.

Recommendations were suggested by researchers of 19 articles (37 %) [25,27,28,34,41,45,47,51,52,55–57,62,64,65,67–69,74]. Recommendations included community sponsorship of locally recruited midwifery students [28], deploying midwives to facilities near their own homes [57], or based on their language abilities [45], integrated efforts to strengthen community-based care [67], actively engaging the community [47], and creating service demand through community awareness and stigma reduction [56].

#### 4.1.3. Ready, willing, and able

Midwives who are well-trained, knowledgeable, skilled, and working in supportive work environments must also be ready, willing, and able to provide quality care. Midwives require functional health systems with appropriate infrastructure, and physical and human resources to provide quality care. Willingness to be present and responsive to community needs is also a crucial factor in the health provider's readiness and is impacted by factors including social support, incentives, and professional opportunities. Fifty-one articles (98 %) included data or discussion relevant to this category. We present the scoped literature relating to these concepts in two sub-categories: i. Facility and health system readiness, and ii. Motivation, resilience, and safety.

##### i. Facility and health system readiness

As evidenced in Table 3, 94 % of the included articles (n = 49) reported challenges, enablers, or recommendations relating to facility and health system readiness. These are related to a). Systems and processes; b). Infrastructure and resources, and c). Staff capacity, scope, and responsibility.

##### a. Systems and processes.

Thirty-five articles (67 %) reported health system or facility process challenges. Challenges included supervisor resource misappropriation [71], poor supply chains [67], ineffective reporting mechanisms for

program planning [56,60], lack of management support in program coordination [56,61], and inadequate communication between primary health posts and referral hospitals [47]. Poor referral systems and processes were identified as a significant challenge impacting midwives' preparedness and readiness [24,32,36,38,42,47–49,51,52,65,66,69,71,72,74].

Eleven articles (21 %) identified health system and process enablers [24,31,32,39,45,51,53,65,72,73,75]. These included early reporting to referral hospitals [24], availability of maternity waiting homes [32,65], community processes to enhance referral processes [72], provisions of transport to commute between home and work [39], responsive referral systems [32,51], and quality assurance processes [65].

Recommendations to improve health systems and processes to support midwives' preparedness and readiness were suggested in 20 articles (38 %) [24,26,32,33,37,39,45,47–49,51,52,54,56,60,64,65,69,72,74]. Recommendations included ensuring reliable data collection, reporting and management systems [33,47,65], health systems strengthening through supportive supervision [39], standardising referral protocols, improving transportation systems [47,49], building community maternity waiting homes [65], and maternal health programs and health systems research [26].

##### b. Infrastructure and resources

Midwives may be prepared, competent, and willing, however, their readiness to provide quality and timely care relies on appropriate infrastructure and available resources. Thirty-eight articles (73 %) reported infrastructure and resource challenges. Specific infrastructure issues included poor facility conditions [59], lack of clean water supply [26,31,32,43,44,48,49,54,60,64,66,68,71,75], electricity [26,32,43,44,48,49,54,60,61,64,68,71,75], heating [54], and sanitation [31,71], and inadequate space and beds for care provision and privacy [46,48,59,63]. The lack of functional and well-maintained medical equipment, consumables, and essential medications were frequently reported issues (n = 31, 60 %) [24–28,32–34,37,39,42–44,46,48–50,52–55,58,60,64,66–68,71–73,75], restricting midwives readiness to provide quality care, or requiring them to improvise their care [46]. Four articles (8 %) reported that midwives were either paying for or imposing fees to purchase these resources [25,49,60,71].

Eleven articles (21 %) reported resource-related enablers [24,31–33,39,43,45,49,53,59,75], including midwives being innovative with available resources [43,75], sharing resources between clinics [49], or lobbying non-governmental organisations to supplement supplies [24]. Recommendations were made by researchers in sixteen articles (31 %) [24,27,28,32,33,37,39,42,45,49,54,62,64,65,73,75] focusing on strengthening health systems and funding to ensure facilities have adequate equipment, supplies, and medications.

##### c. Staff capacity, scope and responsibility

Thirty-seven (71 %) articles reported staff capacity, scope, and responsibility challenges relevant to midwives' preparedness and readiness. Staffing shortages [25,27,42,43,46,52,55,60,63,65,66], resulted in high workloads [39,63,66], being on-call 24 hours a day, seven days a week [49,66], and the inability to take time off for sick leave [46] or to attend training [46]. Working alone or in small teams impacted midwives' provision of quality care [28,52,60,66,67,71,73]. Staffing limitations also resulted in midwives working outside of their professional scope of practice [60,66], with midwives expressing fear of legal ramifications for doing so in Indonesia [60].

Four articles (8 %) discussed enablers relating to staff capacity, scope, and responsibility [25,32,43,66]. Kildea et al [32]. reported in their review of midwifery in Mongolia that remote midwives were more likely than their urban counterparts to be able to work to the international scope of practice. Whilst midwives were working outside of their scope of practice due to staffing constraints in Mozambique [66], a broad scope of practice was also seen as an enabler to work satisfaction.

Recommendations related to staffing, scope, and responsibility were proposed in 19 (37 %) articles [25,29,32,34,37–39,41–44,49,51,52,54,55,57,58,65]. Increased skilled workforce numbers, distribution, and

quality were recommended in a study from Nigeria [39]. In a study from Afghanistan, Mansoor et al [34], recommended the development of formal position descriptions in managing role expectations, monitoring and evaluating staffing gaps, resourcing and training programmes for workforce planning.

### iii. Motivation, resilience and safety

Forty-three articles (83 %) were relevant to motivation, resilience and safety, with forty articles (77 %) reporting associated challenges. Low salaries [28,29,36,59,66], irregular salary payments [24,25,39,49,60,64], lack of professional recognition and appropriate financial reward [46,64] for working in a challenging work context impacted midwives' motivation to practice in rural and remote communities. Midwives' motivation was also impacted by several deployment related factors; placement in culturally and linguistically diverse communities [28], lack of choice in deployment location [43], separation from family [29,39,43,54,59,61,71] and inadequate accommodation [25,29,33,34,39,43,44,54,60,64]. A study from Nigeria [63] reported that midwives' poor motivation was related to attitudes that supervisors were responsible for initiating the changes necessary to improve services.

Security issues related to working in rural and remote midwifery practice were reported in 11 articles (21 %) [24,25,39,47,49,54,57,59,64,68,71], including fear of gender-based violence [59], and the risks to midwives working in conflict areas [24,25]. Situmorang et al [68] reported that the lack of security resulted in midwives' absenteeism from work in Papua province, Indonesia.

Twenty one articles (40 %) discussed enabling factors related to this category [24,25,33,38–40,42,43,46,49,50,52,54,59,61–64,66,71,74]. Enablers included deployment to their own communities [49], community assistance with accommodation [59], midwives' agency and resilience [25,66], and a commitment to their work and the communities they serve [39,49,64].

Recommendations were provided in 21 articles (40 %) [24,25,28,32,34–36,39,40,43,44,46,49,52,54,57,59,64,66,71,74]. These included improving deployment processes [35], the provision of financial allowances [35,64], and non-financial incentives, such as housing and strategies to improve security [25,74], and post-graduate training and career advancement opportunities [39,46].

#### 4.1.4. Governance, policy, and regulation

Twenty-eight articles (54 %) included data or discussion relevant to governance, policy, and regulation. Eleven articles (21 %) reported midwives' preparedness and readiness challenges related to governance, policy, or professional regulation [24–26,28–30,36,43,49,56,64]. Identified challenges included inconsistencies in midwifery education regulation [26], lack of policy implementation plans [25], inadequate funding for national workforce policy implementation [25], low workforce salaries [24,25], and poor health facility readiness [24,25].

Three articles (6 %) described enablers related to this category [31,32,67]. Appropriate professional regulation, strong policy support for service provision, and national guidance and funding of medications and equipment were examples of enabling factors identified in a study in Indonesia [31].

Twenty-six articles (50 %) posited governance, policy and regulation recommendations. Recommendations included evidence-based policy decisions [45], strengthening education, training, professional support and career progression [28,42], strategies to ensure functional health systems [49], and implementing gender-responsive human resource policies, including rural housing allowances [59]. Review of policy, regulation, and laws pertaining to midwives' scope of practice to provide lifesaving interventions in rural and remote contexts were emphasised [38,39,49], as were collaborations between different levels of government [68], and midwives' associations and communities [28]. Engaging midwives in policy development was recommended in studies from Afghanistan [28] and South Africa [63].

## 4.2. Section 2. Evaluation of preparedness and readiness strategies

We identified 16 primary research papers evaluating strategies for strengthening the preparedness or readiness of primary care midwives working in rural and remote communities in low- and middle-income countries, as related to review question three. Six of these articles were also relevant to research questions one and two. Seven articles (44 %) reported using a qualitative design, four articles (25 %) reported quantitative research, four (25 %) reported mixed methods research, and one article (6 %) reported a descriptive usability study.

Sub-Saharan Africa was most represented in the included literature ( $n = 9$ , 56 %), followed by Central/Southern Asia ( $n = 4$ , 25 %) and Eastern/South-East Asia ( $n = 3$ , 19 %). The regions of Latin America/Caribbean and Oceania were not represented. Indonesia had the highest country representation in the included literature, with 3 articles (19 %). Ghana, Kenya, Nigeria, and Pakistan were each represented in two articles, and Ethiopia, Liberia, Tanzania, Afghanistan, and India were each represented in one article.

For this section, we identified three categories representing the evaluated strategies: i. Education, training, and mentoring ii. Readiness through technology, and iii. Midwifery workforce. Table 4 presents the citations mapped to these categories. Where citations are relevant to more than one theme (e.g., training provided to introduce technology), we mapped the citation to the primary category and provided further narrative explanation. The Summary Data Table for these citations (see Appendix D) reports the primary author, year of publication, literature type, country of origin, participants, concept and context, and findings related to the implemented strategies.

### 4.2.1. Education, training, and mentoring

Six articles (38 %) evaluated strategies related to building primary care midwives' preparedness or readiness for rural or remote practice through education, training, or mentoring [35,55,76–79]. A study in Afghanistan [35] evaluating a pre-service midwifery education program for a new cadre of community midwives found it provided appropriate preparation for independent practice and improved health care in rural communities. Studies in Ghana [76], Pakistan [77], and Tanzania [79] evaluating the 'Helping Babies Breathe' training program reported positive results in midwives' knowledge, skill, and confidence; however, there was a recognised need for ongoing training to maintain neonatal resuscitation skills [76]. Studies in Pakistan [78] and India [55] demonstrated that graduate internship and mentor programs, enhanced midwives' knowledge [78], skills [55,78], and confidence [55].

### 4.2.2. Readiness through technology

Seven studies (44 %) evaluated technology-related strategies to enhance midwifery practice that were relevant to improving their readiness to provide responsive care to women and babies in rural and remote communities [60,72,80–84]. One study in Ethiopia [80] evaluated midwives ultrasonography experiences, and another in Kenya [84] evaluated midwives' ultrasonography accuracy in rural clinics. The studies reported that training in this technology improved midwives' knowledge, skills, and confidence in prenatal care [80], enabled high levels of screening and reporting accuracy [84], and facilitated effective and inexpensive mobile phone exchange of images with referral hospitals [84], supporting planning of care and referral needs.

Studies in Indonesia [81] and Liberia [72] evaluated the effectiveness and acceptability of mobile phones and mobile applications in providing care. Midwives' readiness was enhanced by using phones to gain clinical and logistical advice and support, accessing health data and online resources to plan care, and communicating directly with women and their families to arrange care. An Indonesian study [82] found that a Geographic Information System (GIS) enabled midwives and managers to use mapped data to plan service provision and improve program efficiencies. Another Indonesian study [60] evaluating a new reporting system found midwives' data entry inconsistencies and late data transfer

**Table 4**  
Literature mapped to Section 2 categories.

 Education, training & mentoring	 Readiness through technology	 Midwifery workforce
Eblovi, 2017, Ghana [76] Lakhani, 2016, Pakistan [78] Morgan, 2018, India [55] Naz, 2022, Pakistan [77] Turkmani, 2013, Afghanistan [35] Wilson, 2017, Tanzania [79]	Argaw, 2022, Ethiopia [80] Chib, 2010, Indonesia [81] Fisher, 2011, Indonesia [82] Rambu Ngana, 2012, Indonesia [60] Reynolds, 2023, Liberia [72] Vélez, 2014, Ghana [83] Vinayak, 2017, Kenya [84]	Adewole, 2019, Nigeria [85] Mannah, 2014, Kenya [49] Okeke, 2017, Nigeria [64]

impacted program planning; however, with appropriate support and training, the researchers asserted that the systems could be adapted to local contexts for better usage.

Challenges to introducing technology into health services included increased workload [60,80], poor mobile phone connectivity and data costs [72], and lack of power and required supplies [80]. These challenges were reported to impede the use of technology in rural and remote midwifery practice.

4.2.3. Midwifery workforce

Three articles (19 %) reported evaluations in Nigeria [64,85] and Kenya [49] of strategies to recall retired and unemployed midwives back into practice to strengthen the rural midwifery workforce. The Nigerian studies reported that the Midwives Services Scheme increased skilled birth access [64] and was beneficial in enhancing staffing, infrastructure, and supplies [85]. However, both studies concluded it was an unsustainable workforce solution. The Kenyan study [49] found the program to be culturally acceptable and an effective intervention, but returning midwives faced significant challenges in their rural practice.

4.3. Alignment of researcher recommendations and evaluated strategies

Fig. 4 aligns the categorised barriers, enablers, and recommendations related to primary care midwives' preparedness and readiness from the 52 articles in Section 1 to the evaluated strategies from the 16 articles in Section 2. The categories with the most researcher recommendations were pre- and early employment and CPD training (n = 28, 54 %), governance, policy, and regulation (n = 26, 50 %), and motivation, resilience, and safety (n = 21, 40 %).

In contrast, the strategy evaluation studies mainly focused on using technology for professional support and decision-making resources using technology (n = 5, 31 %), pre-and early employment and CPD training (n = 3, 19 %), and addressing midwifery workforce shortages (n = 3, 19 %). No studies in the review evaluated strategies related to teamwork, communication and respect, community connection and support, infrastructure and resource, staff scope and responsibility, midwives' motivation, resilience and safety, or governance, policy, and regulation.

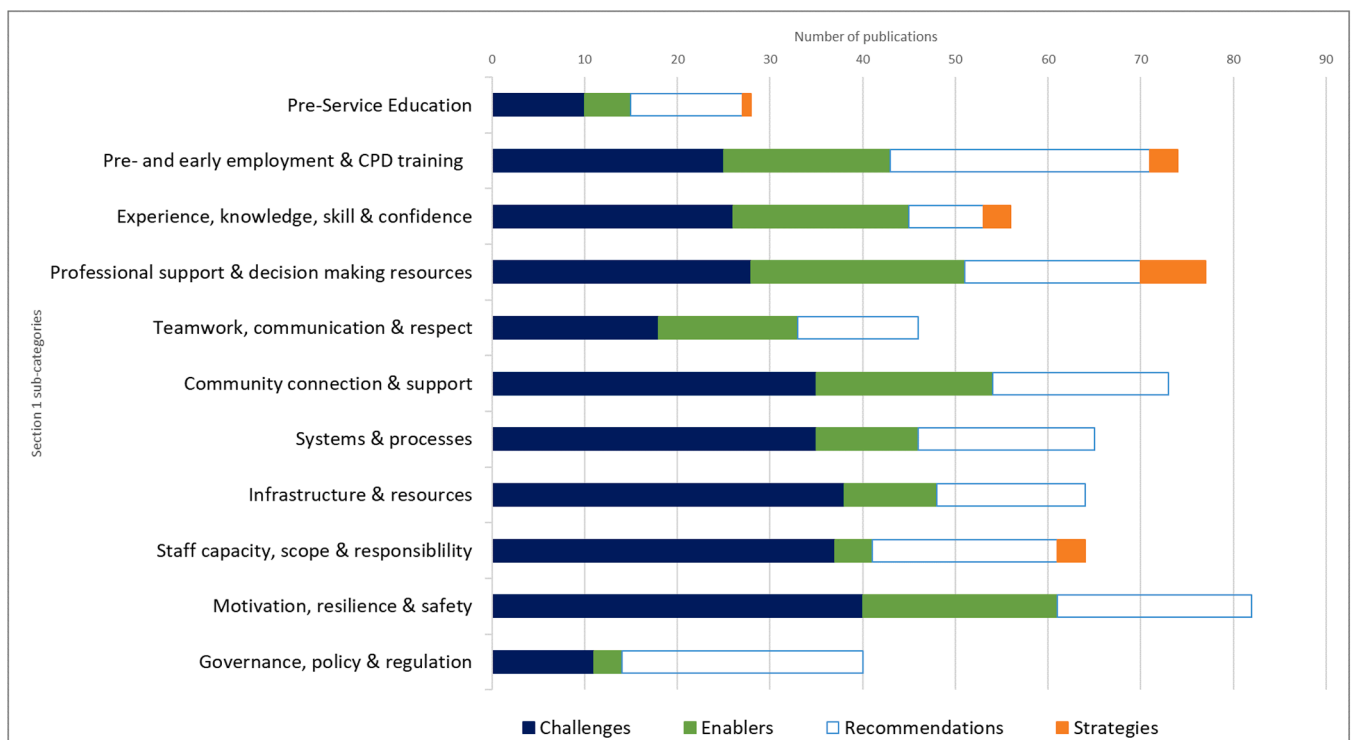


Fig. 4. Number of publications reporting challenges, enablers, recommendations, and evaluated strategies across sub-categories.

## 5. Discussion

This review aimed to systematically identify the extent and type of research knowledge related to the preparedness and readiness of primary care midwives working in rural and remote settings in LMICs. Through the different stages of review and analysis, it became apparent that the concepts of preparedness and readiness in the midwifery workforce are complex and multi-dimensional. While 62 articles met our inclusion criteria and contained content relevant to midwives' preparedness and readiness, only three articles explicitly explored these concepts as their primary focus in their title or study aim [24,62,73]. Our analysis required us to identify content relevant to our study definitions in articles where the relevance to preparedness and readiness was not immediately apparent. This gap in focused research is particularly significant given the responsibilities of midwives as skilled health care providers to the success of birth preparedness and complication readiness activities identified in the 2004 Birth Preparedness and Complication Readiness (BPCR) matrix of shared responsibility [86]. This seminal work focuses on preparedness and readiness as a way to reduce the three delays contributing to maternal and neonatal mortality and improve access to quality health care [86]. While extensive research has examined BPCR among women and their families, there has been minimal explicit investigation of health care provider BPCR or the wider scope of preparedness and readiness relevant for primary care midwives working in the rural and remote context. This is concerning given the extensive responsibilities of primary care midwives related to sexual, reproductive, maternal, newborn, child and adolescent health (SRMNCAH) care, and the need for them to be prepared and ready for a role that can significantly improve health outcomes [87–89].

The scope of literature related to midwives' challenges and enablers for their preparedness and readiness to work in LMIC rural and remote communities confirmed the importance of context-specific preparation and support. Examination of the challenges for midwives' preparedness and readiness highlighted the complexity of their preparation and support needs for rural and remote contexts. The documented challenges to midwives' preparedness and readiness in providing quality care are far more prevalent in the literature than the facilitators that enable responsive health care provision. This may be indicative of the difficult and complex realities for this midwifery cadre, but may also result from participant or researcher biases [90] towards reporting or investigating challenges rather than enablers in this context.

Our review included limited articles on pre-service education for rural practice, as we focused on studies examining the perceptions and experiences of graduate midwives rather than midwifery students. This decision reflects practising graduates' ability to provide more informed perspectives on how their educational preparation aligned with actual workplace demands and realities in rural settings. Furthermore, few articles reported on pre-deployment or early-employment processes and preparation for midwives new to rural and remote primary care practice, indicating a need for further attention. Challenges in accessing CPD opportunities were a common issue highlighted in the literature and a significant focus of researcher recommendations. Whilst training strategies were evaluated in the included literature, they were surprisingly few given the scope of the review. Ensuring midwives initial and ongoing training prepares them for the professional, logistical, and personal challenges of rural and remote primary care practice is a key priority.

A critical component of midwives' preparedness and readiness is working in an organised health system with appropriate infrastructure and logistical supports, facility and teamwork processes, and enhanced by community partnership and engagement. However, except for some focus on the referral processes, limited discussion and recommendations were made to improve health system processes. Many articles identified the impact of inadequate infrastructure and resourcing, including staffing levels and skill mix in primary health facilities. While numerous articles highlighted these challenges, few reported enabling factors or

offered more than general recommendations for improvements. Just three studies evaluated workforce strategies to address the issue of poor midwifery staffing levels [49,64,85]. Given the reported global shortage of 900,000 midwives, which predominantly impacts health care services in LMICs [3], workforce strategies are a priority area for further research. While our review identified twenty-eight recommendations related to governance, policy, and regulation, no studies evaluated strategies relevant to these categories, possibly reflecting the difficulties in undertaking research in these areas. This limited evidence base is concerning, particularly given the World Health Organization's recommendations for rural and remote workforce development, recruitment and retention [5]. The WHO recommendations emphasise the need to improve access to quality care through investment in and protection of the remote health workforce via education, regulation, incentives, and personal and professional support [5], and provide an important foundation for focused research in the preparedness and readiness context.

Research evaluating strategies implemented to strengthen the preparedness and readiness of primary care midwives working in rural and remote communities in LMICs was limited. Strategies centred on building midwives' preparedness or readiness capacities through short training programs or introducing technology, such as portable ultrasonography or mobile telephone systems. The focus of these technology-based systems as solutions is inherently dependent on funding and infrastructure, which is problematic for many countries where midwives in primary health clinics cannot provide basic care due to poor infrastructure and a lack of equipment, essential medicines, and medical supplies.

The limited studies evaluating professional education and development, and workforce strengthening strategies demonstrate a misalignment with researchers' recommendations that emerged from their identification of challenges and enablers in this context. This disconnect is further evidenced by the absence of evaluation studies addressing governance, policy, and regulation, staff capacity, scope and responsibility, and midwives motivation, resilience and safety - areas frequently recommended by researchers. This gap may be the result of funding priorities, lack of time, resources, capacity, and motivation to evaluate and publish implemented strategies, indicating the need for repositioning of strategy and research investment.

### 5.1. Implications

This scoping review identified considerable gaps in the literature that warrant further attention. The most substantial gap was the focus on preparing midwives for rural and remote practice. While the experiences of primary care midwives in rural and remote practice are reasonably well reported, these are often part of broader studies involving multiple health sectors and providers. However, research specifically examining the preparedness and readiness of midwives in this context is limited despite this cohort's unique needs and challenging work environments.

Context-specific preparation is essential for rural and remote work environments with significant social and logistical challenges, limited resources, and professional and social isolation. However, there is a paucity of literature examining pre-service education, pre-deployment training, and mentoring as preparation for rural and remote contexts. A lack of understanding of the specific needs of midwives in this context may lead to the deployment of midwives to challenging work environments without adequate and appropriate professional, socio-cultural and logistical preparation and support to fulfil the unique requirements of the role. Inadequate preparation and ongoing support can negatively impact midwives' motivation and resilience [87], potentially reducing the quality of health care provision despite their professional commitment to their role and communities. This gap is particularly significant in workforce management, given the global shortage of midwives, which necessitates deploying graduates with limited professional experience, skills, confidence, and support to rural and remote posts [64]. Well-prepared and supported midwives are essential in

recruiting and retaining midwives who can provide quality maternal and neonatal care to these communities with increased health vulnerabilities to improve health outcomes. Research examining these key concepts and finding ways to improve primary care midwives' preparation and readiness support in this context is imperative for tangible improvements to education, supportive policy, practice, and future research.

## 5.2. Strengths and limitations

To our knowledge, this is the first review to scope the literature specific to the preparedness and readiness of primary care midwives working in rural and remote contexts in LMICs. This review provides valuable insights into the breadth and complexity of midwives' preparedness and support needs in these settings, highlighting the scope of research required to fully understand the preparation and support needs of this essential midwifery cadre. These insights help to redress the imbalance in existing research, which has predominantly focused on rural and remote workforces in HICs, particularly within the medical and nursing professions [91–93].

We acknowledge that limiting inclusion to English language publications has likely precluded relevant literature in other languages that could have provided additional insights into rural and remote primary care midwives' preparedness and readiness in other world regions. Additionally, numerous articles were excluded where we could not separate data specific to our inclusion criteria elements. For example, we excluded publications where data specific to midwifery participants within a broader health professional sample could not be extrapolated. We also excluded other articles where we could not ascertain the context that met our inclusion criteria, or the midwifery cohort's professional recognition in their country. The exclusion of these articles highlights the importance of presenting research findings that enable data extrapolation specific to different participants and contexts.

Furthermore, while we acknowledge that auxiliary midwives play a crucial role in rural and remote primary health care, our decision to exclude this cadre was purposeful. This exclusion was due to the greater variation in their training, scope of practice, professional recognition and levels of responsibility compared to professionally recognised midwives and nurse-midwives [18]. Whilst this may be perceived as a limitation, we believe that separate scoping reviews examining the specific preparedness and readiness needs of auxiliary midwives and other health care providers delivering midwifery care in this context is warranted, particularly given the support of task-shifting to improve universal access to health care [18].

## 6. Conclusion

The challenges of providing quality midwifery health services to women and babies in rural and remote communities in LMICs are many and complex which was highlighted in this scoping review. We identified numerous significant challenges, including a lack of quality education and training specific to the rural context, inadequate supervision and workplace support, poor infrastructure and health system processes, and staff shortages. Key enabling factors included supportive supervision, workplace mentorship, access to continuing professional development, community partnerships, and functioning health systems. However, these were reported less frequently than challenges. Researcher recommendations included ensuring access to education programs, strengthening workplace support systems, and enhancing policy and processes. The literature evaluating strategies was limited and focused primarily on readiness through the use of technology, with fewer articles addressing workforce strengthening through education, professional development, or additional human resources. The paucity of literature evaluating implemented strategies and their skewed alignment to researcher recommendations highlights the need for evidence to inform priorities for action and for implemented strategies to be

evaluated and published to inform the global community of practice. Finally, despite the number of articles included in the review, we found limited published research explicitly exploring the preparedness and readiness of primary care midwives in rural and remote resource-limited settings. Further research and enhanced professional and political investment to better prepare and support this essential workforce is essential to improving maternal and neonatal health outcomes in low- and middle-income countries.

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## Ethical Statement

Ethics approval was not required for this scoping review.

## CrediT authorship contribution statement

Conceptualization: KG, SC, CL, TH, LS; Methodology: KG, SC, CL, TH, LS; Investigation: KG, SC, CL, TH, LS, HM, SCa; Formal analysis: KG, SC, SCa; Writing – original draft: KG; Writing – review & editing: KG, SC, CL, TH, LS, HM, SCa; Visualisation: KG; Supervision: SC, CL, TH, LS; Project administration: KG, SC.

## Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Claude AI in order to improve language and readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

## Conflict of interest

Linda Sweet has editorial duties with this journal. To reduce any real or perceived conflict of interest, she had no role in the processing or peer review of this paper.

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## Appendices A-D. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.wombi.2024.101866](https://doi.org/10.1016/j.wombi.2024.101866).

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