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Original Research Article

Contextual Factors Influencing the Retention of BEmONC Knowledge and Skills among Skilled Birth Attendants in Western Kenya

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Abstract: ***Background:*** Globally, maternal mortality rate (MMR) fell by nearly 44% from 385 maternal deaths per 100,000 live births in 1990 to an estimated 216 deaths per 100,000 live births in 2015 (Wang, 2021).Most of the maternal deaths occur in low- and middle-income countries, with sub-Saharan Africa accounting for 66 per cent of the maternal deaths (Onambele *et al.*, 2022). Kenya saw a significant drop in MMR from of 605 in 2010 to 510 in 2015 while the deliveries by skilled birth attendants increased from 44% in 2008-09 to 62% in 2014. Besides, health facility deliveries increased from 43% to 61% (KDHS 2014). The improved maternal health indicators have been attributed to trainings of healthcare workers on maternal and newborn healthcare, improved in-service training, continuous supply of obstetric basic and emergency equipment and supplies, improved referral systems and periodic monitoring and evaluation among other interventions. However, MMR remains very high and there exists in-country disparities in the rate of maternal deaths. Kisumu and Vihiga counties are at 597 and 531 maternal deaths per 100,000 live births, respectively. ***Objective:*** To explore the contextual factors influencing the retention of BEmONC knowledge and skills among skilled birth attendants in Western Kenya. ***Methods:*** The study employed a descriptive phenomenological approach to explore the contextual factors influencing the retention of BEmONC knowledge and skills among skilled birth attendants in Western Kenya. Purposive sampling technique was used to select 30 participants for two focused group discussion (FGDs) conducted between October and November 2021.The data were analyzed via inductive thematic analysis. ***Results:*** The thematic areas fell into six categories: The perspective of individual SBA, structural level perspective; sub-theme; infrastructure and facilities, human resource, logistic and supplies: Transportation and accessibility, financial barriers, information and awareness; cultural and societal factors: Policy and governance; data monitoring and use health facility supply and skilled birth attendants' perspective of skills after BEmONC. ***Conclusion:*** Skilled birth attendants with BEmONC training have several contextual factors which contribute negatively in the provision of BEmONC in their respective working area such as lack of equipment and facilities, less up to date training and infrequent supportive supervision. Poor referral systems are also a factor causing delay in care provision.

Keywords: Infrastructure, skilled, birth attendance, BEmONC, knowledge, skills.

INTRODUCTION

Globally, maternal mortality rate (MMR) fell by nearly 44% from 385 maternal deaths per 100,000 live births in 1990 to an estimated 216 deaths per 100,000 live births in 2015 (Wang, 2021)Most of the maternal deaths occur in low- and middle-income countries, with sub-Saharan Africa accounting for 66 per cent of the maternal deaths (Onambele *et al.*, 2022).This, despite, a varying level of decline between 1990 and 2015. Kenya saw a significant drop in MMR from of 605 in 2010 to 510 in 2015 while the deliveries by skilled birth attendants increased from 44% in 2008-09 to 62% in 2014. Besides, health facility deliveries increased from 43% to 61% (Necochea *et al.*, 2015).The improved maternal health indicators have been attributed to

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trainings of healthcare workers on maternal and newborn healthcare, improved in-service training, continuous supply of obstetric basic and emergency equipment and supplies, improved referral systems and periodic monitoring and evaluation among other interventions. (Tomlin *et al.,* 2020).However, MMR remains very high and there exists in-country disparities in the rate of maternal deaths. 15 out of 47 counties account for three quarters of MMR in Kenya with Mandera at 3795 deaths while Kisumu and Vihiga counties are at 597 and 531 maternal deaths per 100,000 live births, respectively (Doris *et al.,* 2021).

METHODS

Study Design and Setting

This study employed a descriptive phenomenological approach to understand the contextual factors influencing the retention of BEmONC knowledge and skills after initial training. in Kisumu and Vihiga counties in Kenya. The design was chosen because it allowed researchers to use a Lazarus and Folkman transactional model to explore the experiences of individual within the experimental world and how individuals make sense to the words to provide insightful accounts of their subjective experiences. The two counties in Western Kenya have maternal mortality ratios (MMR) above the national average allowing recruitment of participants from both counties.

Sampling and Participant Selection

Purposive and snowballing techniques were used to recruit 30 skilled birth attendants. We included unit in-charges in the level three and four health facilities at the time of the study. Information about the study was disseminated through the facility in charge. The principal investigator explained the purpose and protocol of the study to the selected participants and the participants provided written e-consent. The FDG was done virtually. All the 30 participants (100%) consented to the study.

Data Collection

Two focus group discussion (FDGs), each comprising of 15 unit in-charges one from each county, were conducted between October – November 2021. The first author (DCK), a female experienced qualitative researcher and BEmONC trainer and the principal investigator, conducted the FDGs, supported by a research assistant in qualitative research did the recording during each focus group. The FDGs were guided by a semi- structured interview guide with follow up questions and probes used to discern the unit in-charges context on what contributed to knowledge and skills retention in BEmONC. The relevance of the content of the interview guide was assessed by two qualitative and subject matter experts. The interviews were conducted in English and lasted approximately 75 minutes. At the start of each interview. consent was obtained virtually from each participant to record the interview, and the participant were reminded of their rights to participate in the discussion. Data saturation was attained with the second FDG which revealed no additional information from the participants.

Data Analysis

Recorded data were transcribed verbatim and imported to NVivo qualitative analysis software version 22 (QSR international, Victoria, Australia) for the inductive thematic analysis (Byrne, 2022). First. the researchers read and reread the transcript and listened to the audio. Second, the data were coded separately by the principal investigator and research assistant. the initial codes generated were discussed between the two coders and with the research team for comparison and concurrence and to identify initial themes. some codes were modified, while others were dropped. Third, similar codes were grouped to form themes and sub-themes. the final identified themes were grounded into the data.

Rigour

To ensure trustworthiness, we used various strategies to ensure credibility, dependability, confirmability and transferability, as proposed by Lincoln and Guba (Enworo, 2023). First, purposive sampling was used to identify the study participants- unit in-charges in BEmONC facilities who were involved with implementation of the programme, hence providing a more accurate account of their experiences. In addition, all the FGDs were audio-recorded for verification and two investigators coded the data to allow investigator triangulation.

Secondly, the study was conducted with unit in-charges for selected facilities in the two counties, which allowed the inclusion of in-charges from level 3 and 4, increasing the credibility of our study. Similarly, to ensure credibility, a semi- structured discussion guide was used, a diverse group of researchers collected and analyzed the data and analyses were discussed at different point to reduce potential researcher biases. Third, the study adhered to the 32-item checklist of consolidated reporting guidelines for qualitative research (Buus & Perron, 2020).

RESULTS

Participant's Demographics and Characteristics

Two focus groups involving 30 unit in-charges were conducted. Most SBAs were women (n=26, 86.6%), male (n=4, 13.4%)

Five main themes were identified, each further classified based on sub-themes (Fig1). Each of the theme was discussed in detail, including illustrative quota from participants identified by the focus group and participant number and sex (male, M or Female, F).

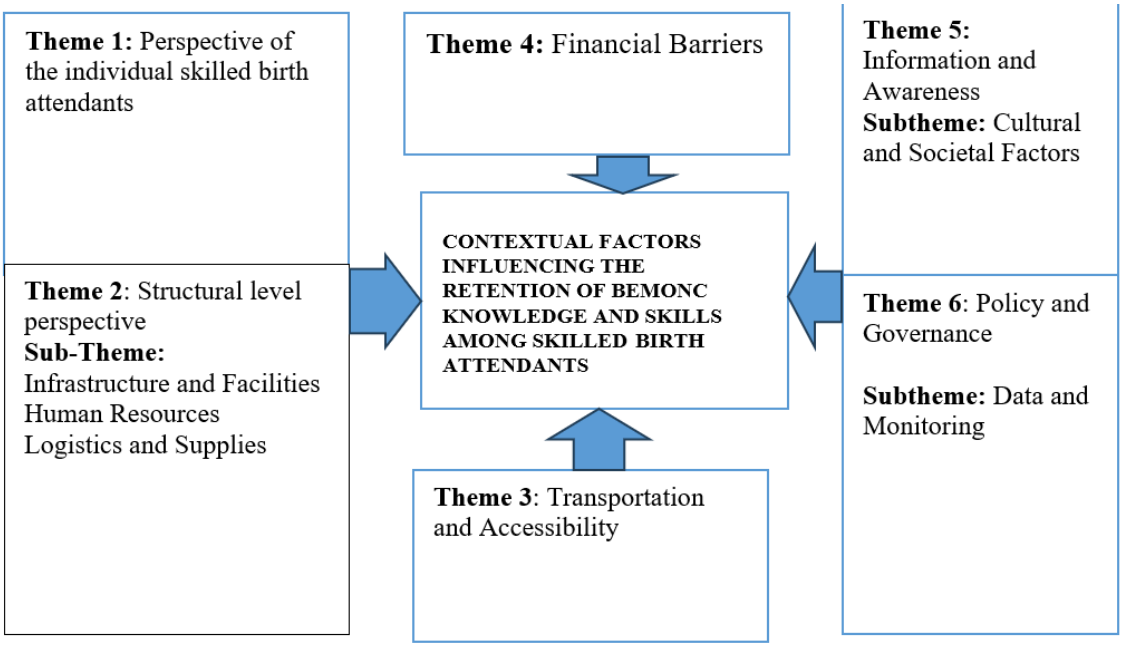

Fig. 1: Themes and sub-themes

Themes and sub-themes

Contextual factors influencing the retention of BEmONC knowledge and skills among skilled birth attendants

Theme 1: Perspective of the individual skilled birth attendants

Lack of timely training for newly recruited staff was among the repeatedly reports as a barrier to the retention of knowledge and skills as well as high staff turnover

'I don't think I can confidently perform BEmONC procedures as trained two years ago because I have since been reshuffled from maternity to an outpatient department, where I seldomly practice any of the BEmONC procedures" FGD1 P2, M

Given an examination on BEmONC, what is your likely score?

'I was trained in 2015, five years ago and I believe I still have 60% retained knowledge.'

Another nurse said, *"I may not have 100% knowledge, but I think I can score 70% and this I attribute to lack of essential equipment's necessary for performing critical procedures such as assisted vacuum delivery." FGD1 P6, F*

Another participant said that *'I believe I still have 60 % knowledge and skills, but I feel I have need for a refresher training in BEmONC". FGD2 P5, M*

A male nurse said *'For me I was say that I have 60 % knowledge, but it be lower in skills. How to apply knowledge to skills is what becomes the problem and that is where we have a gap" FGD2 P11, M*

He went ahead to say *"like for example, I particularly cannot perform an assisted vacuum extraction using kiwi. Found in such scenario, I was not remembering what to do despite having done the procedure during the BEmONC training'" FGD2 P11, M*

A female nurse said *'The knowledge we have, but when it comes to performing some procedures, we lack the confidence because for one we do not have the equipment for performing the procedure e.g., a kiwi and secondly, when working alone during a shift and you find a procedure that requires two nurses becomes difficult. The only choice left is referral to the level 4 facility" FGD1 P13, F*

Another BEmONC trained nurse explained that the first and the last time she saw some emergency equipment and some drug was when she was being trained over five years ago *"I have forgotten how to do a balloon tamponade in case of any post-partum hemorrhage. The equipment for doing vacuum extraction is still in the box (sigh)I don't know how to operate it. I was trained but my seldom use of the equipment has made me forget almost half of what I was trained at the BEmONC training'. Lack of equipment's have made the level of knowledge and its applicability to skills go down tremendously.' FGD1 P10, F*

Lack of timely training for newly recruited staff was among the repeatedly reports as barrier to the retention of knowledge and skills as well as high staff turn over

"*I don't think I can confidently perform BEmONC procedures as trained two years ago because I have since been reshuffled from maternity to an outpatient department, where I seldomly practice any of the BEmONC procedures." FGD2 P9, F*

Given an examination on BEmONC, what would be your likely score?

"I was trained in 2015, five years ago and I believe I still have 60% retained knowledge.'

Another nurse said, "I may not have 100% knowledge, but I think I can score 80% and this I attribute to lack of essential equipment's necessary for performing critical procedures such as assisted vacuum delivery." FGD1 P15, F

Another participant said that *"I believe I still have 60 % knowledge and skills, but I feel I have need for a refresher training in BEmONC".*

A male nurse said *"For me I was say that I have 60 % knowledge, but it be lower in. skills. How to apply knowledge to skills is what becomes the problem and that is where we have a gap." FGD2 P13, M*

He went ahead to say *"like for example, I particularly cannot perform an assisted vacuum extraction using kiwi. Found in such scenario, I was not remembering what to do despite having done the procedure during the BEmONC training" FGD2 P13, M*

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Theme 2: Structural level perspective

Several responses highlighted the multifaceted nature of the challenges related to structural levels affecting maternal and neonatal morbidity and mortality as stated by in charges who also work as skilled birth attendants at level 2 & 3 facilities.

The following were areas of interest in this study:

Sub-Theme

Infrastructure and Facilities

In answering questions focusing on Infrastructure and facilities, participants in the focused group discussion responded to the issue of the lack of well-equipped healthcare facilities in rural areas, insufficient number of hospitals and clinics, poorly maintained healthcare infrastructure, and inadequate access to emergency obstetric care facilities in the prevention of maternal and neonatal mortality in the following ways.

One participant said "*here is a serious concern regarding the absence of adequately equipped healthcare facilities in rural areas. lack of proper medical infrastructure is a major challenge in providing quality healthcare services.*" *FGD1 P13, F*

Another participant pointed out that "*the shortage of hospitals and clinics is a pressing issue. mothers in rural areas must travel long distances to access even basic medical care, which is a significant barrier to healthcare access*". *FGD2 P3, M*

Another participant discussed the state of healthcare infrastructure, stating that "*it is in a deplorable condition in many places. the dilapidated healthcare facilities not only compromise patient safety but also discourage healthcare workers from serving in these areas.*" *FGD1 P813, F*

"*There is limited availability of emergency obstetric care facilities/equipment in rural regions and they play critical role in reducing maternal and neonatal mortality rates and stressed feel that there is a need for improved access*" emphasized another skilled birth attendant. *FGD1 P3, M*

Similarly, another respondent underscored the importance of addressing these infrastructure and facility issues for maternal and neonatal health. She argued that investments and positive policy changes are essential to bridge these gaps and ensure better healthcare outcomes for rural populations.

Human Resources

The interviewer in the focused group discussion further asked whether human resource could be a factor in increased maternal mortality in terms of shortage of skilled healthcare professionals, especially in rural areas. Lack of training and capacity building for healthcare workers, high turnover among healthcare staff and Inadequate staffing levels for 24/7 services.

Participants expressed concern about the shortage of skilled healthcare professionals in rural areas. One participant said, "*One issue is that there is an alarming scarcity of skilled healthcare professionals, particularly in rural regions which contributed to n the limited access to quality healthcare services in these areas*." *FGD1 P4, F*

Another participant may highlight the topic of training and capacity building for healthcare workers, stating, "*The discussion revolved around the need for better training and capacity building for healthcare*

workers. It should be emphasized that investing in their continuous education on skills and knowledge is crucial for improving patient care. This is even coupled by the persistent problem of high turnover and frequent absenteeism among healthcare staff which is a significant challenge in maintaining consistent and reliable healthcare services." *FGD2 P13, F*

Another participant might point out the issue of inadequate staffing levels for 24/7 services, explaining, Overall, there was a consensus in the group that these challenges are interrelated and need to be tackled holistically. The group stressed the importance of collaborative efforts to find solutions and improve the human resources situation in healthcare.

Logistics and Supplies

Three main issues were raised when the interviewer asked about if logistic and supply contributed to a high maternal mortality ratio in the counties: Inconsistent supply chain management for essential medicines and equipment. Frequent stock-outs of crucial medications and supplies and Inefficient distribution systems leading to delays in emergency situations.

"I think one of the major issues with the supply chain is the frequent stock-outs of crucial medications and supplies. Sometimes you need to do vacuum extraction, but all the 'kiwis" are spoilt. These shortages affect patient care and create unnecessary stress for healthcare professionals and hamper the overall effectiveness of healthcare delivery " FGD1 P13, M

"It's not just about the supply chain management itself but also about the lack of proper monitoring and reporting mechanisms. I am concerned about the absence of real-time data on inventory levels and demand forecasts. "One senior skilled birth attendant said. "I wonder why health sector leaders cannot investing in technology and automation to streamline the entire supply process." FGD1 P1, F

Theme 3: Transportation and Accessibility

Four main issues were raised when the interviewer asked about if poor road infrastructure hindered access to healthcare facilities. Is unreliable transportation a factor affects prompt referral to CEmNOC facility? Do mothers delay from seeking prompt care due to geographic isolation of some communities?

These were the feedback.

One member emphasized that the *"poor road infrastructure really makes it tough for people to reach healthcare facilities when they need it the most". FGD1 P10, F*

She emphasized that the poor road infrastructure really makes it tough for people to reach healthcare facilities when they need it the most.

Someone pointed out that the lack of affordable and reliable transportation options is a major obstacle for many. They shared personal stories of struggling to find transportation they can rely on for daily needs.

There was a strong sentiment in the group regarding the urgent need for improved road infrastructure. One respondent stressed that better roads could solve many of these accessibility problems and should be a top priority.

Another participant brought up the economic implications of transportation and accessibility issues. She argued that without easy access to transportation, job opportunities were limited, which perpetuated a cycle of poverty in certain communities which accumulated to delay in health seeking behavior.

Theme 4: Financial Barriers

On issues regarding financial barriers related to maternal and neonatal care, participants expressed their views as follows:

One respondent said *"I think one of the major issues we're facing is limited access to health insurance or any sort of financial support for maternal and neonatal care. It's like there's this huge gap, and many families are struggling to find adequate coverage." FGD1 P7, F*

Agreeing with the other participant she said "*Moreover, even when there is public health insurance, it's disheartening to see how inadequate the coverage for maternal and neonatal care is. It's almost as if these essential services are being sidelined in the policies." ." FGD1 P7, F*

One other respondent said *"I completely agree. It's not just about the financial burden; it's about the lack of support for families during one of the most vulnerable times in their lives. The stress and anxiety that come with these financial barriers are immense and let's not forget that these barriers disproportionately affect low-income families, which perpetuates health disparities. We need a comprehensive solution that ensures financial access to maternal and neonatal care for everyone, regardless of their economic status" FGD1 P9, F*

Theme 5: Information and Awareness

In regards to whether lack information and awareness to BEmONC services could be one of the contributing factors to increased MMR one participant pointed out that there seems to be a significant lack of awareness about the importance of prenatal and postnatal care in our community.

"Many expecting mothers and their families aren't fully aware of the potential risks and benefits associated with proper care during pregnancy and after childbirth which i attribute to insufficient health education programs in our communities" (sigh) "without adequate educational initiatives, it's challenging for individuals, especially those in underserved areas, to gain essential knowledge about maternal and child health."FGD1 P5, M

A participant shared their observation regarding limited access to reliable health information. She pointed out that not everyone has access to trustworthy sources of information on prenatal and postnatal care, leading to misconceptions and a lack of informed decision-making among pregnant women and new mothers."

During the discussion, someone mentioned that the lack of awareness might also be due to cultural factors and social norms. He explained that in their community, there is a prevailing belief that seeking prenatal and postnatal care is unnecessary, this is even coupled a widespread believe about unwarranting CS if one goes to the health facility in early labour' which adds to the challenge of improving awareness."

Lastly, another participant shared a personal story about a friend's experience with inadequate awareness. They recounted how their friend faced complications during pregnancy because she didn't know where to find reliable information or seek appropriate care, highlighting the urgency of addressing this issue.

Sub theme: Cultural and Societal Factors

Regarding cultural beliefs and practices affecting healthcare-seeking behavior, gender disparities in decision-making and access to care and stigma around maternal and neonatal health issue respondents had this to say *"One key aspect of cultural beliefs affecting healthcare-seeking behavior that I've observed is the preference for traditional remedies over modern medicine in some communities.It's important to understand and respect these beliefs when providing healthcare services" FGD1 P10, F*

Another participant said *"speaking of gender disparities, in this society, women often have limited decision-making power when it comes to their own health or the health of their children. This is the reason to delays in seeking care or inadequate access to healthcare services for women and children."FGD1 P5, F*

To add, one participant mentioned that *"I'd like to add that stigma around maternal and neonatal health issues is a serious concern. Some women hesitate to seek care during pregnancy due to fear of judgment or discrimination from their communities. We need to work on reducing this stigma to improve maternal and neonatal health outcomes" FGD2 P6, M*

Theme 6: Policy and Governance

The interviewer sought to find out what the role healthcare policies and regulatory frameworks, political commitment to maternal and neonatal health, efficient allocation of resources and budgetary constraints in the support for BEmONC.

One participant highlighted that one of the key issues contributing to high maternal and neonatal mortality ratios is weak healthcare policies and regulatory frameworks. He mentioned that these policies lack the necessary depth and specificity to address the unique challenges faced by pregnant women and newboms, leaving gaps in care and accountability.

Another respondent raised a concern about the lack of political commitment to maternal and neonatal health. She emphasized that political leaders often prioritize other issues over healthcare, resulting in inadequate funding, limited awareness campaigns, and insufficient efforts to improve healthcare infrastructure specifically geared towards reducing maternal and neonatal mortality rates.

Another respondent said *"the problem is inefficient allocation of resources and budgetary constraints and even when funds are allocated to maternal and neonatal health, these resources are not always utilized optimally. Budget constraints has led to understaffed healthcare facilities, a shortage of essential medical supplies, and inadequate training for healthcare professionals."*

Another participant brought up the issue of fragmented healthcare systems. She mentioned that *Tthe lack of coordination among different healthcare providers and institutions can lead to gaps in care, with pregnant women and newborns often falling through the cracks. This fragmentation can exacerbate the challenges faced in addressing maternal and neonatal mortality."*

Almost all participants expressed concern about the insufficient involvement of local communities in policy making and governance related to maternal and neonatal health. They argued that engaging communities and seeking their input is essential for the success of any policy or program. Failure to involve local stakeholders can result in policies that do not align with the cultural or societal norms of the affected populations, hindering the effectiveness of interventions.

Subtheme: Data and Monitoring

A question was posed to the groups regarding data, monitoring and evaluation factors that informed the high maternal mortality ratio, and the following response was given in regards to inaccurate or incomplete data on maternal and neonatal mortality, weak monitoring and evaluation systems for healthcare services and

insufficient feedback mechanisms for healthcare providers.

A participant discussed the lack of feedback mechanisms for healthcare providers, emphasizing that this creates a barrier to improving maternal care. She mentioned that *"healthcare professionals should receive constructive feedback to enhance their performance and ultimately reduce maternal mortality rates." FGD1 P4, F*

During the discussion, one participant raised concerns about the potential consequences of weak monitoring and data collection on maternal mortality rates. He said *"without reliable data, it's challenging to measure progress and allocate resources effectively to combat maternal mortality and this requires collaborative efforts among healthcare professionals, policymakers, and data experts. There is a dire need for a multi-sector approach to tackle maternal mortality effectively." FGD1 P12, F*

One issue that came up was the challenge of dealing with inaccurate or incomplete data on maternal and neonatal mortality. Some felt that this issue undermines our ability to make informed decisions and develop effective interventions.

Another concern raised was the weakness in monitoring and evaluation systems for healthcare services. People in the group discussed how this can lead to gaps in identifying high-risk cases and implementing timely interventions.

Participants also talked about the lack of sufficient feedback mechanisms for healthcare providers. It was suggested that without proper feedback, healthcare professionals might not have the necessary information to improve their practices and reduce maternal mortality rates.

Finally, there was a consensus that improving the accuracy and completeness of maternal mortality data is crucial. Some participants mentioned examples of cases where inaccurate data led to improper allocation of resources and inappropriate policy decisions.

DISCUSSION

This study found out that lack of trained and specialized providers, poor or partial facility readiness and visibility, weak referral and communication systems, inadequate and inequitable distribution of BEmONC facilities and transportation services with poorly constructed roads, poor community/ clients health care seeking behaviors and low educational level of the community, poor funding for maternal and new born health services and limited government and intersectoral collaboration/coordination were among the major factors compromising the quality of care intended to be given to mothers and new-born in the surveyed MNHC settings in Kenya.

Elements discovered in this study include significant factors that contributed to a quality disparity in BEmONC service delivery points. In low- and middle-income settings, most of the identified barriers were mostly related to inaccessible, inadequate, and inequitable distribution of BEmONC facilities, poor provider competence, poor community/client health care seeking behaviors, and limited government and intersectoral collaboration/coordination associated with poor funding for maternal and newborn health services. Women who are encouraged to give birth at health facilities benefit from the abilities of birth attendants, but this also puts into question those attendants' skills and knowledge, because in the setting of a limited workforce and material resources, providers' knowledge and skills are critical. Through diligent monitoring, detection of emergencies, proper/correct use of drugs and equipment, and appropriate referrals, highly experienced health professionals may be able to overcome resource limitations (Aitken & Gorokhovich, 2012)

Despite significant differences in knowledge based on a clinician's place of work, most of the study participants reported having good knowledge of birth asphyxia identification and management, as well as pre-eclampsia/eclampsia treatment (including the use of MgSo4), which were the two areas where poor knowledge was reported. Though most people had a fair understanding of proper monitoring during regular labour, 44.31% had a poor understanding and were not following internationally recognized best practices, with a high percentage of potentially life-threatening responses from BEmONC institutions. BEmONC employees were marginally more knowledgeable than BEmONC employees, and they had a greater influence on their degree of expertise.

"A skilled birth attendant with the ability to provide parenteral medications (Antibiotics, oxytocic, and anticonvulsant) to perform procedures (manual removal of placenta, vacuum or forceps deliveries), carry out blood transfusions, caesarean sections, and newborn care /resuscitation) is required for Emergency Obstetric and New-born Care (BEmONC)" (Jejaw *et al.,* 2021)

FGDs with senior providers also revealed that a lack of competent health care providers is a key predictor of unsafe care, and an interview with human resource officers reveals that recruiting new graduates with varying levels of knowledge, skills, and background (as in experience) may positively or negatively affect the quality of care, which has been identified in different literature as determinants of the third delay of emergency obstetric care, which accounts for the third delay of emergency obstetric care, which accounts for the third delay of emergency.

According Nishimwe *et al.,* (2022), inadequate provider competence was one of the biggest hurdles to BEmONC quality. Malawi's findings are comparable to those of this study, which indicated that 80 % of providers had solid understanding of how to manage regular labour, whereas 35 % did not follow internationally recognized best practices. Most of the replies from BEmONC facilities claimed that their confidence and training level had minimal impact on their knowledge and knowledge insufficient about early identification (with 58 % correct response) (Zemedu *et al.,* 2019).

Thirty-five (67.35%) of the 52 providers said they had not attended any in-service BEmONC training in the previous year, with substantial proportions (57.2%) of untrained staff reported from health centers and BEmONC facilities. The gap in BEmONC and CEmNOC refresher training was mentioned by interviewees. Untrained MNHC practitioners were twice as likely as their trained counterparts to indicate confidence in completing major BEmONC procedures. BEmONC trained employees are twice as likely as their non-trained co-workers to have adequate understanding of birth asphyxia diagnosis and management. Similarly, at intervention hospitals in Mexico, a highly realistic low-tech simulation-based obstetric and neonatal emergency training program (PRONTO training) was given on the management of obstetric hemorrhage, neonatal resuscitation, general obstetric emergencies, pre-eclampsia/eclampsia, and shoulder dystocia. They also show that both physicians and nurses improved their knowledge and self-efficacy significantly (Walker *et al.,* 2016).

The similar experience from Guatemala shows that after PRONTO training, obstetric and neonatal care professionals' knowledge and self-efficacy scores improved significantly. More than 60% of the objectives set out to improve clinic operations and emergency care were met (Fritz *et al.,* 2020).

In Addis Ababa, Ethiopia, trainees' reactions and knowledge acquisition to BEmONC training revealed enhanced provider knowledge and skills, as shown by a post knowledge score of 83.5 % (Van Tetering *et al.,* 2023). The performance of a facility's or organization's employees determines its success. Employee turnover, physical distress/noncompliance, and unproductive are all caused by a lack of training. As a result, this strongly suggests that health-care executives and program managers sought to maximize the number of trained employees either through TOT (Training of Trainees) or by providing opportunities for all employees to be trained, as well as by establishing training infrastructure within the facilities that allows trained providers to share their knowledge and experiences with other employees.

It is also critical to collaborate with other external organizations/in NGO's order to maximize opportunities and teach all dedicated employees, as well as to reinforce the mentoring and supervision provided by program officers, which leads to greater results.

Human resource issues, as well as systemic and institutional failures, were recognized as the two key hurdles to quality in emergency obstetric and neonatal care in Burundi and Northern Uganda, according to qualitative case studies (Habonimana *et al.,* 2022). A common barrier identified in both countries is a lack of qualified staff, as well as a lack of essential installations, supplies, and medications, as well as increased workload, burnout, and turnover, as well as a poor data collection and monitoring system, all of which are similar to the findings of this study.

In Dire Dawa, seven BEmONC facilities and two CEmNOC facilities were assessed for preparedness. 73.9 % of BEmONC facilities and 91.7 % of CEmNOC facilities are fully prepared to provide BEmONC services on average. Their recent stock of emergency medications (MgSO4 and hydralazine), lack of reliable electric and water supplies, and a shortage of qualified and specialized staff have all been cited as major roadblocks to BEmONC excellence.

Similarly, a study from rural Northwest Bangladesh indicated that high costs for C/S procedures, a paucity of specialized people, basic infrastructures, medications, and supplies, primarily in rural public sub-districts, were all identified as major hurdles to BEmONC supply(Hackett *et al.,* 2015).

This study also found out that access to transport was vital to reduce the travel time to a health care facility offering emergency obstetric and neonatal care for preventing and managing adverse maternal and neonatal outcomes. This is a similar situation found in a study done in Kigoma Tanzania by (Schmitz *et al.,* 2019) who reported that 32% of estimated live births in the region were not able to reach emergency obstetric and neonatal care (BEmONC) services within 2 hours regardless of the type of transportation available. However, bicycles, motorcycles, and cars provide a significant increase in geographic accessibility in some areas.

Inadequate inter-facility referral transport equipment, lack of formalized communication system between key stakeholders, poor hand-off management process (knowledge of the case and or accompanying documentation), clinical skill limitations, errors in the use of existing protocols for referrals (unreliable standards of caliber), and clinical skill limitations were all investigated (Keebler *et al.,* 2023).

As a result, these findings suggest that 'context specific treatments' are the most effective way to

improve care quality and access to services. This study also found that only 28.6% of BEmONC facilities were able to provide all eight signal functions of basic BEmONC, while only half (50%) of CEmNOC facilities were able to provide all ten/eleven signal functions of CEmNOC.

The two signal functions that are least likely to be delivered are forceps and vacuum delivery (28.57 %, 71.43 % respectively).

Between 2009 and 2011, a cross-sectional survey on the status of Emergency Obstetric Care in six developing countries (Kenya, Malawi, Sierra Leone, Nigeria, Bangladesh, and India) revealed that 160 of the 378 health facilities surveyed were designed to provide BEmONC and the remaining 218 provide BEmONC, five years before the MDG targets for maternal and newborn health were set. Only 2.3 % of BEmONC facilities were able to provide all seven signal functions of BEmONC, but 23.1 % of BEmONC facilities were able to provide all nine essential signal functions of BEmONC (Banke-Thomas *et al.,* 2016).The two signal functions that are least likely to be given are assisted delivery and manual vacuum aspiration (17.5 %, 42.3 % respectively). Another study on the availability and distribution of Emergency Obstetric Care services in Karnataka State, South India, based on a combination of self-reporting, record review, and direct observation at the sub-state level found unequal distribution of BEmONC facilities across the region, similar to the main challenges reported in this study (Mony *et al.,* 2013). As a result, reducing maternal and neonatal mortality will necessitate increased government attention to equip all BEmONC facilities with basic BEmONC infrastructural installment such as reliable power and water supply, equipment and drugs, and to work effectively to address inequalities in the distribution of BEmONC services to make the service more accessible to users (Mony *et al.,* 2013b)

Many of the mothers and new-born who have emergency problems live in places where lifesaving assistance (care) and the necessary basic medical requirements are not available. In a qualitative in-depth interview on barriers to Emergency Obstetric Care services in perinatal fatalities in rural Gambia, sociocultural beliefs and family decision-making were identified as the two most significant hurdles to BEmONC care. This has a significant role in the first-tier delay in obstetric and infant care. Client/community behavior to seek health care is significantly complicated by illiteracy/poor community educational status, low community awareness, and client/community behavior to seek health care. As a result, all stakeholders, including the government and non-governmental organizations (NGOs), will contribute to considerably reducing the issues in this area (Morof *et al.,* 2019). As previously stated, equipment and infrastructure improvements alone are insufficient to provide high-quality services. Quality is dynamic and culturally biased by nature, necessitating several interventions and a multidisciplinary approach.

The number of signal functions allowed by legislation and the number of functions performed by nurses and midwives differed in most nations. The importance of task shifting was demonstrated in a study where only 43% of basic and 56% of comprehensive emergency care facilities could execute the necessary signal functions before training, however after training, all facilities were able to perform 100% of the expected signal functions. This was accomplished by having skilled midwives execute tasks that would normally be performed by medical doctors (Kool *et al.,* 2023).

Strengths and limitations

Our study was conducted among facility in charges trained on BEmONC in western Kenya, from level 2,3 and 4 health facilities which allowed for inclusion of diverse set of in charges from different level of care, making the results transferable to similar settings.

However, the transferability of the findings is only possible in Kisumu and Vihiga counties who probably share same factors as generated by the themes.

The study findings yielded insight that can be used to develop structures that can support in charges and SBAs during the provision of BEmONC.

CONCLUSION

The survey results and records review findings raised concerns among Skilled Birth Attendants (SBAs). Discussions highlighted possible explanations, such as limited in-service training, staff shortages, inadequate clinical guidelines, and the lack of essential materials and poor referral syastems. Participants reflected on their current practices, focusing on teamwork, commitment to professional ethics, insufficient skills, learning opportunities, and evidence-based clinical guidelines.

The study revealed numerous contextual factors influencing the delivery of BEmONC services in Western Kenya. These factors include leadership and management, staff shortages and heavy workloads, limited resources, and the socio-economic status and socio-cultural beliefs and behaviors of clients. Recognizing and addressing these contextual factors is crucial, as they significantly impact the quality of facility-based obstetric care.Our findings could inform policy reviews to address real practice challenges and promote improved outcomes.

Abbreviations

BEmONC: Basic emergency obstetric and newborn care
MMR: Maternal mortality rate
SBA: Skilled birth attendants

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Author Contribution

DK conceptualized, acquired and analyzed data for the study, interpreted the findings and wrote the first draft. ME contributed to the study design and interpreted the findings and provided overall supervision to the project. All the authors critically reviewed, read, and approved the manuscript.

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Declarations

Ethics approval and consent to participate

The study was approved by the Moi University/ Moi Teaching & Referral Hospital Institutional Research and Ethics Committee (IREC) (Ref no 0003147) and National Council of Science, Technology and Innovation (Ref No. NACOST/P/19/78748/28845). The County Department of Health of Vihiga and Kisumu counties provided consent to collect data. All Participant who agreed to participate provided written consent before the focus groups and each participant was provided a code to anonymize their identity. The publication of anonymous responses was also explicitly mentioned during the informed consent process.

Consent for publication: Not applicable

Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

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