Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Barriers to obstetric referral systems at Chitedze and Nathenje Health Centres in Lilongwe, Malawi: A Qualitative Descriptive Study

Nicholas Msiska

nicholasmsiska@gmail.com

Kamuzu University of Health Sciences

Mathews Brave Mtegha

Kamuzu University of Health Sciences

Felix Chisoni MScHI

Kamuzu University of Health Sciences

Patrick Mapulanga

Kamuzu University of Health Sciences

Jimmy Mtambo MScHI

Kamuzu University of Health Sciences

Ursula Kafulafula

Kamuzu University of Health Sciences

Ellen Chirwa

Kamuzu University of Health Sciences

Elizabeth Chodzaza

Kamuzu University of Health Sciences

Research Article

Keywords: Obstetric referral system, maternal health, human resource shortages, transportation challenges, documentation gaps, communication barriers, feedback mechanisms

Posted Date: July 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10118766/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Maternal mortality in Malawi remains unacceptably high despite continued efforts to improve maternal health outcomes. A functioning obstetric referral system is critical for timely access to emergency obstetric care and reducing preventable maternal and neonatal deaths. This study explored the challenges in the obstetric referral system at the Chitedze and Nathenje Health Centres in Lilongwe District.

Methodology:

A qualitative descriptive approach was used. Data were collected from 30 participants comprising 15 nurse midwife technicians and registered nurse midwives purposively sampled, and 5 patients and 10 guardians recruited through convenience sampling. Semi-structured interview guides were used during in-depth interviews and focus group discussions; all sessions were audio-recorded. Data analysis followed Braun and Clarke's six-phase thematic framework.

Results

Six themes emerged: (1) inadequate human resources, (2) shortages of essential equipment and supplies, (3) transportation and logistical challenges, (4) incomplete referral documentation, (5) communication barriers, and (6) patient-related barriers.

Conclusion

The obstetric referral system in Lilongwe faces multiple systemic and operational constraints that compromise timely access to emergency obstetric care. Addressing these barriers through improved staffing, transport logistics, training, documentation, and structured feedback mechanisms is critical to strengthening referral pathways and improving maternal health outcomes in Malawi.

Background

Maternal mortality and morbidity remain major public health challenges globally. In 2023, an estimated 260,000 women died from pregnancy-related complications, with Sub-Saharan Africa accounting for approximately 70% of these deaths (1). Most maternal deaths result from direct obstetric complications, including haemorrhage, hypertensive disorders, sepsis, obstructed labour, and abortion complications (2). Timely access to skilled care and effective referral systems is critical for preventing these deaths (3)

Referral in healthcare is defined as the process by which a provider at a lower-level facility seeks assistance from a higher-level facility capable of managing the patient's condition (4). Effective referral systems extend beyond transport and encompass early recognition of danger signs, initial stabilisation, communication with receiving facilities, documentation, safe transfer, and feedback mechanisms. Weaknesses across these components contribute to the three delays: in seeking care, reaching care, and receiving quality care (5, 6). While interventions have addressed the first and third delays, the second delay remains a persistent challenge in many low- and middle-income countries (LMICs).

Studies from Tanzania, Ethiopia, Nigeria, and Ghana have highlighted persistent challenges in maternal referral systems, including poor communication, transport constraints, staff shortages, incomplete documentation, and absence of trained escorts (7–9). In Malawi, primary-level health centres are often the first point of contact for pregnant women, yet frequently lack the capacity to manage obstetric complications (10). Malawi still experiences a maternal mortality ratio of 224 deaths per 100,000 live births and a neonatal mortality rate of 24 per 1,000 live births (11). Achieving SDG 3, targeting a reduction to 110 deaths per 100,000 live births by 2030, requires strengthened referral systems alongside improved antenatal care and skilled birth attendance (12).

Limited evidence exists on context-specific barriers at the primary care level, particularly regarding communication, documentation, and differences between peri-urban and rural settings (5, 13). This study therefore explored barriers affecting the obstetric referral system at Chitedze peri-urban and Nathenje rural health centres in Lilongwe District, aiming to generate context-specific evidence to inform strengthening strategies.

Methodology

Study Design and Setting

This qualitative descriptive study was conducted over three months (May 12 to August 23, 2025) at two primary-level health centres: Nathenje Health Centre, a rural facility serving a population of approximately 55,000 in western Lilongwe District, and Chitedze Health Centre, a peri-urban facility located on the outskirts of Lilongwe City serving approximately 72,640 people. Both facilities refer obstetric complications to Bwaila District Hospital, situated 22 km and 13 km away, respectively. Despite these relatively short distances, emergency transfers are frequently delayed due to limited ambulance availability, reliance on motorbikes, and delayed dispatch, with transfer times ranging from 45 minutes to six hours. Facility records indicated that during the study period, Chitedze referred 849 women and Nathenje referred 741 women with obstetric complications.

Participants and Sampling

Thirty participants were recruited: 11 licenced Nurse Midwife Technicians (NMTs) and 4 Registered Nurse Midwives (RNMs) with at least three months of experience in maternity units, recruited purposively; and 5 patients and 10 guardians recruited through convenience sampling due to the

sensitive and time-critical nature of obstetric care. All participants had direct involvement in obstetric referrals within the three months preceding data collection. Women under 18 years and clinically unstable patients were excluded. Efforts were made to capture diverse perspectives by considering age, parity, gender (for guardians), and facility context.

Ethical considerations

Ethical approval was obtained from the College of Medicine Research and Ethics Committee (COMREC; Ref. No. P.03/25-1447), with additional permissions from facility authorities. Verbal and written informed consent were obtained from the participants, who were informed of their right to decline or withdraw participation at any stage of the study without consequences. Confidentiality was ensured through anonymisation and secure data storage in accordance with the Data Protection Act (2024) and COMREC guidelines.

Data Collection and Analysis

All in-depth interviews (IDIs) were conducted by the principal investigator (PI), a Senior Nursing Officer with no prior relationship with participants at the study sites. IDIs with healthcare workers lasted 20–45 minutes, while three focus group discussions (FGDs) with patients and guardians lasted 60–90 minutes. All interviews were audio-recorded with consent, and field notes were taken immediately after each session.

Two separate interview guides were used: one for healthcare workers, which was developed in English; and another for patients and guardians, which was also developed in English and translated into Chichewa for use during data collection. The English versions of both guides are provided as Supplementary File 1 (healthcare workers) and Supplementary File 2 (patients and guardians).

Data analysis followed Braun and Clarke's six-phase thematic framework: familiarisation, coding, theme development, review, definition, and reporting (14,15). Line-by-line inductive coding was conducted across all data sources. Independent experts in nursing and midwifery education validated the themes. Rigour was ensured using Lincoln and Guba's (1985) trustworthiness framework comprising credibility, confirmability, dependability, and transferability.

Results

Participant Characteristics

Among the 15 nurse/midwives, 11 (73%) were NMTs and 4 (27%) were RNMs. Work experience ranged from 2 to 14 years (see Table 1). Focus group discussions included 5 patients and 10 guardians, mostly aged 26–40 years with primary-level education (see Table 2).

Table 1
Demographic characteristics of nurse/midwives (n = 15)

Variable	Frequency	Percentage
Nurse Midwife Technician (NMT)	11	73%
Registered Nurse Midwife (RNM)	4	27%
Work experience 2–5 years	6	40%
Work experience 6–10 years	5	33%
Work experience 11–14 years	4	27%

Table 2
Demographic characteristics of focus group discussion participants (n = 15)

Variable	Frequency	Percentage
Age (years)		
18–25	5	33
26–40	6	40
41–55	4	27
Education level		
Primary	9	60
Primary/Secondary	3	20
Primary/None	3	20
Religion		
Christian (CCAP, Roman Catholic, Assemblies of God)	15	100
Occupation		
Housewives	8	53
Housewives/Farmers	4	27
Farmers	3	20

Themes

Six key themes emerged that describe barriers that constrained the effective functioning of the obstetric referral system: (1) inadequate human resources; (2) inadequate resources for obstetric emergencies; (3) transportation and logistics challenges; (4) incomplete referral documentation; (5) communication

barriers; and (6) patient-related barriers. The themes are expanded below, supported by the participants quotes, which are presented using codes to ensure anonymity.

Theme 1: Inadequate Human Resources

Staff shortages, especially during night shifts, were a central barrier. Single nurse-midwives frequently managed entire maternity units, limiting their ability to complete documentation, coordinate transport, and escort referrals. One participant explained:

"At night, we do not escort patients because there is only one staff member on duty. Leaving the ward unattended compromises the care of other patients. Women are usually accompanied by their guardians, and if none are present, the ambulance driver takes on that role" (NMT-F-P5).

In some cases, staff shortages forced nurses/midwives to refer patients without completing essential pre-referral care, with fatal consequences. Another participant narrated:

"During one night shift, I was the only provider on duty, and due to the urgency of the ambulance departure, I referred a patient without securing intravenous access. Unfortunately, the patient later died at Bwaila" (NMT-F-P14).

Theme 2: Inadequate Resources for Obstetric Emergencies

Persistent shortages of essential drugs, including oxytocin, magnesium sulfate, and antihypertensive agents, along with non-functional equipment such as blood pressure machines, significantly limited the capacity to stabilise patients before referral. An excerpt from one nurse-midwife exemplifies this:

"We had a patient with PPH who needed her blood pressure checked, but the BP machine had no batteries. Unfortunately, the ambulance took over two hours to arrive, and the patient died a few days later" (NMT-F-P3).

In situations of stockouts, providers reported feeling constrained in their ability to manage emergencies, particularly in cases requiring life-saving medications.

"Sometimes, magnesium sulphate is out of stock, and when you have a woman with eclampsia, you feel helpless. You just stabilise her as much as you can and refer quickly" (NMT-M-P7).

Theme 3: Transportation and Logistics Challenges

Both facilities relied on a single district ambulance from Bwaila Hospital, resulting in prolonged response times, frequent diversions, and delays exacerbated by fuel shortages. Ambulances were often inadequately equipped, lacking oxygen cylinders, suction devices, and neonatal resuscitation kits. When ambulances were unavailable, providers advised families to use private transport, which many could not afford. One participant illustrated the extent of referral delays caused by these system inefficiencies:

"On one occasion, I called for an ambulance at 11 a.m. and was told it had gone to Kang'oma. I waited until 4 p.m. before it arrived, and instead of going directly to Bwaila, it went via Mbabzvi and Area 18 health centre" (RNM-M-P12).

In response to such delays, providers reported using informal transport arrangements when the patient's condition deteriorated:

"When the ambulance delays too much and the patient's condition is worsening, we sometimes advise guardians to find their own transport so that the woman can reach Bwaila as soon as possible" (NMT-M-P1).

Theme 4: Incomplete referral documentation

The absence of standardised referral forms led to incomplete and inconsistent documentation. Providers relied on handwritten notes on loose paper, resulting in missing vital signs, clinical assessments, and newborn details that delayed decision-making at receiving facilities. One participant highlighted the lack of structured documentation tools in routine practice:

"There are no standardised referral forms to guide us... I once managed a patient with eclampsia but used plain paper" (NMT-F-P10).

In some cases, the consequences of incomplete documentation only became apparent after patient transfer, as described by another participant:

"The baby's birth weight was not recorded... when the patient arrived at Bwaila, they called me, and I realised nothing had been documented" (RNM-F-P4).

Theme 5: Communication barriers

Limited access to facility phones and lack of official airtime forced health workers to use personal mobile phones for referral calls, causing financial strain and delays. Weaknesses in the Bwaila Hospital switchboard further complicated communication. Post-referral feedback was irregular, informal, and often blame-oriented, limiting learning and weakening staff confidence. One participant described the reliance on personal resources to facilitate referral communication:

"We use our own phones to call Bwaila or the ambulance driver because the facility does not provide any phone or airtime" (NMT-F-P9).

Feedback from the receiving facility was also reported as inconsistent and discouraging, as highlighted by another participant:

"Feedback from Bwaila is only provided when something has gone wrong. Instead of constructive feedback, they often accuse us of mismanaging the patient. It makes us feel discouraged to communicate with them again" (NMT-F-P5).

Theme 6: Patient-Related Barriers

Sociocultural beliefs and financial constraints significantly impeded referral acceptance. Many women sought advice from traditional healers or prophets before presenting at health facilities, leading to late arrival and delayed access to urgent care. Financial barriers, including transport costs, food, and accommodation, further hindered adherence to referral advice. One participant described delays linked to reliance on alternative care sources:

"Most patients with breech presentation go to prophets or witchdoctors before coming to the health centre. When they finally come, it is usually too late" (NMT-F-P10).

Economic hardship was also highlighted as a major reason for non-compliance with referral advice.

"High-risk patients are expected to deliver at Bwaila, but many fail to go because they lack money for transportation and food. Some say they would rather deliver here than suffer with hunger in town" (NMT-F-P5).

Women and guardians further described the financial burden of arranging transport, particularly during periods of fuel shortages. Some reported borrowing money or relying on transport providers willing to offer services on credit. One guardian recounted:

"I did not want to go… we were told to use our own transport instead of an ambulance to Bwaila. I searched for transport, but many taxi drivers reported fuel shortages and high prices. One driver said fuel was scarce and expensive on the black market and charged K45, 000.00 for urgent assistance. I agreed, but I have not yet paid, and the driver continues to call demanding payment." (FGD1-G4).

Discussion

This study explored barriers to effective obstetric referral at primary-level health facilities in Malawi, revealing interconnected system, facility, and patient-level challenges undermining timely, safe, and coordinated emergency care.

Human resource shortages emerged as a central barrier, consistent with evidence from Uganda, Ethiopia, and Tanzania showing that inadequate staffing delays emergency response and weakens referral quality (3, 16, 17). Despite Malawi's Human Resources for Health Strategic Plan, many facilities operated below recommended staffing levels, limiting adherence to referral and BEmONC guidelines (18). Addressing these challenges requires strengthening recruitment and deployment of skilled health personnel, improving retention strategies for rural facilities, and enhancing supportive supervision to improve referral timeliness, decision-making, and quality of care.

Persistent shortages of essential obstetric drugs and equipment compromise safe referral preparation, consistent with regional evidence (19, 20). These shortages reflect broader systemic challenges in procurement, supply chains, and equipment maintenance in low-income settings (21, 22), while also

creating emotional and ethical burdens on frontline providers (23, 24). Strengthening supply-chain management systems, timely maintenance or replacement of critical equipment, and ensuring consistent availability of life-saving obstetric resources could improve referral readiness and patient safety.

Transportation barriers were major contributors to delays, with both facilities relying on a single district ambulance. Even when available, ambulances were inadequately equipped, reinforcing the persistent contribution of transport barriers to the second delay, as documented across sub-Saharan Africa (5, 8). Delays in transportation increase the risk of maternal and neonatal morbidity and mortality, particularly among women requiring urgent surgical or specialist interventions. Addressing this requires fleet expansion, assured fuel availability, and operationalised district-level dispatch.

Poor documentation and inconsistent use of referral tools compromised information exchange between facilities. Similar challenges have been reported across sub-Saharan Africa, where the absence or inconsistent use of structured referral templates contributes to triage delays and suboptimal emergency care (3, 8). In Malawi, these challenges extend beyond tool availability to inconsistent adherence to Ministry of Health referral guidelines. Strengthening documentation through consistent availability of referral forms, routine mentorship, and integrated audits within quality-improvement frameworks is essential (3, 25, 26). This may enhance communication, continuity of care, and accountability across levels of the health system.

Communication gaps, where providers relied on personal phones and unreliable networks, increased referral delays and burdens on midwives. Irregular and blame-focused feedback limited learning opportunities and undermined staff confidence, as also documented in other low-resource settings (8, 13, 25). Systemic interventions, including dedicated facility-based communication channels, airtime provision, and formalised supportive feedback mechanisms, are needed.

Financial and sociocultural barriers delayed referral completion, compromising effectiveness despite appropriate clinical identification of emergencies (27–29). Such barriers disproportionately affect vulnerable women and contribute to inequities in access to emergency obstetric care. Addressing these challenges requires community-based interventions that strengthen awareness of obstetric danger signs, promote birth preparedness, and encourage timely care-seeking. The engagement of traditional leaders and financial support mechanisms, such as transport vouchers, could improve referral uptake and equity.

Conclusion

This study demonstrates that obstetric referral systems at Chitedze and Nathenje Health Centres are constrained by interconnected health-system and contextual barriers, including inadequate staffing, shortages of essential commodities, and limited transport capacity. Gaps in documentation, communication, and feedback mechanisms delayed referrals, with financial and sociocultural barriers further exacerbating these delays.

Improving obstetric referral pathways in low-resource settings requires investment in staffing, transport, and communication systems, standardised referral tools, and continuous capacity building. Addressing these gaps is essential to improve timely access to emergency obstetric care and support Malawi's progress toward Sustainable Development Goal 3.

Recommendations

Policy

Develop and enforce clear national referral guidelines and standard operating procedures. Allocate adequate funding for emergency transport, including ambulance procurement, maintenance, and fuel. Strengthen human resource capacity and improve communication infrastructure between referring and receiving facilities.

Education and Practice

Provide continuous in-service training on referral procedures, documentation, and emergency management. Strengthen inter-facility communication and feedback systems. Promote teamwork, mentorship, and supportive supervision to enhance referral process efficiency.

Research

Conduct mixed-methods research to evaluate the effectiveness of referral interventions and include perspectives from policymakers and transport service providers for a more comprehensive understanding.

Strengths and Limitations of the Study

Data were collected from multiple participant groups, including licenced nurse midwives (NMTs), registered nurse midwives (RNMs), patients, and guardians which enriched the study findings through diverse perspectives and experiences. Furthermore, the study provides valuable insights into both health system and interpersonal factors influencing obstetric referral experiences within the Malawian context.

Despite these strengths, this study has some limitations. This study was conducted in only two health centres, which may limit the transferability of the findings to other districts or health

facilities in Malawi. However, a detailed description of the study setting and context was provided to enable readers to determine the applicability of the findings to similar settings.

The principal investigator’s role as a senior nursing officer facilitated access to participants

and provided valuable contextual understanding of the study setting. However, this dual role

may also have introduced potential researcher bias. To address this, reflexivity was

maintained throughout the study through continuous self-reflection, and reflexive note-taking

during data collection and analysis.

Declarations

Ethical approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and relevant local ethical guidelines. Ethical approval was obtained from the College of Medicine Research and Ethics Committee of Kamuzu University of Health Sciences (Ref. No. P.03/25/1447). Permission to conduct the study was obtained from the relevant district health authorities and participating health facilities. Prior to data collection, written and verbal informed consent were obtained from all participants. Participation was voluntary, and confidentiality and anonymity were ensured through the use of unique participant identification codes, with no personal identifiers included in the study.

Consent for publication

Written informed consent for participation and publication of data was obtained from all participants prior to data collection. No identifiable personal information is included in this publication.

Availability of data

The study data are available from the corresponding author on request.

Conflict of interest

The authors report no conflicts of interest related to this study.

Funding

The study received no funding

Authors' contributions

NM performed the data collection. Data analysis was conducted by NM, MBM, UK, EC1, EC, FC, PM, and JM. The original manuscript was drafted by NM and EC1. NM, FC, JM, and PM reviewed the manuscript. All authors contributed to the completion of this manuscript and have read and approved the final version.

Acknowledgements

We sincerely thank all healthcare workers, patients, and guardians who participated in this study. We also thank the two health centres where this study was conducted.

References

1. Rahman P, Mehnaz S. International Journal for Multidisciplinary Research (IJFMR). SSRN Electron J. 2024. doi:10.2139/ssrn.5054029
2. Langlois EV, Reid A, Khosla R. Mothers deserve better: evidence-based strategies to address maternal mortality. Lancet Glob Health. 2025 May;13(5):e797–8. doi:10.1016/S2214-109X(25)00149-4
3. Mengist B, Semahegn A, Yibabie S, Amsalu B, Tura AK. Barriers to proper maternal referral system in selected health facilities in Eastern Ethiopia: a qualitative study. BMC Health Serv Res. 2024 Mar 27;24(1):376. doi:10.1186/s12913-024-10825-3
4. Nakayuki M, Basaza A, Namatovu H. Challenges Affecting Health Referral Systems in Low-And Middle-Income Countries: A Systematic Literature Review. Eur J Health Sci. 2021 Oct 3;6:33–44. doi:10.47672/ejhs.809
5. Mgawadere F, Unkels R, Kazembe A, Van Den Broek N. Factors associated with maternal mortality in Malawi: application of the three delays model. BMC Pregnancy Childbirth. 2017 Dec;17(1):219. doi:10.1186/s12884-017-1406-5
6. Serbanescu F, Goodwin MM, Binzen S, Morof D, Asiimwe AR, Kelly L, et al. Addressing the First Delay in Saving Mothers, Giving Life Districts in Uganda and Zambia: Approaches and Results for Increasing Demand for Facility Delivery Services. Glob Health Sci Pract. 2019 Mar 11;7(Supplement 1):S48–67. doi:10.9745/GHSP-D-18-00343
7. Cagayan MSF, Ang-Bon RM, Garcia F, San Juan F, Llave C, Banwell C, et al. Barriers to an Effective Maternal Health Service Delivery Network: A Qualitative Study among Health Providers in Legazpi City, Albay. Acta Med Philipp. 2020 Oct 28;54(5). doi:10.47895/amp.v54i5.664
8. Daniels AA, Abuosi A. Improving emergency obstetric referral systems in low and middle income countries: a qualitative study in a tertiary health facility in Ghana. BMC Health Serv Res. 2020 Dec;20(1):32. doi:10.1186/s12913-020-4886-3
9. Harahap NC, Handayani PW, Hidayanto AN. Barriers and technologies of maternal and neonatal referral system in developing countries: A narrative review. Inform Med Unlocked. 2019 Jan 1;15:100184. doi:10.1016/j.imu.2019.100184
10. Kazanga I, Munthali AC, McVeigh J, Mannan H, MacLachlan M. Predictors of Utilisation of Skilled Maternal Healthcare in Lilongwe District, Malawi. Int J Health Policy Manag. 2019 Aug 13;8(12):700–10. doi:10.15171/ijhpm.2019.67
11. MDHS. Malawi Demographic and Health Survey 2024 Final Report [Internet]. 2024. Available from: https://www.dhsprogram.com › pubs › pdf
12. UNFPA Malawi. UNFPA Malawi | Malawi reiterates commitment to the ICPD25 Agenda [Internet]. 2022. Available from: https://malawi.unfpa.org/en/news/malawi-reiterates-commitment-icpd25-agenda

13. Chitsa B. Factors Affecting the Provision of Referral Services at the Primary Level of Health Care in Zomba District in Malawi. 2019. doi:10.21522/TIJPH.2013.SE.19.01.Art023
14. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006 Jan;3(2):77–101. doi:10.1191/1478088706qp063oa
15. Jowsey T, Deng C, Weller J. General-purpose thematic analysis: a useful qualitative method for anaesthesia research. BJA Educ. 2021 Dec;21(12):472–8. doi:10.1016/j.bjae.2021.07.006
16. Kanyesigye H, Ngonzi J, Mulogo E, Fajardo Y, Kabakyenga J. Health Care Workers' Experiences, Challenges of Obstetric Referral Processes and Self-Reported Solutions in South Western Uganda: Mixed Methods Study. Risk Manag Healthc Policy. 2022 Oct 6;15:1869–86. doi:10.2147/RMHP.S377304 PubMed PMID: 36225611; PubMed Central PMCID: PMC9550169.
17. Selemani S, Mwakyusa MO, Bashiri S, Ezekiel MJ, Mwakawanga DL, Alwy Al-beity FM, et al. "Are all referrals necessary?" Experiences and perceptions of maternity healthcare providers on emergency intrapartum referrals in Dar es Salaam, Tanzania. Tappis H, editor. PLOS ONE. 2024 Feb 21;19(2):e0298103. doi:10.1371/journal.pone.0298103
18. Malawi, Health Sector Strategic Plan III. Government of the Republic of Malawi Health Sector Strategic Plan III 2023-2030 [Internet]. 2023. Available from: https://www.prepwatch.org › resources › malawi-health-s...
19. Ayawine A, Atinga RA. "We know it is not good, but we are constrained": A study on quality of emergency obstetric and newborn care in Northern Ghana. Heliyon. 2023 Apr;9(4):e15250. doi:10.1016/j.heliyon.2023.e15250
20. Pandey AR, Adhikari B, Lamichhane B, Joshi D, Regmi S, Lal BK, et al. Service Availability and Readiness for Basic Emergency Obstetric and Newborn Care: Analysis from Nepal Health Facility Survey 2021 [Internet]. Health Systems and Quality Improvement; 2023 [cited 2025 Nov 27]. Available from: http://medrxiv.org/lookup/doi/10.1101/2023.02.15.23285987 doi:10.1101/2023.02.15.23285987
21. Alfaouri M, Jaaron AAM, Igudia E. Pharmaceutical Supply Chain Management Challenges in Developing Countries: A Systematic Literature Review. J Afr Bus. 2025 Oct 2;26(4):798–841. doi:10.1080/15228916.2025.2532943
22. Olaniran A, Briggs J, Pradhan A, Bogue E, Schreiber B, Dini HS, et al. Stock-outs of essential medicines among community health workers (CHWs) in low- and middle-income countries (LMICs): a systematic literature review of the extent, reasons, and consequences. Hum Resour Health. 2022 Jul 15;20(1):58. doi:10.1186/s12960-022-00755-8
23. Addo B, Amoah H, Eshun S, Ocran H. Moral distress among midwives working in the labour ward of a hospital in Ghana. Eur J Midwifery. 2020 Jun 1;4(June). doi:10.18332/ejm/120117
24. Mashamba EK, Ramavhoya IT. The stress of the midwife: Experiences of advanced midwives working in obstetric emergency units in Johannesburg, South Africa. 2021.
25. Ameyaw EK, Njue C, Tran NT, Dawson A. Quality and women's satisfaction with maternal referral practices in sub-Saharan African low and lower-middle income countries: a systematic review. BMC

Pregnancy Childbirth. 2020 Dec;20(1):682. doi:10.1186/s12884-020-03339-3

26. Amoakoh-Coleman M, Ansah E, Klipstein-Grobusch K, Arhinful D. Completeness of obstetric referral letters/notes from subdistrict to district level in three rural districts in Greater Accra region of Ghana: an implementation research using mixed methods. BMJ Open. 2019 Sep;9(9):e029785. doi:10.1136/bmjopen-2019-029785
27. Alemayehu M, Yakob B, Khuzwayo N. Barriers and enablers to emergency obstetric and newborn care services use in Wolaita Zone, Southern Ethiopia: a qualitative case study. BMC Public Health. 2022 Nov 16;22(1):2087. doi:10.1186/s12889-022-14504-y
28. Amoakoh-Coleman M, Klipstein-Grobusch K, Vidzro ES, Arhinful DK, Ansah EK. Obstetric referral processes and the role of inter-facility communication: the district-level experience in the Greater Accra region of Ghana. Ghana Med J. 2022 Sep;56(3 Suppl):51–60. doi:10.4314/gmj.v56i3s.7 PubMed PMID: 38322747; PubMed Central PMCID: PMC10630038.
29. Rajbanshi S, Norhayati MN, Nik Hazlina NH. A Qualitative Study to Explore the Barriers for Nonadherence to Referral to Hospital Births by Women with High-Risk Pregnancies in Nepal. Int J Environ Res Public Health. 2021 May 28;18(11):5801. doi:10.3390/ijerph18115801

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryFile2.docx
- SupplementaryFile1.docx