RESEARCH ARTICLE

Journal of Public Health, Policy, and Society (JPHPS)
DOI: https://doi.org/10.54117/2jx9hk48

3(2): 146-151 (2026)

Determinants of Utilisation of Emergency Obstetric Equipment among Healthcare Givers in Bonny LGA

Oluwatomiyin Abosede Bassey-Ekong, Constance Chioma Oko

African Centre of Excellence for Public Health and Toxicology Research (ACE-PUTOR), University of Port Harcourt.

*Corresponding author e-mail address: toyinbe@gmail.com

Received: *11 Apr 2026* ***Accepted:*** *20 May 2026* ***Published:*** *29 May 2026*

ABSTRACT

Preventable obstetric emergencies remain a major cause of maternal and newborn deaths, yet many primary health care (PHC) facilities do not have consistently available and functional emergency obstetric care (EmOC) equipment, and referral pathways are often weak. In Bonny LGA, Rivers State, these challenges are intensified by the riverine context, where transport, distance, and communication barriers can delay timely care. Against this background, this study examined the determinants of utilization of EmOC equipment across PHC facilities in the area. A descriptive cross-sectional survey design was adopted. Fourteen (14) PHCs were assessed using a facility checklist, and 236 healthcare workers (doctors, nurses, midwives, CHOs and CHEWs) were selected through multistage sampling: proportionate stratified sampling (75% of facility staff strength), purposive selection of eligible cadres, and systematic random sampling within facilities. Data were collected using the Utilization of Basic Obstetric Care Emergency Equipment Questionnaire (UBOCEEQ) with a reliability coefficient of 0.87. The researcher with two Trained assistants administered questionnaires. Data were analyzed in SPSS v26 using frequencies, percentages, means, standard deviations, independent t-test, and one-way ANOVA for hypotheses. It was found that utilization was good (M = 2.70±0.69) but advanced procedures were poorly used (MVA M = 2.26; vacuum extraction M = 2.25). Healthcare workers' training $t(234)=6.434$, $p<.001$; and experience, $F(3,232)=15.068$, $p<.001$ influenced utilization. The study concluded that workers' training and experience are major determinants of utilisation of emergency obstetric equipment. One key recommendation is that public healthcare facilities management should implement continuous on the job training for healthcare workers as this will help to improve appropriate and adequate utilization of emergency obstetric equipment for better service delivery.

How to cite this article
Bassey-Ekong, O. A., & Oko, C. C. (2026). Determinants of utilisation of emergency obstetric equipment among healthcare givers in Bonny LGA. *Journal of Public Health, Policy, and Society*, *3*(2), 146–151. https://doi.org/10.54117/2jx9hk48

Keywords
Determinants, workers training, work experience, Emergency obstetric care (EmOC), Primary health care (PHC), Utilization

Introduction

Maternal mortality remains one of the clearest signs of weakness in health systems, especially in low and middle income countries where many women still face preventable risks during pregnancy and childbirth. In 2023, about 260,000 women died from pregnancy or childbirth related causes globally, and the global maternal mortality ratio was 197 deaths per 100,000 live births. The burden remains heaviest in poorer regions, with most maternal deaths occurring in low and lower middle income countries, where access to skilled birth attendance, emergency care, and timely referral is still uneven (WHO, 2025; UNICEF, 2025). Nigeria continues to carry a very high share of this burden. World Bank data show that Nigeria's maternal mortality ratio remains extremely high at about 993 deaths per 100,000 live births, a level that is far above the global average and still worse than the regional average for Sub Saharan Africa (World Bank, 2026; WHO, 2025). This means that maternal mortality in Nigeria is not only a clinical issue but also a systems issue, reflecting failures in readiness, response, staffing, and frontline decision making.

Most maternal deaths arise from complications that are well known and largely preventable when health workers respond quickly with the right skills, tools, and judgement. These complications include postpartum haemorrhage, hypertensive disorders such as preeclampsia and eclampsia, sepsis, obstructed labour, and complications of unsafe abortion (WHO, 2025). Emergency obstetric care was designed to address these conditions through time sensitive interventions such as parenteral antibiotics, oxytocics, anticonvulsants, assisted vaginal delivery, removal of retained products, and newborn resuscitation, with referral to higher facilities when needed (WHO, 2009; Bailey *et al*., 2006). Yet the presence of policy and technical standards does not automatically produce safe practice. Equipment may be absent, broken, poorly maintained, or locked away from the point of care. Even where equipment is present, it may still be underused because providers lack confidence, have weak practical exposure, or do not receive enough supervision and reinforcement. The real challenge, therefore, is not only equipment availability but whether available emergency obstetric equipment is actually utilized during critical moments of care.

This is where provider factors become important. Training shapes knowledge, confidence, and competence, and it can influence whether health workers recognize emergencies early and use equipment correctly. However, training is not always equal to effective practice. Skills may fade when staff are not retrained, supported, or regularly exposed to emergencies, especially in lower level facilities where complex cases are less frequent (van Lonkhuijzen *et al*., 2010; Johanson *et al*., 2020). Work experience may also matter because repeated clinical exposure can build judgement, speed, and practical familiarity with emergency procedures. At the same time, experience alone may not guarantee good utilization if staff were never properly trained, if they learned outdated methods, or if the facility environment discourages action. This makes training and work experience important but also contestable determinants. Their effects are likely shaped by the wider context of staffing, workload, fear of blame, weak supervision, and poor institutional support. The issue is therefore not simply whether providers have years on the job, but whether their knowledge and experience are translated into competent equipment use when emergencies occur.

Journal of Public Health, Policy, and Society (JPHPS)
DOI: https://doi.org/10.54117/2jx9hk48
3(2): 146-151 (2026)

The concern becomes more urgent in primary health care facilities located in difficult settings such as Bonny Local Government Area in Rivers State. Bonny is a riverine area where movement is heavily water based and referral can be delayed by distance, transport barriers, weather conditions, and communication gaps (Mezie Okoye *et al*., 2022). In such a setting, PHCs are often the nearest and sometimes the only realistic first point of care for pregnant women, which makes prompt stabilization before referral extremely important (MacDorman *et al*., 2021; Wolf *et al*., 2023). Existing evidence shows that Bonny's geography and service conditions can worsen emergency delays, while local evidence on what equipment is used, by whom, and under what constraints remains limited (Mezie Okoye *et al*., 2022; Mkoka *et al*., 2024). This is a critical gap because the consequences of delayed or poor utilization of emergency obstetric equipment are likely to be more severe in riverine communities than in urban locations with easier access to hospitals (Mkoka *et al*., 2024). Bonny therefore offers a strong context for examining whether healthcare providers' training and work experience influence the utilization of emergency obstetric care equipment in PHC facilities.

Against this background, the problem of this study is that maternal emergencies remain highly dangerous in Bonny PHCs because the mere presence of emergency obstetric equipment does not guarantee its effective utilization, and little local evidence exists on whether providers' training and work experience significantly shape such utilization. This gap weakens evidence-based planning for training, deployment, supervision, and service improvement in a high-risk riverine setting. The major questions arising from this problem are: does healthcare providers' training significantly influence the utilization of emergency obstetric care equipment in PHC facilities in Bonny LGA, and does healthcare providers' work experience significantly influence such utilization? In line with these questions, the study is guided by the following null hypotheses: healthcare providers' training has no significant influence on the utilization of emergency obstetric care equipment in PHC facilities in Bonny LGA; healthcare providers' work experience has no significant influence on the utilization of emergency obstetric care equipment in PHC facilities in Bonny LGA. These questions and hypotheses make it possible to test whether provider related factors help explain a practical frontline problem that continues to shape maternal risk in Bonny.

Methodology

Design: The study adopted a descriptive cross sectional survey design using a quantitative approach to provide a clear snapshot of emergency obstetric care equipment readiness and use across primary health care facilities in Bonny LGA. This design was appropriate because the study sought to describe existing conditions at a single point in time, particularly the extent of utilization by providers, and the influence of selected provider training and work experience on the extent of utilization.

Population/sampling: The study population was 315 healthcare workers drawn from 14 primary health care facilities in Bonny LGA. The sample size for the study was 236 healthcare workers. Sampling was multistage. First, the researcher used proportionate allocation based on facility staff strength and selected about 75 percent of staff from each facility so that both larger and smaller facilities were fairly represented. Next, purposive sampling was used to retain only eligible healthcare workers who were directly involved in obstetric or maternal health services. Finally, systematic random sampling was applied within each facility to select individual participants from staff lists after proportional allocation had been determined. This approach strengthened representativeness while ensuring that the respondents were those most relevant to the study objectives. In addition to the questionnaire survey, all 14 facilities were assessed with a checklist to document the presence, functionality, and accessibility of basic emergency obstetric equipment.

Instrument for data collection: Data was collected using the Utilization of Basic Obstetric Care Emergency Equipment Questionnaire (**UBOCEEQ**), developed to measure utilization. The questionnaire was structured in two sections which include the demographic characteristics (section A) and the utilization scale (section B) containing 15 items of the UBOCEEQ. It was structured as a 4 points Likert scale scored Very Often (4), Often (3), Rarely (2), and Never (1). The items assessed how often providers used key EmOC equipment and procedures in managing obstetric emergencies. To ensure validity, both instruments underwent face, content, and construct validation by three experts in obstetrics and gynaecology, public health, and measurement and evaluation. After their review, ambiguous items were revised and the final tools were pilot tested outside the study area. Reliability was established using Cronbach's alpha, producing acceptable coefficients of 0.87.

Data Collection and Analysis: Data were collected physically by the researcher and two trained assistants during visits to the selected PHCs. On each visit, the team first met the facility head and administrative staff, administered the questionnaires to sampled healthcare workers. Completed questionnaires were checked for completeness, coded, and entered for analysis. The data were analysed with SPSS version 26 using descriptive statistics such as frequencies, percentages, means, and standard deviations to answer the research questions. Inferential statistics were then used to test the hypotheses at the 0.05 level. Independent sample t-test tested the influence of training, and one way ANOVA assessed the effect of work experience on utilization. This analytical procedure allowed the study to move beyond description and test whether the selected determinants significantly shaped equipment use in Bonny PHCs.

Ethical Clearance: Ethical approval was obtained from the University of Port Harcourt Research Ethics Committee, with permission from PHC authorities and facility heads. Participation was voluntary, with written informed consent obtained. Confidentiality, anonymity, privacy, secure data storage, and the right to withdraw without penalty were fully guaranteed throughout the study.

Results

The table 1 above showed the demographic distribution of the respondents in relation to age, work experience, and exposure to EMOC training. The result revealed that most respondents were aged 26–35 years, accounting for half of the sample (50%, n=118), indicating that the workforce is largely in its early productive years. Respondents aged 36–45 years formed about one quarter (24.6%, n=58), while younger workers aged 18–25 years (13.1%, n=31) and older workers aged 46 years and above (12.3%, n=29) were fewer. This suggests a relatively young and active health workforce. Moreso, most respondents had between 3–5 years of work experience (30.1%, n=71), closely followed by those with 6–10 years of experience (29.2%, n=69). Fewer respondents had 0–2 years of experience (20.8%, n=49), while those with 11 years and above constituted 19.9% (n=47). This indicated that the workforce largely consisted of moderately experienced healthcare providers with practical exposure to maternal care services. Finally, the table data revealed that more

Journal of Public Health, Policy, and Society (JPHPS)
DOI: https://doi.org/10.54117/2jx9hk48
3(2): 146-151 (2026)

than half of the respondents had received EmOC/BEmOC training within the last two years, accounting for 56.4% (n=133). However, a substantial proportion, 43.6% (n=103), reported that they had not received such training during the period. This suggested that although training coverage was fairly good, a notable gap still existed, which could affect providers' preparedness to manage obstetric emergencies effectively.

Table 1: Demographic characteristics of the respondents

Demography	Cohorts	f	%
Age	18–25 years	31	13.10
	26–35 years	118	50.00
	36–45 years	58	24.60
	46+ years	29	12.30
	Total	**236**	**100.00**
Work Experience	0–2 years	49	20.80
	3–5 years	71	30.10
	6–10 years	69	29.20
	11 years and above	47	19.90
	Total	**236**	**100.00**
Exposure to EmOC/BEmOC Training	Yes	133	56.40
	No	103	43.60
	Total	**236**	**100.00**

To what extent do healthcare providers utilize available EmOC equipment in the management of obstetric emergencies?

Table 2 indicated that healthcare providers generally utilized available EmOC equipment at a good level, with an overall mean of 2.70 (SD = 0.69), which fell within the 2.50–2.99 benchmark. Response patterns also supported this, as most respondents reported using items often (51.41%) or rarely (33.42%), while very often responses were relatively low (11.55%) and never responses were minimal (3.62%). Basic and routine practices recorded stronger use, including sterile delivery sets (M = 2.96), IV line/fluids (M = 2.92), infection prevention items (M = 2.90), blood pressure assessment (M = 2.83), and guideline use (M = 2.81). In contrast, utilization was poor for more advanced procedures requiring higher skills and equipment support, such as uterine evacuation (M = 2.26) and vacuum extraction (M = 2.25). Overall, the findings suggest that utilization was fairly consistent for basic actions but limited for advanced obstetric interventions.

Table 2: Mean and standard deviation analysis of the extent do healthcare providers utilize available EmOC equipment in the management of obstetric emergencies

S/No	Items	VO f(%)	O f(%)	R f(%)	N f(%)	Mean	SD
1	I use a blood pressure apparatus to assess women with emergency symptoms.	31 (13.1%)	139 (58.9%)	60 (25.4%)	6 (2.5%)	2.83	0.68
2	I use a fetal Doppler/Pinard to check fetal condition during emergencies.	21 (8.9%)	126 (53.4%)	77 (32.6%)	12 (5.1%)	2.66	0.71
3	I use a partograph to monitor labour progress and detect danger early.	26 (11.0%)	116 (49.2%)	91 (38.6%)	3 (1.3%)	2.7	0.68
4	I start IV line and fluids when stabilizing obstetric emergency cases.	50 (21.2%)	122 (51.7%)	59 (25.0%)	5 (2.1%)	2.92	0.74
5	I use oxygen when a mother shows signs of severe distress.	30 (12.7%)	132 (55.9%)	69 (29.2%)	5 (2.1%)	2.79	0.68
6	I use suction equipment when needed during emergency management.	16 (6.8%)	130 (55.1%)	84 (35.6%)	6 (2.5%)	2.66	0.64
7	I use neonatal bag and mask for newborn resuscitation when required.	19 (8.1%)	126 (53.4%)	87 (36.9%)	4 (1.7%)	2.68	0.64
8	I use mucus extractor/bulb suction for newborn airway clearing when needed.	29 (12.3%)	121 (51.3%)	79 (33.5%)	7 (3.0%)	2.73	0.71
9	I use a sterile delivery set correctly during emergency deliveries.	47 (19.9%)	136 (57.6%)	50 (21.2%)	3 (1.3%)	2.96	0.68
10	I use infection prevention items (sterile gloves, sharps box, proper waste disposal) during emergencies.	49 (20.8%)	119 (50.4%)	64 (27.1%)	4 (1.7%)	2.9	0.73
11	I use uterine evacuation equipment (MVA/other set) when indicated and allowed.	5 (2.1%)	80 (33.9%)	122 (51.7%)	29 (12.3%)	2.26	0.69
12	I use assisted vaginal delivery equipment (vacuum extractor) when indicated and permitted.	4 (1.7%)	81 (34.3%)	121 (51.3%)	30 (12.7%)	2.25	0.69
13	I use available guidelines/protocols to guide EmOC actions during emergencies.	33 (14.0%)	129 (54.7%)	70 (29.7%)	4 (1.7%)	2.81	0.69
14	I complete referral documentation properly during emergency referrals.	30 (12.7%)	128 (54.2%)	74 (31.4%)	4 (1.7%)	2.78	0.68
15	I communicate with the receiving facility using phone/radio before or during referral.	19 (8.1%)	135 (57.2%)	76 (32.2%)	6 (2.5%)	2.71	0.65
	Aggregate	**27 (11.55%)**	**121(51.41%)**	**79(33.42%)**	**9(3.62%)**	**2.70**	**0.69**

Note: mean <2.50 Poor; 2.50-2.99 good level; 3.00-4.00 Very good.

Journal of Public Health, Policy, and Society (JPHPS)
DOI: https://doi.org/10.54117/2jx9hk48
3(2): 146-151 (2026)

Hypothesis 1: Healthcare providers training has significant influence on utilization of EmOC equipment.

Table 3 showed that training had a statistically significant influence on the utilization of EmOC equipment. Healthcare providers who had received EmOC/BEmOC training in the last two years reported a higher mean utilization score (M = 2.79, SD = 0.21) than those who had not received training (M = 2.61, SD = 0.22). The t-test result indicated that this difference was significant, t(234) = 6.434, p < .001. Therefore, the null hypothesis was rejected, and it was concluded that recent training significantly improved EmOC equipment utilization among providers.

Table 3: T-test analysis of the if healthcare providers training has significant influence on utilization of EmOC equipment

	Group	n	Mean	St.D	df	t	P.val
Have you received any EmOC/BEmOC training in the last 2 years?	Yes	133	2.79	0.21			
	No	103	2.61	0.22	234	6.434	0.00
		236					

Hypothesis 2: Healthcare providers work experience has no significant influence on the utilization of EmOC equipment.

Table 4 showed that healthcare providers' work experience had a statistically significant influence on the utilization of EmOC equipment. The ANOVA result indicated a significant difference in utilization scores across the four work-experience groups, F(3, 232) = 15.068, p < .001. This means that utilization was not the same for all experience categories. Therefore, the null hypothesis was rejected, and it was concluded that work experience significantly influenced EmOC equipment utilization among healthcare providers in Bonny LGA PHCs.

Table 4: Summary of One-way ANOVA to establish if Healthcare providers work experience has significant influence on the utilization of EmOC equipment

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.018	3	1.673	15.068	0.000
Within Groups	25.768	232	0.111		
Total	30.786	235			

Discussion

The findings showed that healthcare providers in Bonny LGA primary health care facilities utilized available emergency obstetric care equipment at a generally good level, with an aggregate mean score of 2.70 (SD = 0.69). Utilization was stronger for basic and routine items such as sterile delivery sets, intravenous line and fluids, infection prevention materials, blood pressure apparatus, and clinical guidelines. However, the use of more advanced procedures was poor, especially uterine evacuation equipment for manual vacuum aspiration and assisted vaginal delivery equipment for vacuum extraction, both of which recorded mean scores below the benchmark of 2.50. In addition, healthcare providers who had received EmOC or BEmOC training within the previous two years reported significantly higher utilization than those without such training, $t(234) = 6.43$, $p < .001$. Work experience also had a statistically significant influence on utilization, $F(3, 232) = 15.07$, $p < .001$. These findings indicate that utilization in Bonny PHCs is shaped by both provider capacity and practice exposure, rather than occurring randomly or uniformly across all aspects of emergency obstetric care.

This pattern is important because it suggests that PHC providers are more consistent in using equipment associated with routine stabilization and common delivery practices than in using equipment linked to complex or less frequently performed obstetric procedures. This finding is broadly consistent with Maswanya *et al.* (2021), who found that health facilities in Tanzania were more likely to provide basic signal functions than more technically demanding interventions such as assisted vaginal delivery and uterine evacuation. It also aligns with Pandey *et al.* (2023), who reported important readiness gaps in lower-level facilities in Nepal, especially where the full package of basic emergency obstetric and newborn care was expected but not consistently operational. The Bonny result therefore supports the wider view that lower tier maternal care facilities often function with partial readiness, where some components of emergency care are embedded in daily practice while other essential lifesaving procedures remain weak. This matters clinically because emergencies do not always present in ways that can be safely managed with only basic actions, and delayed use of advanced procedures may increase the likelihood of poor maternal outcomes.

The particularly low utilization of manual vacuum aspiration and vacuum extraction deserves critical attention. These procedures are essential within the BEmOC package, yet their poor use in Bonny suggests that the problem is not merely one of access to equipment, but one of confidence, procedural competence, authorization, and institutional support. This interpretation is consistent with Obembe *et al.* (2017), who observed that low provider confidence, weak institutional support, and poor working conditions can discourage active use of emergency obstetric interventions. It is also supported by Bailey (2020), who noted that assisted vaginal delivery is becoming a declining skill in some settings despite its recognised importance in emergency obstetric care. Thus, the low use of advanced equipment in Bonny should not be simplistically interpreted as staff unwillingness. Rather, it appears to reflect a practical and systemic gap between what providers are expected to do and what they are actually equipped, trained, and supported to perform in real emergency situations.

The significant influence of training on utilization is one of the clearest findings of the study. Providers who had received recent EmOC or BEmOC training showed better utilization scores than those who had not. This finding supports the

argument of Ameh and van den Broek (2025) that training in emergency obstetric and newborn care is central to improving provider competence and service quality. It also agrees with Austin *et al*. (2025), who identified inadequate pre-service and in-service training as a major barrier to quality emergency obstetric care in Ethiopia. Similarly, Jejaw *et al*. (2023) found that training gaps weakened the implementation of comprehensive emergency obstetric and newborn care, even in facilities with otherwise acceptable programme structures. The implication of the Bonny finding is therefore clear: training does not simply improve theoretical knowledge, but directly shapes whether providers are able and willing to use equipment appropriately during emergencies. At the same time, the literature warns that training effects can weaken when skills are not reinforced through practice, mentorship, and supportive supervision (Johanson *et al*., 2020; van Lonkhuijzen *et al*., 2020). This means that periodic workshops alone may not sustain improvement unless they are linked to continuous hands-on support within the facility.

The finding that work experience significantly influenced utilization also deserves a careful reading. On one hand, it suggests that providers with longer clinical exposure may develop stronger judgement, familiarity, and confidence in emergency situations. This interpretation is in line with Mukuru *et al*. (2021), who showed that frontline emergency obstetric practice is shaped by accumulated service realities and coping patterns within constrained environments. However, experience should not be treated as a substitute for updated skills or system readiness. Alemayehu *et al*. (2022) showed that competency, referral systems, leadership, and infrastructure interact to shape the use of EmONC services, while Cavallaro *et al*. (2020) and Daniels and Abuosi (2020) demonstrated that referral delays, transport barriers, and weak coordination can still undermine emergency care even when providers are present. In Bonny, a riverine setting with difficult referral pathways, this broader systems perspective is especially important. The findings therefore suggest that training and work experience are major determinants of EmOC equipment utilization, but their effects are strengthened or limited by wider structural realities. Overall, the study makes a useful contribution by showing that effective utilization of emergency obstetric equipment in Bonny PHCs depends on the interaction between provider preparation, accumulated practice experience, and the enabling conditions of the health system.

Conclusion

This study concludes that the utilization of emergency obstetric care equipment in primary health care facilities in Bonny LGA is fairly good at the basic level, but important gaps remain in the use of more advanced lifesaving procedures. The findings show that healthcare workers were more likely to use routine equipment and supplies than equipment linked to manual vacuum aspiration and vacuum extraction. This uneven pattern suggests that service readiness cannot be judged only by the presence of equipment, but by whether staff are able and confident enough to use it when emergencies occur. The study also established that training and work experience significantly influenced utilization. This means that provider capacity is central to the quality of emergency obstetric response in Bonny PHCs. Overall, improving maternal outcomes in this riverine setting will depend on strengthening staff competence, sustaining practical exposure, and creating facility conditions that support the effective use of available emergency obstetric equipment.

Recommendations

Based on the study findings, the following recommendations were fundamental:

1. Rivers State Primary Health Care Management Board and Bonny LGA health authorities should implement regular in service EmOC training for all relevant PHC workers, especially nurses, midwives, CHOs, and CHEWs, through periodic hands-on drills, simulation sessions, and refresher workshops. This should be done at scheduled intervals and tied to practical competency checks because recent training was shown to improve utilization. The aim is to strengthen confidence and ensure that lifesaving procedures are not avoided during emergencies.
2. Facility heads and maternal health supervisors should establish routine supportive supervision and clinical mentoring within PHCs by observing practice, guiding less experienced staff, and providing feedback during maternal care activities. This should focus particularly on advanced procedures and emergency decision making. The reason is that work experience influenced utilization, which means that structured mentorship can help less experienced workers gain practical competence more quickly and safely.
3. Government and PHC facility managers should ensure that all EmOC equipment is available, functional, accessible, and supported by clear use protocols and referral communication systems. This should involve regular equipment audits, maintenance plans, replacement of faulty items, and keeping emergency guidelines visible in labour and delivery units. This is necessary because equipment cannot save lives if it is unavailable, non-functional, difficult to access, or not backed by clear emergency response processes.

Reference

Alemayehu, M., Yakob, B., & Khuzwayo, N. (2022). Barriers and enablers to emergency obstetric and newborn care services use in Wolaita Zone, Southern Ethiopia: A qualitative case study. *BMC Public Health, 22*(1), 2087–2099.

Ameh, C. A., & Van Den Broek, N. (2025). Making it happen: training health-care providers in emergency obstetric and newborn care. *Best practice & research Clinical obstetrics & gynaecology*, *29*(8), 1077-1091.

Austin, A., Gulema, H., Belizan, M., Colaci, D. S., Kendall, T., Tebeka, M., *et al*. (2025). Barriers to providing quality emergency obstetric care in Addis Ababa, Ethiopia: Healthcare providers' perspectives on training, referrals and supervision, a mixed methods study. *BMC Pregnancy and Childbirth, 15*(1), 74–88.

Bailey, P. E. (2020). The disappearing art of instrumental delivery: Time to reverse the trend. *International Journal of Gynecology & Obstetrics, 91*(1), 89–96.

Bailey, P. E., Paxton, A., Lobis, S., & Fry, D. (2006). The availability of life saving obstetric services in developing countries: An in depth look at the signal functions for emergency obstetric care. *International Journal of Gynecology & Obstetrics, 93*(3), 285–291.

Cavallaro, F. L., Benova, L., Wong, K., Sheppard, P., Faye, A., Radovich, E., *et al*. (2020). What the percentage of births in

facilities does not measure: Readiness for emergency obstetric care and referral in Senegal. *BMJ Global Health, 5*(3), 1–11.

Daniels, A. A., & Abuosi, A. (2020). Improving emergency obstetric referral systems in low and middle income countries: A qualitative study in a tertiary health facility in Ghana. *BMC Health Services Research, 20*(1), 32–41.

Jejaw, M., Debie, A., Yazachew, L., & Teshale, G. (2023). Comprehensive emergency management of obstetric and newborn care program implementation at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2021: An evaluation study. *Reproductive Health, 20*(1), 76–92.

Johanson, R., Akhtar, S., Edwards, C., Dewan, F., Haque, Y., & Jones, P. (2020). MOET: Bangladesh – An initial experience. *Journal of Obstetrics and Gynaecology Research, 28*(4), 217–223.

MacDorman, M. F., Thoma, M., Declercq, E., & Howell, E. A. (2021). Causes contributing to the excess maternal mortality risk for women 35 and over, United States, 2016–2017. *PloS one, 16*(6), e0253920.

Maswanya, E., Muganyizi, P., Kilima, S., Mogella, D., & Massaga, J. (2021). Practice of emergency obstetric care signal functions and reasons for non-provision among health centers and hospitals in Lake and Western Zones of Tanzania. *BMC Health Services Research, 18*(1), 944–958.

Mezie-Okoye, M. M., Adeniji, F. O., Tobin-West, C. I., & Babatunde, S. (2022). Status of emergency obstetric care in a local government area in South-South Nigeria. *African Journal of Reproductive Health, 16*(3), 171–179.

Mkoka, D. A., Goicolea, I., Kiwara, A., Mwangu, M., & Hurtig, A. K. (2024). Availability of drugs and medical supplies for emergency obstetric care: Experiences of health facility managers in a rural district of Tanzania. *BMC Pregnancy and Childbirth, 14*, 108-123.

Mukuru, M., Kiwanuka, S. N., Gibson, L., & Ssengooba, F. (2021). Challenges in implementing emergency obstetric care policies: Perspectives and behaviours of frontline health workers in Uganda. *Health Policy and Planning, 36*(3), 260–272.

Obembe, T. A., Osungbade, K. O., & Ibrahim, C. (2017). Appraisal of primary health care services in Federal Capital Territory, Abuja, Nigeria: How committed are the health workers? *Pan African Medical Journal, 28*(134), 1-13.

Pandey, A. R., Adhikari, B., Lamichhane, B., Joshi, D., Regmi, S., Lal, B. K., *et al.* (2023). Service availability and readiness for basic emergency obstetric and newborn care: Analysis from Nepal Health Facility Survey 2021. *PLOS ONE, 18*(8), e0282410.

United Nations Children's Fund. (2025). *Trends in maternal mortality 2000 to 2023: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division*. UNICEF.

van Lonkhuijzen, L., Dijkman, A., van Roosmalen, J., Zeeman, G., & Scherpbier, A. (2020). A systematic review (van Lonkhuijzen, Dijkman, van Roosmalen, Zeeman, & Scherpbier, 2020; Fournier, Dumont, Tourigny, Dunkley, & Dramé, 2019) of the effectiveness of training in emergency obstetric care in low-resource environments. BJOG: An International Journal of Obstetrics & Gynaecology, 117(7), 777–787.

van Lonkhuijzen, L., Dijkman, A., van Roosmalen, J., Zeeman, G., & Scherpbier, A. (2010). A systematic review of the effectiveness of training in emergency obstetric care in low resource environments. *BJOG: An International Journal of Obstetrics & Gynaecology, 117*(7), 777–787.

Wolf, L., Noblewolf, H. S., Callihan, M., & Moon, M. D. (2023). What if it were me? A qualitative exploratory study of emergency nurses' clinical decision making related to obstetrical emergencies in the context of a post-roe environment. *Journal of Emergency Nursing, 49*(5), 714-723.

World Bank. (2026). *Maternal mortality ratio (modeled estimate, per 100,000 live births), Nigeria*. World Bank Data. https://data.worldbank.org/indicator/SH.STA.MMRT?locations=NG

World Health Organization. (2009). *Monitoring emergency obstetric care: A handbook*. World Health Organization. https://iris.who.int/bitstream/handle/10665/44121/9789241547734_eng.pdf)?sequence=1

World Health Organization. (2025, April 7). *Maternal mortality*. https://www.who.int/news-room/fact-sheets/detail/maternal-mortality (World Health Organization)