



Pre-eclampsia training needs of midwives in a Ghanaian tertiary hospital: A cross-sectional study

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ABSTRACT

Aim: This study aimed to assess the specific clinical and non-clinical training needs of midwives and determine their preferred approach to enhancing performance.

Background: Pre-eclampsia remains one of the leading causes of maternal deaths in low and middle-income countries. Pre-eclampsia-related deaths may be due to reduced midwifery knowledge and inadequate management. Therefore, a training needs assessment is vital in identifying gaps in practice, especially, in poorly resourced settings for maximal use of training resources.

Design: A hospital-based cross-sectional study.

Setting: The largest tertiary hospital in Ghana.

Methods: An online version of the validated WHO Hennessy-Hicks Training Needs Analysis questionnaire was used to assess midwives' training needs on the management of pre-eclampsia. The tool has good psychometric properties and was used to assess 1) midwives' confidence in performing tasks, 2) the importance of the task to their role and 3) their preferred performance improvement approach. Data analysis adhered to the guidelines specified in the Hennessy-Hicks Training Needs Analysis Questionnaire and the priority training requirements of the midwives were assessed through descriptive statistics and a series of independent t-tests.

Results: Among the 250 midwives who responded, most possessed 1–5 years of experience (74.7 %). All 28 tasks were viewed by midwives as essential responsibilities in pre-eclampsia management. Midwives had the greatest need for training in research/audit and clinical skills domains respectively ($p < 0.001$, 95 % confidence interval: 1.08–1.47, Cohen's-D = 1.27; and $p < 0.001$, 95 % confidence interval: 0.69–1.06, Cohen's-D = 0.87). The foremost primary training necessity, as recognised by midwives, was undertaking health promotion activities, including antenatal health education (MD= 0.43, 95 % confidence interval: 0.29–0.57). Training courses were identified as the preferred approach to address training needs and improve overall proficiency.

Conclusion: Midwives in Ghana require comprehensive training covering research and clinical-based competencies to improve pre-eclampsia management. Considering the pivotal role of Ghanaian midwives in safeguarding maternal well-being, there is a compelling need to enhance the calibre of midwifery services. These findings can guide stakeholders in countries with comparable healthcare contexts in creating effective, resource-efficient training programs that avoid counterproductivity, ultimately supporting national initiatives to enhance pre-eclampsia management and the quality of care.

1. Introduction

The threat of adverse effects of pre-eclampsia is more profound for women and babies in poorly resourced settings where the incidence of pre-eclampsia is 14 % (Firoz et al., 2011; von Dadelszen et al., 2021). In

low- and middle-income countries (LMICs) where resources are limited, pre-eclampsia causes 30 % of maternal deaths, resulting in a mortality rate of 0.8 % for women affected by this condition (Burton et al., 2019). Enhancing early identification and prompt management of pre-eclampsia is crucial for decreasing maternal and perinatal mortality

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rates (Magee et al., 2022).

In Ghana, the maternal mortality ratio is 310/ 100,000 live births (Ghana Statistical Service, 2018) and pre-eclampsia is the leading cause of direct maternal death, most of which occurs in tertiary healthcare settings (Dassah et al., 2019). Recently, Boafor and colleagues reported that 37 % of maternal deaths at Ghana's premier teaching hospital were attributed to hypertensive disorders of pregnancy including pre-eclampsia (Boafor et al., 2021). Maternal deaths and severe morbidities from pre-eclampsia have been linked to quality-of-care issues in Ghanaian hospitals (Adu-Bonsaffoh et al., 2014). A previous observation in Ghana made as a subset of a broader PhD project, confirms that the best practice advice for pre-eclampsia management is not streamlined and does not reflect current international practice (Garti et al., 2022).

Research highlights several gaps in pre-eclampsia management including a lack of 1) women's decision-making power; 2) access to hospital-based care; 3) standardised evidence-based guidelines; 4) drugs and appropriate diagnostic equipment; 5) a competent multidisciplinary workforce (Firoz et al., 2011; Rawlins et al., 2018). The goal of pre-eclampsia management in low and middle-income countries (LMICs) is to first diagnose and then accelerate care according to standardised guidelines to avert severe maternal and fetal complications (von Dadelszen et al., 2021; Rawlins et al., 2018). However, internationally, the evidence suggests that health workers, particularly midwives, are not abreast with current trends in the treatment of pre-eclampsia which has grave consequences for management (Rawlins et al., 2018; Garti et al., 2020). Still, there remains a significant gap in knowledge as there is a dearth of empirical data examining other health worker-related variables and their impact on pre-eclampsia management especially, in low- and middle-income countries (Rawlins et al., 2018). Similarly in Ghana, despite the enormous threat of pre-eclampsia to maternal and neonatal health, pre-eclampsia management is under-researched and presently we do not know in full the impact of health systems and structures.

Midwives need to have the capability to initiate care for women who develop pre-eclampsia in line with the International Confederation of Midwifery (ICM) practice requirements (International Confederation of Midwives, 2019). Whilst a multi-professional approach is advised for women experiencing pre-eclampsia, well-trained midwives, as the initial first contact, can screen and deliver lifesaving interventions when they are adequately trained to have relevant competencies, thereby averting 32 % of maternal deaths (Nove et al., 2021). However, due to limited gap analysis in midwives' practice, there are few opportunities to implement innovative strategies which will, in turn, improve the quality of midwifery services in deprived settings whilst simultaneously maximising training resources.

Insufficient education and training may significantly undermine the professional identity, competence and confidence of midwives as primary providers in obstetric emergencies (Garti et al., 2020). Therefore, strengthening midwifery care through continuing professional development can address actual or potential skill deficiencies which are pivotal to creating a pool of highly skilled midwives who can competently care for women who develop pregnancy complications like pre-eclampsia (Soggiu-Duta et al., 2019). Thus, the complementary role of training and continuing education coupled with concise policies and an enabling clinical environment may lead to desired outcomes and improved institutional capacity and therefore requires further investigation. A training needs analysis aims to determine what training needs are present, what training is required to fill the gap and the best approach to use (Hicks et al., 1996). Performing a training needs analysis (TNA) is a strongly advised but frequently overlooked initial stage in developing a continuous professional development (CPD) strategy aimed at enhancing service quality (Holloway et al., 2018).

Although performance is influenced by other factors (Mahmud et al., 2019), training programs enhance the refinement of practical skills and prepare the health worker to achieve job competencies with great benefits to the organisation and health system. In the literature, training has

been directly linked with increased knowledge of pre-eclampsia management and more comprehensive care from midwives (Soggiu-Duta et al., 2019; Rahimi et al., 2017). Hence a training needs assessment is an important first step to preventing a mismatch between organisational expectations and employee learning needs which may have a negative impact on organisational efficiency and quality care (Holloway et al., 2018; Mahmud et al., 2019).

Like other LMICs, Ghanaian midwives are the core maternity service providers. Most midwives in Ghana complete a three-year post-secondary school diploma in midwifery. Baccalaureate programs are also offered in both public and private universities across the country (Salisu et al., 2020). Programmes of midwifery education encompass formal classroom instruction with a standardised curriculum and clinical pre-service sessions (Asamani et al., 2019; Chakraborty et al., 2023). The students' clinical contact hours amount to 432 hours in the first year, 624 hours in the second year and 576 hours in the third year of their training (Ziba et al., 2021). There are also pathways for registered nurses to complete either a one or two-year course to become midwives. On completion, all students undergo a licensing examination administered by the Nursing and Midwifery Council (NMC-GH), granting them a license to practice midwifery (Salisu et al., 2020). Currently, there are limited post-graduate programs for midwives in Ghana (Salisu et al., 2020). Ghanaian midwifery pre-service education is challenged by limitations that have an impact on the preparation of midwives (Salisu et al., 2020; Ziba et al., 2021). Due to limited infrastructure, midwifery students experience an imbalance in theory and practical hours. There is a lack of midwifery lecturers with essential teaching competencies which results in an insufficient student to lecturer ratio (Salisu et al., 2020; Anaman-Torgbor et al., 2022) and this has resulted in essential curricula being overlooked such as the development of research skills crucial for evidence-based practice (Salisu et al., 2020; Ziba et al., 2021).

Midwives work across the 5 tiers of the Ghanaian health system and are often the first contact for pregnant women (Adatarata et al., 2021). Mostly employed in the public sector, midwives have autonomy and provide a wide range of care. Ghanaian midwives provide antenatal, birthing and postnatal services. They can prescribe and administer lifesaving medicines like anticonvulsants and can provide urgent care before referring the woman to a higher-level facility (Adatarata et al., 2021; Dartey et al., 2022). Therefore, midwives play an essential role in maintaining an operational maternal health system within the nation. Midwives working in tertiary hospitals function within a multidisciplinary team primarily under the instruction of obstetricians. They lead the coordination of care in combination with clinical care provision. In this context, midwives carry out blood pressure screening for women at the antenatal clinic and emergency units, monitor and escalate care in high-risk situations like eclampsia and initiate antihypertensive and anticonvulsant treatment following standard protocols (Garti et al., 2023). Despite midwives' integral roles, data indicates a significant skill gap, with one study reporting that approximately 50 % of 414 Ghanaian midwives at secondary and primary health facilities possessed the necessary skills to care for women facing pregnancy complications like pre-eclampsia (Chakraborty et al., 2023).

Ghana has in the past 15 years scaled up the midwifery workforce to accelerate progress toward universal health coverage (UHC) and for maternal health service improvement (Asamani et al., 2019; Adua et al., 2017). Nevertheless, although the assumption on which Ghana's workforce development is based appears reasonable, the strategy to increase midwife numbers does not necessarily translate into improved quality of care. Despite the existence of a few opportunities for ongoing education for practising midwives in Ghana, it has not translated into improvements in maternity care largely because policies are inconsistent and training needs have not been assessed (Asamani et al., 2019; Escribano-Ferrer et al., 2016). A few years ago, the Nursing and Midwifery Council (NMC-GH) in conjunction with its stakeholders launched an online CPD platform (WCEA app) and mobile application to replace existing CPD programs for midwives but, it is yet to take effect

nationwide (Nursing and Midwifery Council Ghana (NMC-GH), 2020). At a minimum, the international standards require a training needs assessment to identify priority areas for consideration necessary to enhance patient safety and the quality of care (Mahmud et al., 2019; Hicks and Hennessy, 2011; Gaspard and Yang, 2016). However, there are no publicly available data, nor research findings to support the introduction of this initiative or its suitability to improve midwifery competencies in the Ghanaian context.

The outcomes of pre-eclampsia management are distressingly unfavourable, marked by high mortality rates stemming from late presentation to the hospital, missed diagnosis and inappropriate management by Ghanaian hospital staff (Adu-Bonsaffoh et al., 2014). Given the limitations in pre-service preparation for Ghanaian midwives, competency gaps are likely to have a negative impact on pre-eclampsia outcomes, further derailing the country's progress towards achieving the SDGs. Also, the many variations in training could impact collaborative approaches to pre-eclampsia management. Therefore, the insights from this study could significantly contribute to tailoring effective strategies for both pre-service and post-qualification training ensuring midwives have the necessary skills for pre-eclampsia care, contributing to improved maternal health outcomes across Ghana and perhaps a broader spectrum of LMICs. Addressing midwives' training requirements is essential to optimise midwives' roles in early detection, continuous monitoring and timely intervention for pre-eclampsia cases.

Given the high burden of pre-eclampsia in Ghana, regular updating of skills in the midwifery workforce is essential for midwives to stay updated with the latest evidence-based practices, guidelines and advancements in their field. And so, assessing the training needs of midwives is essential for policy design to inform CPD provision, optimise resource use and for midwives to be able to adapt to changing healthcare landscapes.

1.1. Aim

This study aimed to identify specific clinical and non-clinical pre-eclampsia training needs and priorities for midwives in a Ghanaian tertiary hospital. The study also explored preferred approaches for improving midwives' performance in pre-eclampsia management. By providing evidence-based findings, the study contributes to policy formulation on capacity building for midwives ensuring competencies lacking in pre-eclampsia and eclampsia are prioritised for high-quality care.

2. Methods

2.1. Study design

This study forms a part of the quantitative arm of a mixed-method evaluation of the contextual factors influencing midwives' management of preeclampsia in Ghana. A hospital-based cross-sectional survey design using an adapted version of the WHO Hennessey-Hicks training needs analysis questionnaire (Hicks and Hennessy, 2011) was administered online from May to July 2021.

2.2. Setting

In Ghana, tertiary hospitals are the top tier of a multi-tiered health system. The tertiary hospital (X) serves as the chief national referral centre with 319 midwives in the obstetric and gynecological departments. Obstetricians take the lead in managing complications, with midwives being an integral part of the team. Midwives are responsible for the initial assessment, initiating antihypertensive treatment and carrying out other tasks as prescribed by obstetricians. Midwives work across the antenatal unit, the emergency, labour and admission wards. Midwives in senior positions, from the midwifery officer rank, head the units and perform administrative roles. A few midwives work in

education capacities as trainers and continuing professional development coordinators.

2.3. Study population and recruitment

The target population was midwives working at the maternity department of the hospital. The inclusion criteria were registered midwives, working full-time in any unit of the maternity department. Auxiliary midwives, midwives working at various places outside the confines of the maternity department, registered nurses, student midwives and midwives on official leave were excluded. Respondents were recruited using a printed advertisement that was displayed on the noticeboards and other strategic areas in the maternity unit of the hospital. Two staff at the hospital were trained and they assisted in recruiting the survey respondents. Midwives who showed interest, were available and willing to participate were recruited. Following the respondents' initial expression of interest, further information about the study was provided and the respondents completed a consent form before data collection was conducted.

2.4. Sample size

The sample was obtained from a population of 319 midwives at a 95 % confidence level, with a 5 % margin of error (Daniel, 1999). Below is the sample size calculation. The formula uses a finite population correction to account for sampling from populations that are small.

$$\text{sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right)}$$

Where Z is the z-score for estimating the confidence level $z=1.96$ equates to a 95 % confidence level; P is the proportion of the condition in the population (Daniel, 1999). Since this is unknown, we assumed it to be 50 % => $p=0.5$; E is the margin of error (precision). We assumed $z=0.5$ (i.e., 5 %); N is the population size which is 319 as above. The above figures applied to the equation yielded $n = 175$. Gaspard and Yang (Gaspard and Yang, 2016) reported a 33.2 % non-response rate for the survey, based on which the final sample size was calculated as $175 / (1 - 33.2/100) = 261.9$.

Therefore, a sample size of 262 was deemed appropriate. Convenience sampling enabled a selection of respondents who were readily accessible for inclusion in the study and were able to meaningfully contribute to the study, ensuring a comprehensive and high-quality exploration of the study variables.

2.5. Questionnaire development

The study used an adapted version of the WHO Hennessey-Hicks training needs analysis questionnaire endorsed as a comprehensive psychometrically valid instrument that is adaptable in any setting, to establish midwives' training needs in pre-eclampsia management (Hicks et al., 1996; Holloway et al., 2018; Hicks and Hennessy, 2011; Gaspard and Yang, 2016). The original instrument scale has been shown to have excellent internal consistency, as evidenced by a Cronbach's alpha of 0.954 (Mwansisya et al., 2021). The original survey has 30 basic responsibilities spread across 5 generic categories of research, management/supervisory, administration, communication/ teamwork and clinical tasks (Hicks et al., 1996; Holloway et al., 2018; Hicks and Hennessy, 2011).

There are four sets of rating criteria, the first two criteria (A and B) provide the current occupational profile of the health professional concerning the importance of tasks in a specific area and the index of the current skill performance. Comparing scores for A and B shows where the greatest training needs are, and training needs can be compared for each subcategory. Hence, the higher the importance assigned to a task

and the lower its performance, the more urgent the requirement for training becomes. The third and fourth criteria (C and D) identify the preferred performance improvement approach either through organisational changes or training courses. The advantage of this instrument lies in its semi-opaque nature whereby respondents cannot distort their responses thereby painting a true picture of the gaps and possible solutions (Hicks and Hennessy, 2011).

Permission was obtained for the tool to be used in the study and in line with the originators' instructions, the 25 % modification rule was upheld as only 8 of the basic items were omitted and 6 new items added (Hicks and Hennessy, 2011). A total of twenty-eight items each rated along a Likert scale of 1–5 were used (Supplementary file 1). Slight alterations were introduced to 18 items to enhance their relevance to the role of midwives in pre-eclampsia management. Respondents were required to rate importance (A) on a five-point Likert scale (1 = Not at all important, 2 = Slightly important, 3 = Moderately important, 4 = Very important, 5 = Extremely important) and likewise their current performance (1 = Terrible, 2 = Poor, 3 = Average, 4 = Good, 5 = Excellent). The preferred improvement approach (C & D) was rated as 1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree Strongly, 5 = Agree.

Modifications were framed from literature (Garti et al., 2020) and appraised by Ghanaian midwifery experts who assessed whether proposed adaptations to the instrument suited the context (Hicks and Hennessy, 2011). A pilot test was conducted to evaluate the clarity of the question items on the tool, its viewership on multiple platforms and the ease of movement through the survey (forward and back), as well as the effectiveness of skip instructions and the clarity of the items in the tool. No further changes were required. The internal reliability of the instrument was assessed with Cronbach's alpha. All 28 items showed very high internal consistency: rating A (Cronbach's alpha = 0.932); rating B (Cronbach's alpha = 0.942); C (Cronbach's alpha = 0.970); and Rating D (Cronbach's alpha = 0.964).

2.6. Administration

An active survey link was distributed through the Qualtrics software using an anonymous link that could be used on the respondent's mobile phone or computer. The survey completion time was thirty minutes and partially completed surveys could be saved and continued later, not more than one week after the first attempt. Respondents were provided with a plain language statement and completed an online consent form before commencing. Data collection lasted for three months.

2.7. Statistical analyses

We used descriptive and inferential statistics to analyse the data, as outlined in the Hennessy-Hicks TNA tool manual (Hicks and Hennessy, 2011). Categorical data were represented as counts and percentages, while continuous data were presented as mean and standard deviation where assumptions of normality were met or median and interquartile range for skewed data. Histograms and normal probability distribution plots were used to visually inspect normality assumptions.

To evaluate the importance of each task, the mean scores for each item were calculated, yielding an indicative occupational profile that outlines the tasks deemed crucial to pre-eclampsia management. Scores for importance and performance were compared for each subcategory item. Training needs were computed for overall average responses per question for the perceived importance (Rating A) and perceived self-performance (Rating B) yielding a difference score. A positive difference indicates that a task is considered important but not currently performed well. Unpaired Student's t-test was used to estimate the mean difference between Ratings A and B for the 28-item questions with p values set at <0.05. The greater the difference in scores, the greater the training needs (Hicks and Hennessy, 2011). Training needs were then ranked and this helped to highlight those that demanded the most

Table 1
Sociodemographic characteristics of the study population.

Characteristics	Total
	N^a = 250
Highest educational qualification	
Certificate	3/250 (1.2 %)
Diploma	186/250 (74.4 %)
Post Basic Diploma	7/250 (2.8 %)
Bachelor's degree	50/250 (20 %)
Masters	4/250 (1.6 %)
Highest educational qualification (dichotomised)	
Certificate, Diploma, Post Basic Diploma	196/250 (78.4 %)
Bachelor/Master	54/250 (21.6 %)
Current professional rank	
Staff midwife	130/250 (52 %)
Senior staff midwife	71/250 (28.4 %)
Midwifery officer	34/250 (13.6 %)
Senior midwifery officer	15/250 (6.0 %)
Primary midwifery role	
Clinical	233/250 (93.2 %)
Research	3/250 (1.2 %)
Administrative/ Managerial	7/250 (2.8 %)
Other	7/250 (2.8 %)
Years of experience categorized	
1–5 years	186/249 (74.7 %)
6–10 years	34/249 (13.7 %)
11–15 years	25/249 (10.0 %)
16–20 years	2/249 (0.8 %)
21 years and above	2/249 (0.8 %)
Years of experience (re-categorized)	
1–5 years	186/249 (74.7 %)
≥6 years	63/249 (25.3 %)
Type of recent training for pre-eclampsia	
Workshop	152/245 (62.0 %)
Train the trainer	10/245 (4.1 %)
Online/Distance learning	24/245 (9.8 %)
Seminar	3/245 (1.2 %)
Conference	9/245 (3.7 %)
Other (On the job training)	3/245 (1.2 %)
Multiple	44/245 (18.0 %)
Length of time spent on pre-eclampsia content	
0–6 hours	200/214 (93.5 %)
≥67 hours	14/214 (6.5 %)
CPD provider in the last 6 months	
Current employer	64/250 (25.6 %)
Privately run, self-funded	5/250 (2.0 %)
Online, self-funded	13/250 (5.2 %)
Online, WCEA app	45/250 (18 %)
GCNM	7/250 (2.8 %)
No attendance	30/250 (12 %)
Multiple	86/250 (34.4 %)

CPD- Continuing professional development; GCNM- Ghana College of Nurses and Midwives; WCEA- World Continuing Education Alliance.

^a Denominator may vary because of missing values.

significant improvement, an approach deemed useful in situations where training and education budgets are limited. To assess whether midwives had different training needs for each sub-group of items, the questions were analysed in the five super-ordinate categories – research/audit, communication/teamwork, clinical task, administration and management/supervisory task. The training needs for each category were compared by subtracting the average values of each super-ordinate category between Ratings A and B (i.e., A – B).

For the questions relating to organisational development (Rating C) or training (Rating D), average responses per question were also computed. The average ratings for organisational development (C) and training courses (D) were graphed together with average ratings for perceived importance and perceived self-performance to determine whether midwives generally consider organisational development (Rating C) or training courses (Rating D) to be more effective at improving performance on tasks showing a clear training need. All statistical analyses and visualisations were conducted using Stata 17.0 (StataCorp, College Station, TX, USA).

Table 2
The training needs of midwives.

Task	Rating A			Rating B			Difference (A-B)	Cohen's D (95 % CI)	p-value
	N ^a	Mean	SD	N ^a	Mean	SD			
Administration									
Using automated BP machine, pulse oximeter, cardiocotograph	250	4.39	0.71	249	4.32	0.79	0.07	0.09 (−0.06 to 0.20)	0.293
Completing paperwork and inputting routine data like vital signs into folders or computerised records	250	4.56	0.56	249	4.46	0.61	0.1	0.17 (−0.00 to 0.20)	0.051
Clinical task									
Undertaking preeclampsia health promotion activities like antenatal education	250	4.36	0.65	249	3.93	0.91	0.43	0.54 (0.29–0.57)	<0.001
Using approved guidelines and protocols for pre-eclampsia management	250	4.63	0.55	249	4.53	0.60	0.1	0.17 (−0.00 to 0.20)	0.048
Carrying out blood pressure assessment and urine test	250	4.68	0.53	249	4.60	0.64	0.08	0.13 (−0.02 to 0.18)	0.122
Understanding magnesium sulphate use and risks	250	4.71	0.52	249	4.52	0.64	0.19	0.32 (0.08–0.29)	<0.001
Accurate and safe administration of antihypertensives	250	4.65	0.59	249	4.62	0.60	0.03	0.05 (−0.07 to 0.13)	0.579
Finding information that can inform how you manage women with pre-eclampsia or eclampsia	250	4.44	0.63	249	4.21	0.69	0.23	0.34 (0.11–0.34)	<0.001
Assessing the psychological and social needs of a pregnant woman diagnosed with pre-eclampsia or eclampsia	250	4.24	0.73	249	4.07	0.73	0.17	0.23 (0.04–0.30)	0.009
Providing accurate discharge advice for a woman with pre-eclampsia	250	4.52	0.60	249	4.31	0.68	0.2	0.33 (0.09–0.32)	<0.001
Prioritizing care for a woman diagnosed with pre-eclampsia according to management protocols	250	4.57	0.59	249	4.43	0.68	0.13	0.21 (0.03–0.25)	0.018
Assessing a woman's clinical needs who present with eclampsia	250	4.40	0.65	249	4.25	0.64	0.16	0.23 (0.04–0.26)	0.007
Communication/Teamwork									
Getting along with colleagues	250	4.44	0.69	249	4.50	0.62	−0.07	−0.09 (−0.17 to 0.05)	0.261
Working as a member of the obstetric health	250	4.14	0.79	249	4.26	0.71	−0.12	−0.16 (−0.25 to 0.01)	0.082
Providing feedback to colleague midwives in other units	250	3.96	1.07	249	3.87	0.95	0.09	0.08 (−0.09 to 0.27)	0.328
Providing correct pre-eclampsia information to pregnant women, their spouses, and family	250	4.42	0.71	249	4.19	0.75	0.23	0.31 (0.10–0.36)	<0.001
Communicating with a woman diagnosed with pre-eclampsia face-to-face	250	4.34	0.67	249	4.34	0.67	0	−0.17 (−0.12 to 0.12)	0.965
Establishing a supportive relationship with a pregnant woman	250	4.46	0.61	249	4.23	0.71	0.23	0.34 (0.11–0.35)	<0.001
Management/Supervisory									
Making do with limited resources	250	3.96	0.82	249	4.09	0.71	−0.13	−0.16 (−0.26 to 0.00)	0.055
Appraising self-performance in preeclampsia or eclampsia	250	4.07	0.87	249	4.02	0.72	0.05	0.06 (−0.09 to 0.19)	0.467
Personally coping with changes in pre-eclampsia guidelines	249	4.20	0.73	249	4.20	0.62	0	−0.17 (−0.12 to 0.12)	0.947
Mentoring midwifery students and or junior midwives on pre-eclampsia or eclampsia care	250	4.52	0.60	249	4.15	0.76	0.37	0.54 (0.25–0.49)	<0.001
Research/Audit									
Investigating adverse events to identify root causes	250	4.51	0.67	249	4.31	0.71	0.19	0.29 (0.08–0.32)	0.002
Assessing the value of research papers on pre-eclampsia	250	4.08	0.84	249	3.80	0.75	0.28	0.35 (0.14–0.42)	<0.001
Applying research results from studies on pre-eclampsia to your midwifery practice	250	4.41	0.65	249	4.09	0.71	0.32	0.47 (0.20–0.44)	<0.001
Identifying areas in pre-eclampsia management that can be researched	250	4.20	0.64	249	3.80	0.88	0.4	0.52 (0.26–0.53)	<0.001
Writing clinical, shift and other reports about women diagnosed with pre-eclampsia or eclampsia	250	4.33	0.69	249	4.24	0.72	0.09	0.12 (−0.03 to 0.21)	0.148
Preparing logistics for severe symptoms or eclampsia	249	4.27	0.77	249	4.15	0.72	0.12	0.16 (−0.01 to 0.25)	0.083

SD- Standard Deviation.

The table provides a summary of the responses to tasks in the five domains.

^a Denominator may vary because of missing values; Rating A- Mean importance rating; Rating B-Mean performance rating; CI- Confidence Interval

2.8. Ethical considerations

The study conformed to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Supplementary file 2). Informed consent was obtained from all midwives participating in the study. Ethical clearance was granted by Charles Darwin University Human Research Ethics Committee (CDU-HREC H20118) and Korle-Bu Teaching Hospital Institutional Review Board (KBTH-STC/IRB/00013/2021).

3. Results

3.1. Sociodemographic characteristics

Of the 250 midwives who took the survey, most (n = 186, 74.4 %) held diploma qualifications and had 1–5 years' experience. The most mentioned form of in-service education was exclusively pre-eclampsia and eclampsia workshops (n = 152, 62.0 %). Midwives assessed continuing professional development (CPD) mainly from their place of work (n = 64, 25.6 %) and most from multiple sources (n = 86, 34.4 %). The other sociodemographic characteristics of the study population are presented in [Table 1](#).

Table 3
Top 14 pre-eclampsia training priorities.

Rank	Tasks
1	Undertaking pre-eclampsia health promotion activities like antenatal education
2	Identifying areas in pre-eclampsia management that can be researched
3	Mentoring midwifery students and or junior midwives on pre-eclampsia or eclampsia care
4	Applying research results from studies on pre-eclampsia to midwifery practice
5	Assessing the value of research papers on pre-eclampsia
6	Providing correct pre-eclampsia information to pregnant women, their spouses, and family
7	Finding information that can inform how you manage women with pre-eclampsia or eclampsia
8	Establishing a supportive relationship with a pregnant woman
9	Providing accurate discharge advice for a woman with pre-eclampsia
10	Investigating adverse events to identify root causes
11	Using magnesium sulphate safely and understanding the risks
12	Assessing the psychological and social needs of a pregnant woman diagnosed with pre-eclampsia or eclampsia
13	Assessing a woman's clinical needs who presents with eclampsia
14	Prioritising care for a woman diagnosed with pre-eclampsia according to management protocols

3.2. Training needs

All 28 items were given a high importance rating by midwives, with mean ratings ranging from 3.96 to 4.71 (Table 2). This indicates that midwives consider all 28 tasks to be crucial in their role related to pre-eclampsia management. Clinical tasks deemed to be most important included: using magnesium sulphate safely and understanding the risks; carrying out routine midwifery assessment procedures like fetal heart assessment, blood pressure assessment, urine testing; accurate and safe administration of antihypertensives; using approved guidelines and protocols for pre-eclampsia management; and prioritising care for a woman diagnosed with pre-eclampsia according to management protocols. Training needs were identified as those with a statistically significant difference between importance and performance scores (Table 2). Twenty-three items scored higher for importance (rating A) than performance (rating B). However, only 14 items had a difference between ratings ≥ 0.13 and statistically significant difference at $p < 0.05$. These items were the highest training needs (Table 3).

3.3. Overall training needs based on questionnaire sub-category

Based on the sub-category, roles relating to research/audit had the highest training needs with a mean difference (MD) score of 0.23 (95 % CI: 0.21–0.27), followed by clinical tasks MD = 0.17 (95 % CI: 0.13–0.20). The p-value for both of these domains was $p < 0.001$, indicating a statistically significant difference. Communication and teamwork-related roles had the least training needs (MD=0.06). To further understand the practical significance of these differences, Cohen's D was computed for each task category to enable identification of the magnitude of the difference between the importance and performance ratings. Research and clinical competency domains had Cohen's

Table 4
Difference in average training needs by subcategory.

	Rating A		Rating B		Difference (A-B)	Cohen's D (95 % CI)
	N ^a	Mean (SD)	N ^a	Mean (SD)		
Research/ Audit	249	4.30 (0.15)	249	4.06 (0.22)	0.23	1.27 (0.21–0.27)
Clinical Tasks	250	4.52 (0.15)	249	4.35 (0.23)	0.17	0.87 (0.14–0.20)
Communication and Teamwork	250	4.29 (0.20)	249	4.23 (0.21)	0.06	0.29 (0.24–0.10)
Administration	250	4.48 (0.12)	249	4.39 (0.10)	0.09	0.81 (0.70–0.11)
Management/Supervision	249	4.19 (0.24)	249	4.12 (0.08)	0.07	0.39 (0.04–0.10)

^a Denominator may vary because of missing values; CI- Confidence Interval; SD- Standard deviation.

D values above 0.8 indicating a large effect size signifying that targeted training is required in these areas.

The specific training requirements in the foremost category, research/audit roles, included in the top tier training needs were identifying areas in pre-eclampsia management that can be researched ($p < 0.001$, 95 % CI: 0.26–0.53), applying research results from studies on pre-eclampsia to midwifery practice ($p < 0.001$, 95 % CI: 0.20–0.44), assessing the value of research papers on pre-eclampsia ($p < 0.001$, 95 % CI: 0.14–0.12) and investigating adverse events to identify root causes ($p = 0.002$, 95 % CI: 0.08–0.32). Table 4 shows the differences in average training needs by sub-category.

3.4. Preferred improvement approach

The preferred approach to performance improvement was determined by the average score for each rating C and D. The highest ratings were in rating D indicating that training courses were preferred to improve performance on the task in comparison to organisational development. Across other tasks with high training needs, training courses were considered more useful than organisational development, except for 'preparing logistics for severe symptoms or eclampsia' and 'using approved guidelines and protocols for pre-eclampsia management' where organisational development to improve performance on the task was preferred over training courses.

4. Discussion

This study investigated the training needs of midwives in providing pre-eclampsia care and their preferred performance improvement approach. The findings provide a snapshot of the Ghanaian context as illustrated by the salient roles, current skill index of midwives and the training needs identified and prioritised. Midwives self-evaluated the significance of tasks within their present responsibilities, along with their proficiency in executing these tasks. Midwives had high training needs in 14 key areas, mainly research/audit and clinical care tasks, which have implications for their practice. In pre-eclampsia care, midwives in LMICs undertake an autonomous role demanding critical thinking, evidence-based practice and technical skills for effective management. Deficiencies in midwifery practice competencies may have a direct impact on the pursuit of ending preventable maternal mortality through prioritising quality care in the management of pre-eclampsia, eclampsia and its complications (Tunçalp et al., 2015). Therefore, midwives' deficits in research and clinical tasks need urgent remediation to contribute to favourable pre-eclampsia outcomes within their autonomous responsibilities. In contrast to earlier findings (Gaspard and Yang, 2016; Hennessy et al., 2006; Tsantili et al., 2021) the deficits in pre-eclampsia management did not vary by midwife's education, experience, or professional rank, suggesting similar competencies at tertiary hospitals.

The similarity of training needs for Ghanaian midwives raises the possibility that a standardised set of modules on pre-eclampsia management could be delivered to all midwives in that setting as also suggested by Hennessy et al. (2006). Plans for both short-term and long-term training might start by concentrating on the most important

priorities to make the most use of available resources. However, after every member of the midwifery staff has upgraded their skills, issues might occur. What strategy will be used moving forward? One school of thought advocates refocusing efforts on in-person, hands-on training delivered by internal trainers at the hospital to transfer to less-experienced staff members organisation-specific knowledge from a pool of more-experienced workers (Takase et al., 2015). According to the data, 4.1 % of midwives reported receiving specialised training (train the trainer) focused on the subject of pre-eclampsia. Given that most of the hospital's midwives are less experienced, there is a chance to develop more specialists, which is sustainable over the long run. Moreover, new entrants into a profession may be more receptive to training and positive reinforcement from follow-up supervision.

To develop a full picture of continuing professional development related to pre-eclampsia management, further research may include a multi-layered analysis to identify barriers hindering midwives' involvement in CPD vis-a-vis the scope of practice at the macro and micro levels. As espoused by Hicks et al., the work context influences how a midwife may conceptualise her role and therefore health systems may have a direct or indirect influence on what midwives do (Hennessy et al., 2006). In future investigations, regional differences, environmental factors and work contexts can be explored with nationwide surveys to identify whether training courses for pre-eclampsia management ought to be centralised for midwives in Ghana. A recent review of sub-Saharan African countries highlights skill, knowledge and behavioural gaps in midwifery pre-service training curricula when aligned with the ICM Essential Competencies framework (Moller et al., 2022). Therefore, it is important to assess pre-service midwifery education curricula in Ghana to determine if the quality of education needs to be improved and whether the content focuses on competencies that align with the current trends in maternal and child health.

The priority training needs were mostly related to research and clinical tasks which is not unusual based on their primary clinical role (Anaman-Torgbor et al., 2022; Singh et al., 2015; Adewole et al., 2020). The study's midwives practice in a teaching hospital where there may be a dependence on the application of scientific knowledge to practise, hence the highlighted need for research and new knowledge management in midwifery practice. For midwives to be equipped to provide evidence-based care, they must be able to identify their roles and develop their skills to engage with the evidence (Anaman-Torgbor et al., 2022). Research use and the research capability of nurses and midwives in Ghana remain largely unexplored and this could account for what was found (Christmals et al., 2018).

All the midwives in this study believed that training programmes may fill their skill shortages in pre-eclampsia care, which would have a significant positive impact on clinical practice. The study's findings are consistent with past research which concludes that training courses, as opposed to organisational changes, are the most suitable corrective option to fill practice gaps, notwithstanding barriers to midwives' continuous professional growth (Adewole et al., 2020, 2019). The data revealed that over 90 % of midwives actively participated in training programs in the six months leading up to data collection. This high engagement demonstrates their dedication to continuously acquiring skills, presenting an opportunity that can be effectively used. While attendance at these training programs may be mandatory to maintain registration, the midwives' commitment to professional development goes beyond mere compliance. Therefore, targeted multi modal approaches have a huge potential to effectively address competency gaps in pre-eclampsia management (Tabatabaieian et al., 2018).

5. Limitations

While the instrument used is applicable in different settings, the study was conducted in only one tertiary health facility in Ghana. Geographic and contextual differences at the tertiary hospital level may result in varying specific training needs have a potential impact on the

generalisability of the study findings. Also, this study focused solely on the midwives and did not address the organisational factors that may have an impact on the training needs we have identified. However, this has been addressed by the other part of the PhD project.

There is a need to consider self-report bias which is common in cross-sectional studies and so findings should be taken cautiously. However, to minimise bias in responses, the format of the self-assessment was changed for each rating. This study used convenience sampling because it was cost-effective, efficient and convenient to implement especially when data collection was at the height of the Covid-19 pandemic. As can happen with convenience sampling, our sample was skewed to an inexperienced cohort. Very few midwives of the mid to senior level participated in the study. Therefore, we are missing their underrepresented perspectives.

6. Conclusion

In summary, this study highlights the training requirements for midwives in Ghana regarding pre-eclampsia management. It reveals that midwives' needs in this area predominantly revolve around research/audit roles and clinical care for pre-eclamptic women. Training programs within the framework of continuing professional development are favoured over organisational changes to address these needs. Consequently, the study's findings serve as a foundation for policymakers in resource-constrained settings to design context-specific, practical, cost-effective and targeted continuing professional development programs aimed at enhancing midwives' proficiency in pre-eclampsia management.

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Ethical statement

This study is also part of a doctoral research project ethical clearance for the broader project has been granted from Charles Darwin University Human Research Ethics Committee and Korle Bu Teaching Hospital Institutional Review Board and Scientific Committee.

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CRediT authorship contribution statement

Isabella Garti: Conceptualization, Methodology, Investigation, Data Curation, Visualization, writing original draft. **Michelle Gray:** Supervision, Writing- reviewing and editing. **Angela Bromley:** Writing-reviewing and editing. **Jing-Yu (Benjamin) Tan:** Supervision, Writing-reviewing and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.nepr.2024.103872](https://doi.org/10.1016/j.nepr.2024.103872).

References

- Adatara, P., Amooba, P.A., Afaya, A., Salia, S.M., Avane, M.A., Kuug, A., et al., 2021. Challenges experienced by midwives working in rural communities in the Upper East Region of Ghana: a qualitative study. *BMC Preg. Childbirth* 21 (1), 287.

- Adewolfe, D., Bello, S., Adebowale, S., 2019. Preferred approach to performance improvement among stakeholders in the health insurance industry in southwest region of Nigeria: implications for universal health coverage. *J. Community Med. Prim. Health Care* 31 (2), 78–89.
- Adewolfe, D.A., Salawu, M.M., Bello, S., 2020. Training needs assessment and preferred approach to enhancing work performance among clinical nurses in University College Hospital (UCH), Ibadan, Oyo State, South-western Nigeria. *Int. J. Nurs. Midwifery* 12 (4), 130–138.
- Adua, E., Frimpong, K., Li, X., Wang, W., 2017. Emerging issues in public health: a perspective on Ghana's healthcare expenditure, policies and outcomes. *EPMA J.* 8 (3), 197–206.
- Adu-Bonsaffoh, K., Obed, S.A., Seffah, J.D., 2014. Maternal outcomes of hypertensive disorders in pregnancy at Korle Bu Teaching Hospital, Ghana. *Int. J. Gynecol. Obstet.* 127 (3), 238–242.
- Anaman-Torgbor, J.A., Nyande, F.K., Amenuke, M., Gyapong, B., Dodunoo, D., Tarkang, E., 2022. Evidence-Based Nursing Practice in Ghana. *SAGE Open Nurs.* 8, 23779608221088252.
- Asamani, J.A., Amertil, N.P., Ismaila, H., Francis, A.A., Chebere, M.M., Nabyonga-Orem, J., 2019. Nurses and midwives demographic shift in Ghana—the policy implications of a looming crisis. *Hum. Resour. Health* 17 (1), 32.
- Boafor, T.K., Ntumy, M.Y., Asah-Opoku, K., Sepenu, P., Ofosu, B., Oppong, S.A., 2021. Maternal mortality at the Korle Bu Teaching Hospital, Ghana: A five-year review. *Accra, Ghana: A five-year Rev. Afr. J. Reprod. Health* 25, 56.
- Burton, G.J., Redman, C.W., Roberts, J.M., Moffett, A., 2019. Pre-eclampsia: pathophysiology and clinical implications. *BMJ* 366, 12381.
- Chakraborty, S., Saggurti, N., Adanu, R., Bando, D.A.B., Berrueta, M., Gausman, J., et al., 2023. Validating midwifery professionals' scope of practice and competency: a multi-country study comparing national data to international standards. *PLoS One* 18 (5), e0286310.
- Christmals, C.D., Gross, J., Aziato, L., Armstrong, S.J., 2018. The state of nursing research in Ghana: an integrative literature review. *SAGE Open Nurs.* 4, 2377960818783820.
- von Dadelszen, P., Vidler, M., Tsigas, E., Magee, L.A., 2021. Management of preeclampsia in low- and middle-income countries: lessons to date and questions arising, from the PRE-EMPT and related initiatives. *Matern. Fetal Med.* 3 (2).
- Daniel, W.W., 1999. *Biostatistics: A Foundation for Analysis in the Health Sciences*, 7th ed. John Wiley & Sons, New York.
- Dartey, A.F., Dzansi, G., Lotse, C.W., Obuobisa, R., Afua Bosu, C.E., Afaya, A., 2022. Midwives experiences of managing clients with eclampsia in a low resource setting: a qualitative descriptive study. *SAGE Open Nurs.* 8, 23779608221094542.
- Dassah, E.T., Kusi-Mensah, E., Morhe, E.S.K., Odoi, A.T., 2019. Maternal and perinatal outcomes among women with hypertensive disorders in pregnancy in Kumasi, Ghana. *PLoS One* 14 (10), e0223478.
- Escribano-Ferrer, B., Cluzeau, F., Cutler, D., Akufo, C., Chalkidou, K., 2016. Quality of health care in Ghana: mapping of interventions and the way forward. *Ghana Med. J.* 50 (4), 238–247.
- Firoz, T., Sanghvi, H., Meriardi, M., von Dadelszen, P., 2011. Pre-eclampsia in low and middle income countries. *Best. Pract. Res. Clin. Obstet. Gynaecol.* 25 (4), 537–548.
- Garti, I., Gray, M., Tan, J.-Y., Bromley, A., 2020. Midwives' knowledge of pre-eclampsia management: a scoping review. *Women Birth* 34 (1), 87–104.
- Garti, I., Gray, M., Bromley, A., Tan, J.-Y.B., 2022. A qualitative document analysis of policies influencing preeclampsia management by midwives in Ghana. *Women Birth* 35 (6), 612–618.
- Garti, I., Gray, M., Bromley, A., Tan, B., 2023. A socioecological description of the influencing factors to midwives' management of preeclampsia in a Ghanaian tertiary hospital. *PLoS One* 18 (9), e0291036.
- Gaspard, J., Yang, C.-M., 2016. Training needs assessment of health care professionals in a developing country: the example of Saint Lucia. *BMC Med. Educ.* 16 (1), 112.
- Ghana Statistical Service, Ghana Health Service, ICF International. *Ghana maternal health survey 2017*. Accra, Ghana: GSS, GHS, ICF; 2018.
- Hennessy, D., Hicks, C., Koesno, H., 2006. The training and development needs of midwives in Indonesia: paper 2 of 3. *Hum. Resour. Health* 4 (1), 9.
- Hicks C., Hennessy D. *Hennessy-Hicks training needs analysis questionnaire and manual*, 2011.
- Hicks, C., Hennessy, D., Cooper, J., Barwell, F., 1996. Investigating attitudes to research in primary health care teams. *J. Adv. Nurs.* 24 (5), 1033–1041.
- Holloway, K., Arcus, K., Orsborn, G., 2018. Training needs analysis - The essential first step for continuing professional development design. *Nurse Educ. Pract.* 28, 7–12.
- International Confederation of Midwives. *Essential competencies for midwifery practice 2019* [Available from: (<http://www.internationalmidwives.org/>)].
- Magee, L.A., Brown, M.A., Hall, D.R., Gupte, S., Hennessy, A., Karumanchi, S.A., et al., 2022. The 2021 international society for the study of hypertension in pregnancy classification, diagnosis & management recommendations for international practice. *Preg. Hypertens.* 27, 148–169.
- Mahmud, K.T., Saira Wahid, I., Arif, I., 2019. Impact of training needs assessment on the performance of employees: evidence from Bangladesh. *Cogent Soc. Sci.* 5 (1), 1705627.
- Moller, A.-B., Welsh, J., Ayebare, E., Chipeta, E., Gross, M.M., Hougbo, G., et al., 2022. Are midwives ready to provide quality evidence-based care after pre-service training? Curricula assessment in four countries—Benin, Malawi, Tanzania and Uganda. *PLoS Glob. Public Health* 2 (9), e0000605.
- Mwansisiya, T., Mbekenga, C., Isangula, K., Mwashia, L., Pallangyo, E., Edwards, G., et al., 2021. Translation and validation of Training Needs Analysis Questionnaire among reproductive, maternal and newborn health workers in Tanzania. *BMC Health Serv. Res.* 21 (1), 735.
- Nove, A., Friberg, I.K., de Bernis, L., McConville, F., Moran, A.C., Najjamba, M., et al., 2021. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a Lives Saved Tool modelling study. *Lancet Glob. Health* 9 (1), e24–e32.
- Nursing and Midwifery Council Ghana (NMC-GH), 2020. *Continuing Professional Development Programmes for Nurse Assistants, Nurses and Midwives*. Nursing and Midwifery Council Ghana, Accra.
- Rahimi, M.S., Fahami, F., Najimi, A., 2017. The effectiveness of training through mobile on the practice of midwives in the management of pre-eclampsia. *Biomed. Pharmacol. J.* 10 (2), 781–786.
- Rawlins, B., Plotkin, M., Rakotova, J.P., Getachew, A., Vaz, M., Ricca, J., et al., 2018. Screening and management of pre-eclampsia and eclampsia in antenatal and labor and delivery services: findings from cross-sectional observation studies in six sub-Saharan African countries. *BMC Pregnancy Childbirth* 18 (1), 346.
- Salisu, W.J., Sadooghiasl, A., Yakubu, I., Abdul-Rashid, H., Mohammed, S., 2020. The experiences of nurses and midwives regarding nursing education in Ghana: a qualitative content analysis. *Nurse Educ. Today* 92, 104507.
- Singh, S., Sheweta, K., Arya, S., Gupta, S.K., Williamson, S.N., 2015. Training need assessment of nursing personnel as super specialty tertiary care hospitals in northern India. *Int. J. Health Sci. Res.* 5 (3), 262–270.
- Soggiu-Duta, C.L., Crauciuc, D.V., Crauciuc, E., Dmour, A., Iov, T., Bulgaru-Iliescu, D., et al., 2019. The impact of an intensive educational program regarding preeclampsia on health professional knowledge. *Rev. de Chim.* 70 (6), 2245–2251.
- Tabatabaiean, M., Kordi, M., Dadgar, S., Esmaeily, H., Khadivzadeh, T., 2018. Comparing the effects of simulation-based training, blended and lecture on the simulated performance of midwives in preeclampsia and eclampsia. *J. Educ. Health Promot.* 7.
- Takase, M., Yamamoto, M., Sato, Y., Niitani, M., Uemura, C., 2015. The relationship between workplace learning and midwives' and nurses' self-reported competence: a cross-sectional survey. *Int. J. Nurs. Stud.* 52 (12), 1804–1815.
- Tsantili, I., Hadjidema, S., Galanis, P., 2021. Identification of the training needs of health care professionals in Greece. *Int. J. Caring Sci.* 14 (1), 115.
- Tunçalp, Ö., Were, W.M., MacLennan, C., Oladapo, O.T., Gülmezoglu, A.M., Bahl, R., et al., 2015. Quality of care for pregnant women and newborns—the WHO vision. *Bjog* 122 (8), 1045–1049.
- Ziba, F.A., Yakong, V.N., Ali, Z., 2021. Clinical learning environment of nursing and midwifery students in Ghana. *BMC Nurs.* 20 (1), 14.