CHAPTER 10

KEY INFORMATION SOURCES FOR CLINICAL DECISION-MAKING AMONG GHANAIAN CLINICAL NURSES AND MIDWIVES

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Abstract

Clinical decision-making in healthcare relies on factors such as clinical experience, knowledge of evidence-based practices (EBPs) and patient-specific circumstances. Over the years, there has been a skewed emphasis on the empirical pattern of knowing, overlooking other patterns of knowing. Key sources of information and patterns of knowing influence how nurses and midwives interpret clinical situations, make decisions and provide care. However, in many low- and middle-income countries, such as Ghana, a knowledge gap exists regarding the sources of information, patterns of knowing guiding clinical decision-making in nursing and midwifery practice. It is also not known to what extent nurses and midwives are able to use the empirical pattern of knowing, which has gained priority over the years. This chapter addresses the knowledge gap by examining the primary sources of information, the patterns of knowing that guide clinical decision-making in nursing and midwifery practice in Ghana, as well as their ability to use the empirical pattern of knowing. Recommendations for use of all patterns, with an emphasis on empirical pattern of knowing are provided to facilitate knowledge translation to practice and support clinical decision-making. A cross-sectional quantitative study was conducted with 400 clinical nurses and midwives, sampled through a multistage sampling method. Data were collected using a modified EBP questionnaire and analysed with STATA 16, both descriptively and inferentially. The results show that the most used sources of information in line with the patterns of knowing were empirical (formal education/school training, in-service training, journal articles (34%) and pharmaceutical literature), with journal articles being the least used source, and ethical (hospital policies and protocols). The findings imply the need for enhanced research training. Health facilities and educational institutions should improve access to digital resources and regularly update hospital protocols and curricula for nursing and midwifery education using current evidence.

Keywords: information; decision-making; clinical; nurses; midwives; evidence-based practice

1 Introduction and background

The State of the World's Nursing Report 2025 has provided strategic direction for nurses and midwives to practice to the fullest extent of their abilities, with a policy priority of adapting workplaces to enable them to contribute maximally to healthcare delivery as they work in interdisciplinary teams (World Health Organization, 2025). This action calls for a review of the information sources guiding nurses and midwives' clinical decision-making to enable strategic planning and ensure optimal health (World Health Organization, 2025).

Clinical decision-making in nursing and midwifery is complex, involving critical thinking, knowledge application and ethical considerations to determine the best course of action for a patient's care. Information sources and patterns of knowing play a key role in nurses and midwives clinical decisions making (Fossum et al., 2022).

In 1978, Barbara Carper identified four patterns of knowing: empirical, aesthetic, ethical and personal knowing (Brown et al., 2022; Carper, 2021; Carper, 1978). Subsequently, Chinn also identified additional patterns of knowing, including sociopolitical, unknowing and emancipatory patterns of knowing (Chinn et al., 2021). All these seven (7) patterns of knowing represent the complex phenomenon nurses use in providing care to their patients (Thorne, 2020). Empirical knowing is a positivistic science where knowledge is logically determined through a systematic investigation (Carper, 2021). This knowledge is based on objective information, and the order of this pattern is evidence-based practice (EBP) (Jackson et al., 2009). EBP is a systematic approach to solving problems using current research evidence, patient values and clinical expertise for clinical decision-making (Boswell & Cannon, 2022; Dagne & Beshah, 2021; Li et al., 2019). It plays a critical role in contemporary healthcare by addressing the increasingly complex and evolving demands of society (Mercer, 2018; Virpi et al., 2017). According to Barbara Carper (1978), aesthetic knowing is a more subjective form that focuses on intuition and the interpretation of what nurses "come

to know" and find meaning in what they see. It is gained from experience rather than objective ways (Carper, 1978).

Carper (1978) defined personal knowing as a nurse knowing oneself and developing an interpersonal relationship with their patient. It requires maturity and self-confidence in one's experiences and capabilities and, therefore, increases with age and experience (Chinn & Kramer, 2014). On the other hand, ethical knowing focuses on morality, and decisions are based on what is right at the moment and what ought to be done for the patient's good (Chaddha & Agrawal, 2023). Brown et al. (2021) describe ethical knowing as offering alternatives and ensuring a sense of responsibility for patient's safety and best interests. The source of this knowledge includes ethical codes and professional standards (Collings-Hughes et al., 2022; Giorgini et al., 2015).

Sociopolitical knowing was later developed by White (1995) and refers to the environment within which nursing care takes place. This knowledge enables nurses to recognise the broader determinants of health, which include social, economic and political factors (Camargo et al., 2008; Fyers, 2024; Persegona et al., 2025; White, 1995). Unknowing is another pattern which means the position of how people understand the complex realities of life (Thorne, 2020). It highlights openness and encourages nurses to approach patient care without assumptions (Munhall, 1993; Thorne, 2020). In 2008, Chinn and Kramer added emancipatory knowing, which emphasises social justice and equity, helping nurses recognise the challenges, including institutional injustice, which affect healthcare delivery. It encourages advocacy for marginalised populations (Thorne, 2014; Velasco & Reed, 2023; Walter, 2017).

According to Chinn and Kramer (2014), also supported by Rafii et al. (2022) nursing practice becomes more effective when all the patterns of knowing are together and coherently applied to achieve praxis. Again, professional practice benefits from knowing because it is essential to competent clinical judgement, which goes beyond physical examinations (Sherwood, 2024). It incorporates the abilities of perceptive understanding and active engagement, which strengthen the nurse's capacity for advocacy and serve

as a critical component of clinical learning (Mantzorou & Mastrogiannis, 2011; Forough Rafii et al., 2021; Rafii et al., 2022). Even though these patterns of knowing in nursing are in place, in many developed countries, there has been a skewed focus towards the use of research, clinical guidelines and formal education as the primary basis for making decisions in healthcare, disregarding other patterns of knowing (Hanney & González-Block, 2015; Thacharodi et al., 2024).

Africa has also emphasised empirical knowledge, as studies show an increase in clinical research in line with global trends (Strüver et al., 2022; Strüver & Ibeneme, 2021). An increase in empirical knowledge generation is expected to be reflected in the practice of nurses and midwives, where clinical decisions would be made based on this evidence generated (Barría, 2022). However, this is not always the case. Increased attention to research use or evidence-based clinical decision-making might have led to less acceptance of other patterns of knowledge in clinical decision-making (Porter, 2010b). Moreover, it is not known to what extent are the nurses and midwives ready to use the empirical pattern of knowing given the increased attention it has received. Understanding of the nurses and midwives' sources of information, their patterns of knowing, and their ability to use empirical pattern of knowing to make clinical decision-making, could assist in the formulation of recommendations for using all patterns of knowing in clinical decision-making, with an emphasis on empirical pattern of knowing (Kitson & Harvey, 2016; Mantzorou & Mastrogiannis, 2011). Hence, the need for this study which assesses the information sources and patterns of knowing by nurses and midwives in Kumasi.

2 Problem statement

The World Health Organisation's Global Strategic Directions for Nursing and Midwifery (2021–2025) emphasises the importance of nurses and midwives accessing and applying various sources of knowledge to improve the quality of care and reach universal health coverage (World Health Organization, 2021). Nursing scholars, beginning with Carper (1978) and later scholars (Chinn et al., 2021; Munhall, 1993; F. Rafii et al., 2021; White, 1995; Zander,

2007) explain that the various ways of knowing influence how healthcare workers interpret clinical situations, make decisions and provide care. Despite this theoretical recognition, global research has consistently shown a dominant emphasis on empirical knowledge, often accompanied by continued reliance on informal information sources in clinical practice (Porter, 2010a).

Globally, research emphasises the growing importance of empirical knowledge in guiding clinical decisions. Evidence from integrative and systematic reviews indicates that nurses and midwives frequently depend on personal experience, peers and other informal sources rather than independently engaging with research evidence. For example, Fossum et al. (2022) found that peers are the primary source of information guiding clinical nursing practice. Similarly, Saunders and Vehviläinen-Julkunen (2016) found that nurses have positive attitudes towards EBP but do not use it in their practice. Similar patterns have been documented over several decades, with a high reliance on informal and interactive sources (Spenceley et al., 2008). Although a small number of studies from African contexts exist, they remain limited in scope and number, underscoring a persistent geographical imbalance in the source of information guiding clinical practice.

While these studies provide valuable insights into information use among nurses and midwives in high-income countries, far less is known about how information sources and patterns of knowing shape clinical decision-making in low- and middle-income countries (LMICs). In Ghana, as in many LMICs, there has been increasing emphasis on empirical knowledge and EBP within education, policy and professional discourse. However, it remains unclear to what extent nurses and midwives' access, interpret and apply empirical knowledge in practice or how the patterns of knowing interact with each other in clinical practice. Existing studies have predominantly focused on EBP attitudes or research utilisation (Agyei et al., 2015; Anaman-Torgbor et al., 2022; Antwi-Yamoah et al., 2021; Atakro et al., 2020), without sufficiently examining the broader range of information sources and patterns of knowing that inform everyday clinical decision-making.

Consequently, a critical gap exists in the literature regarding a comprehensive understanding of the information sources and patterns of knowing that guide clinical nursing and midwifery practice in Ghana and similar LMIC contexts. Addressing this gap is essential for developing contextually appropriate strategies that support balanced knowledge use in clinical decision-making for optimal health.

3 Aims and objectives

This study aims to investigate the current information sources and patterns of knowing that guide clinical decision-making among nurses and midwives, and to formulate recommendations to guide nurses and midwives in using all patterns of knowing to facilitate knowledge translation into practice and inform clinical decision-making, with an emphasis on empirical patterns of knowing. Therefore, the following objectives will be addressed:

- To investigate the primary information sources and the patterns of knowing guiding clinical decision-making in nursing and midwifery practice in Kumasi, Ghana.
- To assess the nurses and midwives' ability to use the empirical pattern of knowing (such as their competence in research skills and evidence-based practice) to inform clinical decision-making.

4 Methods

4.1 Research design

The study employed a cross-sectional design with a quantitative approach to identify the information sources guiding clinical decision-making in nursing and midwifery practice in Kumasi, Ghana.

4.2 Study setting

The study was conducted in the city of Kumasi in the Ashanti region of Ghana. The Ashanti region is the second-most populous region in Ghana

(Ghana Statistical Service, 2021). The Ashanti region was selected for this study due to its strategic location in the middle belt of Ghana, which brings together diverse socio-demographic groups and a mix of urban and rural settings, making it broadly representative of the national context (Ghana Statistical Service, 2021). It also has the highest concentration of healthcare facilities in the country, spanning community-based services to tertiary referral hospitals, thereby enabling the examination of information sources across different levels of nursing and midwifery practice (Awuah et al., 2014). While a large proportion of the population has access to primary care, access to secondary and tertiary services remains uneven, highlighting structural factors that may influence how information is obtained and used (George et al., 2020). Previous studies in the region have examined specific aspects of practice, such as nursing documentation (Tasew et al., 2019) and respectful maternity care (Dzomeku et al., 2021), but there is limited evidence on the broader spectrum of information sources guiding clinical decision-making. These characteristics make Ashanti an ideal setting for generating insights that are both contextually grounded and generalisable for nursing and midwifery practice in Ghana. The study was conducted in six hospitals in Kumasi City: one tertiary facility, four district-level facilities, which are government-owned, and one quasi-health facility representing the private health facilities. Including participants from multiple healthcare facilities across various service levels enhances the external validity of the study's findings and ensures the representation of diverse practice environments and organisational cultures.

4.3 Study population

The study included clinical nursing and midwifery professionals who have practised for a minimum of two (2) years post-qualification within the study area and have a valid licence from the Nursing and Midwifery Council of Ghana. Those who were on study or annual leave were excluded. As of January 2022, the total population of nurses and midwives in the selected health facilities was 3,556, representing the total target population.

4.4 Sample size calculation and sampling strategy

Determining an appropriate sample size was critical to ensuring the statistical power and reliability of the factor analysis. A sample size of 400 clinical nurses and midwives was calculated from the total population of nurses and midwives in the selected health facilities, which was 3,556 as of January 2022, using the Taro Yamane formula for calculating sample sizes (Yamane, 1967) with a 10% estimated dropout rate.

A multistage proportionate sampling was used to allocate the sample size for each facility based on the number of nurses and midwives at each facility (Shimizu, 2014). This step was followed by systematic sampling (Mostafa & Ahmad, 2018) with a sampling frame of nine, which was determined by dividing the population for each hospital by the sample size for that facility. The process was repeated until the required sample size of 400 was obtained. This systematic approach to sample size determination ensured that the study would have sufficient statistical power to detect meaningful patterns in the data while maintaining precision in the estimates.

4.5 Data collection

The data were collected using the EBP questionnaire by Upton and Upton (2006) with permission from the authors. The questionnaire was modified to assess research utilisation (RU) rather than evidence-based practice (EBP), given the conceptual overlap between the two constructs. Specifically, items were reworded to reflect the use of research findings in clinical practice while maintaining the instrument's original structure and domains (knowledge, attitude, and practice). Additionally, items on the sources of information and socio-demographic characteristics were included. No changes were made to the underlying constructs or measurement scale. This chapter reports on a sub-component of a larger study developing a framework to utilise research evidence by nurses and midwives. In the larger study, a first phase focused on situation analysis regarding nurses and midwives' sources of knowledge, as well as their ability to use research skills and evidence-based practice. In this chapter, we report findings from this section, which had the socio-demographic characteristics of respondents, questions on nurses and midwives' information sources,

their competence in research skills and evidence-based practice activities. While the rest of the larger study questionnaire had other subsections on knowledge, attitude and practice, including barriers and facilitators, these are not part of this chapter. Five (5) BSc nurses and midwives with over 10 years' experience in clinical practice reviewed the questionnaire for face validity, and their inputs were used to modify the questionnaire. The modified questionnaire was pretested among 40 clinical nurses and midwives working in two (2) health facilities within the study area but not included in the study. Cronbach's alpha for the modified questionnaire after pretesting was 0.8438, confirming the reliability of the questionnaire (Bonett & Wright, 2014). The modified questionnaire in English was administered online to respondents who consented to the study by trained research assistants (RAs) with a BSc in Nursing or Midwifery. English is the medium of instruction in Ghanaian schools and the official language of nursing and midwifery practice in Ghana, hence its use in the questionnaire. The RAs met the nurses and midwives face to face, provided information on the study to the nurses and midwives and handed the participant information leaflet to them. Their questions were answered, and their verbal consent was obtained. Interested participants' written consents were obtained afterwards, and the link to the online survey was shared with them individually via WhatsApp or Telegram by the RAs from December 2022 to February 2023. The questionnaire took approximately 15 minutes to complete [A1.1][A1.2].

4.6 Data analysis

The results of the online survey were downloaded to an Excel spreadsheet for cleaning, after which they were exported to STATA 16 for coding and analysis. Descriptive statistics were performed by a statistician for the socio-demographic characteristics, the information sources guiding respondents' practice and EBP activities. Inferential analysis was performed using factor analysis and reliability assessment. Statistical significance was established at $p \leq 0.05$.

4.7 Ethical considerations

Ethics approval for the study was obtained from the Health Research and Ethics Committee of Northwest University (NWU) in South Africa, with ethics number NWU-00070-22-A1; the Ghana Health Service (GHS) Ethics Review Committee, with ethics number GHS-ERC 003/07/22; the Komfo Anokye Teaching Hospital Institutional Review Board in Kumasi (KATH IRB/AP/152/22); and the Committee on Human Research, Publication and Ethics of the School of Medicine and Dentistry at the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana (CHRPE/AP/762/22). Permission was also obtained from the Ashanti Regional Health Directorate and Management of the various hospitals before data collection. Both verbal and written informed consent were obtained from respondents before data collection. Confidentiality was ensured by deleting identifiers from the data, such as respondents' names and contact addresses. To ensure privacy, an online survey was used to collect data for respondents to fill on their devices. They were assured of optional participation and the right to withdraw from the study at any time without consequences to promote autonomy.

5 Results and discussion

The study aimed to investigate the primary information sources guiding clinical decision-making in nursing and midwifery practice [A2.1][A2.2], identify factors influencing these information sources, and determine the proportion of practitioners using current evidence-based information. Data were analysed for 400 respondents, yielding a 100% response rate.

5.1 Socio-demographic characteristics

Table 10.1 provides a comprehensive overview of the sample composition across key variables, including educational qualifications, professional categories, age distribution and gender representation. The participants' educational profiles reveal a predominantly diploma-prepared workforce (50.8%). Bachelor's degree holders constituted the second-largest group at 40.3%, indicating that approximately 91.1% of the sample possessed either

a diploma or an undergraduate degree qualification. The findings also show 5.1% are specialist nurses or midwives from the Ghana College of Nurses and Midwives, which are few. This finding aligns with global patterns and highlights the need for targeted support for specialist education to increase their number (World Health Organization, 2024, 2025) since they are more likely to play an influential role in guiding evidence-based practice and mentoring others in information use. The participants' age distribution demonstrates a predominantly young to middle-aged workforce (30–39 years). The educational qualifications and age distribution reflect the state of the findings of the State of the World's Nursing 2025 report, where most countries have diplomas and bachelor's degrees as the entry-level, with a predominantly young to middle-aged workforce (World Health Organization, 2025). These might have implications for technology adoption and more receptivity to evidence-based innovations. This can influence how information is accessed and applied in clinical practice.

Table 10.1: Socio-demographic characteristics of study participants (N = 400)

Characteristic	Category	Frequency	Percentage (%)
Highest academic qualification	Diploma	203	50.8
	Bachelor's degree	161	40.3
	Master's degree	16	4.0
	Specialist	20	5.1
Professional category	Nursing	220	55.0
	Midwifery	180	45.0
Age group	20–29 years	134	33.5
	30–39 years	232	58.0
	40–49 years	29	7.3
	50 years and above	5	1.3
Gender	Female	348	87.0
	Male	52	13.0

5.2 Sources of information guiding clinical practice

Table 10.2 outlines the top ten information sources respondents used. Analysis of this study shows that the strongest information source is formal education, as 84.75% of the respondents use the knowledge gained from school, followed by in-service training (80.75%), which illustrates the high role of continuous professional growth in maintaining the current practice standards. Hospital policies and protocols (79.25%) were the third-highest information sources, with intuition-based practice (43%) being the least used source.

Table 10.2: Top information sources guiding clinical practice (N = 400)

Information source	Frequency	Percentage (%)
Formal education/school training	339	84.75
In-service training	323	80.75
Hospital policies and protocols	317	79.25
Conference attendance	258	64.50
Pharmaceutical literature	225	56.25
Online search engines	209	52.25
Personal experience	201	50.25
Physician/Peer consultation	198	49.50
Intuition-based practice	172	43.00
Journal articles	134	34

5.3 Aligning the information sources with the patterns of knowing

The information sources guiding clinical nursing and midwifery practice were aligned with the patterns of knowing and are rated and presented in Table 10.3.

Table 10.3: Sources of information aligned with the patterns of knowing

Pattern of knowing	Aligned source(s) of information	Rating of the usage
Empirical	Formal education/school training (84.75%) In-service training (80.75%) Hospital policies and protocols (79.25%) Journal articles (34%) Pharmaceutical literature (56.25%)	**High**
Aesthetic	Intuition-based practice (43.00%)	**Moderate**
Personal	Personal experience (50.25%)	**Moderate**
Ethical	Formal education/school training (84.75%) Hospital policies and protocols (79.25%)	**High**
Sociopolitical	Conference attendance (64.50%) Journal articles (34%) Online search engines (52.25%)	**Moderate**
Unknowing	Personal experience (50.25%) Intuition-based practice (43.00%)	**Moderate**
Emancipatory	In-service training (80.75%) Conference attendance (64.50%) Journal articles (34%) Online search engines (52.25%)	**Moderate**

Rating criteria: High = ≥75%, Moderate = 40–74.99%, Low = <40%

5.4 Research competence and application skills

The respondents rated themselves on 15 competencies related to EBP activities, ranging from 1 (very poor) to 5 (excellent), as presented in Table 10.4. Search engine competency (M = 4.10, standard deviation (SD) = 0.80) and gap identification skills (M = 3.83, SD = 0.64) were high; conversely, the ability to conduct research had the lowest mean rating (M = 3.36, SD = 0.83), followed by critical analysis of research articles skills (M = 3.42, SD = 0.74) and problem formulation skills (M = 3.47, SD = 0.75).

Table 10.4: Descriptive summary of research competence skills (N = 400)

Research competency	Mean	Std Dev	Min	Max
Search engine competency	4.10	0.80	1.0	5.0
Practice reflection ability	4.02	0.63	1.0	5.0
Gap identification skills	3.83	0.64	1.0	5.0
Knowledge-sharing frequency	3.80	0.78	1.0	5.0
Idea dissemination frequency	3.80	0.72	1.0	5.0
Evidence application skills	3.78	0.69	2.0	5.0
Educational preparation adequacy	3.68	0.91	1.0	5.0
Applicability assessment skills	3.66	0.72	1.0	5.0
Database awareness	3.64	0.88	1.0	5.0
Practice monitoring frequency	3.58	0.72	1.0	5.0
Validity assessment skills	3.51	0.73	1.0	5.0
Evidence retrieval knowledge	3.51	0.75	1.0	5.0
Problem formulation skills	3.47	0.75	1.0	5.0
Critical analysis skills	3.42	0.74	1.0	5.0
Research conduct ability	3.36	0.83	1.0	5.0

The question is, what information source guides nursing and midwifery practice, enabling us to elucidate the use of current evidence? The primary information sources that nurses and midwives use to guide clinical decision-making include formal education/school training, in-service training, hospital policies and protocols and conference attendance. The study's findings are discussed in the context of the patterns of knowing.

The findings show that nurses' and midwives' sources of information are predominantly institutionally driven, including formal education/school training, in-service training, hospital policies and protocols and conference attendance. This reflect a strong orientation toward structured knowledge, which is particularly characteristic of LMICs, confirmed by other studies

(Graham et al., 2025; Macey et al., 2022; Merry et al., 2023). Empirical knowing was mainly expressed through formal education/school training and in-service training, indicating that practice is largely shaped by foundational and employer-provided knowledge rather than independent engagement with research literature. This pattern aligns with evidence from studies in LMIC contexts where nurses and midwives report limited use of journal articles and research evidence due to structural constraints such as restricted access to databases, limited research training and time with workload pressures (Anaman-Torgbor et al., 2022; Atakro et al., 2020; Dagne & Beshah, 2021; Fossum et al., 2022; Kyei et al., 2023). The use of structured learning environments underscores the importance of fostering a workplace culture that actively promotes evidence-based and reflective practice, particularly through the leadership of nurse managers and nurse educators in both clinical and academic settings. This culture is essential for strengthening the translation of empirical knowledge into day-to-day clinical decision-making. Additionally, the reliance on formal training supports standardised care; it therefore underscores the need for contextually relevant curriculum updates (Owusu et al., 2025) and strengthened in-service education to enhance clinical decision-making for optimal health outcomes.

However, the low use of journal articles, which provide information for empirical knowing, found in our study, is akin to a study in Ethiopia (Dagne et al., 2021) and an integrative review where nursing journals were ranked number four, with 36 quantitative and two mixed-method studies, and number 10 in 13 qualitative and three mixed-methods studies (Fossum et al., 2022). Previous studies have reported structural barriers, including restricted access to databases, limited research training and time constraints with heavy workloads (Anaman-Torgbor et al., 2022; Atakro et al., 2020; Dagne & Beshah, 2021; Fossum et al., 2022; Kyei et al., 2023). The use of information from journal articles forms a significant portion of empirical knowledge. It denotes the independent use of current evidence in practice and scientific knowledge, which can be verified through the scientific process known as nursing science (Baixinho et al., 2014). Institutional strategies such as establishing EBP research hubs within

hospitals, providing access to databases and journals; and supporting nurse or midwife-led clinical research could strengthen research literacy and improve uptake of empirical evidence in patient care.

Table 10.4 shows that respondents expressed the greatest confidence in search engine competence (M = 4.10, SD = 0.80), indicating excellent skills in everyday internet searching. This result reflects the increased number of young workforce with a high diploma or bachelor's degree found in this study and could be leveraged as the basis for redirecting searching for credible, evidence-based sources of information to guide clinical decision-making for empirical knowing. Training programmes that guide nurses and midwives on appropriate databases and reputable online resources, alongside improving digital infrastructure such as database subscriptions could bridge the gap between general searching skills and effective evidence retrieval. The low use of journal articles could be linked with the low scores in the ability to conduct research (M = 3.36, SD = 0.83) and critical research appraisal skills (M = 3.42, SD = 0.74). This result calls for ongoing research education, mentorship by experienced researchers and protected time for literature review to equip the professionals for practice.

Aesthetic knowing involves using intuition as an information source to guide practice, which requires an individual's understanding of clinical issues and adopting a more creative and empathetic response (Bonis, 2009; Chinn & Kramer, 2014). Patient/family-centred care arises from this pattern of knowing. In this study, consistent with findings from an integrative review where it ranked among the least utilised patterns of knowing (Fossum et al., 2022). This finding of low aesthetic knowing raises concern because patient/family-centred care is being promoted globally and has enormous benefits for patients/families and healthcare providers (Park et al., 2018). It also ensures that care is delivered through the lens of the patient and tailored to meet their needs (Edgman-Levitan & Schoenbaum, 2021), with emotional intelligence and sensitivity of the care provider being essential. The findings call for deliberate strategies such as preceptorship models that demonstrate creative and empathetic care approaches, use of varied teaching models in clinical practice. Additionally, continuous and deliberate engagement of patients and families in shared clinical decision-making to

optimise their cooperation and improve patient outcomes. Policies on improving the working conditions of nurses and midwives in low- to middle-income countries to retain them and encourage the use of aesthetic knowing is key.

Personal knowing is reflected in personal experiences, which denotes reflective practice, and influences the nurse–patient relationship and leads to personal growth (Forough Rafii et al., 2021). This was reported by approximately half of the respondents, aligning with high scores in the ability to reflect on practice (M = 4.02, SD = 0.63 in Table 10.4). This result is akin to a study in the Midwest region of the United States (Miller & Hill, 2018) and Norway (Dalheim et al., 2012). The moderate use of personal experiences could be linked to the younger age distribution of respondents, and the migration of experienced professionals to higher-income countries, as highlighted in the State of the World's Nursing Report 2025. This report supports using reflective practice in nursing and midwifery care and calls for further research into how using personal experience can be enhanced and formally acknowledged. Integrating reflective journaling and mentorship programmes into both education and clinical practice could enhance personal knowing.

Ethical knowing was demonstrated through an increased use of hospital policies and protocols and formal education/training, indicating a strong reliance on structured ethical frameworks informed by professional standards, guiding nursing and midwifery practice. Similarly, sociopolitical knowing was demonstrated through hospital policies and protocols, online search engines and conference attendance, indicating a positive working environment requiring awareness of broader social systems that support professional development and are shaped by global perspectives. This finding is similar to a study in Norway and Ethiopia (Dagne & Beshah, 2021), where institutional guidelines were among the top information sources. This finding could have implications for developing policies, leadership and systems thinking for nurses to understand the influence of the broader context of care. However, it raises the question of the autonomy of nurses and midwives to implement and evaluate care based on current evidence.

It also raises the issue of outdated or unclear protocols and underscores the regular review and update of hospital policies with current evidence.

Emancipatory knowing was identified through in-service training, which means the use of sound, scientifically planned educational activities to improve employees' performance and, ultimately, output and service quality (Mutshatshi et al., 2022; Sajjadnia et al., 2015). Emancipatory knowing was also demonstrated through online searches, journal articles and conference attendance to obtain information to enable them to build capacity and be aware of, respond to, and comprehend the current societal, political and cultural order (Chinn et al., 2021), fostering social justice and addressing healthcare systems' inequities. This knowing could be strengthened by enlightening nurses and midwives on health equity, advocacy and social determinants of health, which can lead to inclusive care without inequities (Tind et al., 2025).

Unknowing was identified through intuition-based practice and peer and physician consultation, which were used by less than half of the participants. This finding indicates the low use of interactive and human information sources, which is contrary to other studies where nursing professionals prefer human information sources (Alving et al., 2018; Clarke et al., 2013; Ebenezer, 2015; Fossum et al., 2022). This finding could result from the high use of hospital protocols and policies, which provide guidelines for clinical decision-making. Intuition-based practice means that decision-making about care is based on the nurses' and midwives' intuition without recourse to patients and families. This shadows the implementation of patient-centred care and calls for deliberate efforts and support for nurses and midwives to develop active listening and patient-centred care to enhance unknowing and support holistic, person-centred care.

5.5 Research application in clinical practice

5.5.1 Frequency of EBP activities

Participants rated how often they performed specific EBP activities on a scale of 1 (never) to 5 (always). Table 10.5 presents the descriptive summary

of research application skills. The average mean is 3.64 (SD = 0.51), showing that practitioners accept the activities towards EBP at a moderate to good level. Gap identification in practice received the highest average (M = 3.83), and knowledge-sharing (M = 3.80) and idea dissemination (M = 3.80) received high scores. However, critical analysis of literature received the lowest rating (M = 3.42), as was the case in determining its performance in the previous competence assessment.

Table 10.5: Frequency of evidence-based practice (EBP) activities (N = 400)

EBP Activity	Mean	Std Dev	Min	Max
Gap identification in practice	3.83	0.64	1.0	5.0
Knowledge sharing with colleagues	3.80	0.78	1.0	5.0
Idea dissemination to colleagues	3.80	0.72	1.0	5.0
Evidence application in practice	3.78	0.69	2.0	5.0
Applicability assessment of evidence	3.66	0.72	1.0	5.0
Practice monitoring and evaluation	3.58	0.72	1.0	5.0
Validity assessment of evidence	3.51	0.73	1.0	5.0
Evidence retrieval from sources	3.51	0.75	1.0	5.0
Problem formulation from gaps	3.47	0.75	1.0	5.0
Critical analysis of literature	3.42	0.74	1.0	5.0

Earlier studies have identified high confidence in core information searching skills, with nurses preferring computer use as an information source (Clarke et al., 2013; Ebenezer, 2015; Spenceley et al., 2008). This skill could be enhanced by providing education and guidance on the appropriate sites to search for information. The active commonality of practitioners in sharing knowledge was identified as a facilitator influencing information sources. This finding is similar to other study findings where peers predominantly provided information to guide practice (Alving et al., 2018; Ebenezer, 2015),

which is concerning because peer information could deviate from the current evidence. Management structures that provide institutional support, policies and protocols are facilitators. Provision of institutional support in addition to availability of protocols that make practice decision-making easy are facilitators that promote empirical knowing. This is akin to a study by Veeramah, (2016) where nurses and midwives stated that has information in a form they can easily understand have implications for its use. Adherence to lifelong learning (professional development) through in-service training and attaining higher education in nursing and midwifery practice is crucial for professional development, as identified by Mutshatshi et al. (2022).

A lack of awareness of niche healthcare databases, moderate research self-efficacy and time constraints were consistent with findings from multiple international contexts (Dagne & Ayalew, 2020; Farokhzadian et al., 2015; Kocaman et al., 2010; Nwankwo & Amechi, 2019). Addressing these barriers requires coordinated efforts by regulatory bodies, professional associations, healthcare institutions and ministries of health to support continuous professional development, provide study leave opportunities, intensify research education, and improve digital access. Collectively, these strategies can promote the integrated use of all patterns of knowing to facilitate effective knowledge translation and improve clinical decision-making and patient outcomes.

5.6 Factor Analysis of Research Competence Skills

5.6.1 Factor extraction and model specification

Exploratory Factor Analysis (EFA) using Principal Component Analysis with Varimax rotation was conducted to identify the underlying dimensional structure of research competence skills among health professionals. Before conducting the factor analysis, data adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to confirm the appropriateness of the dataset for factor analysis. The factor analysis revealed a three-factor solution that effectively captured the variance in research competence skills as shown in Table 10.6.

This provided a comprehensive framework for understanding the multidimensional nature of research competence in healthcare practice.

Table 10.6: Factor Loadings for Research Competence Skills

Research Competency	Factor 1	Factor 2	Factor 3
Factor 1: Evidence Application and Critical Analysis			
Practice monitoring frequency	0.76	0.12	0.09
Evidence application skills	0.70	0.19	0.06
Applicability assessment skills	0.66	0.24	0.12
Knowledge sharing frequency	0.64	0.11	0.15
Idea dissemination frequency	0.63	0.11	0.16
Validity assessment skills	0.60	0.36	0.07
Critical analysis skills	0.57	0.32	0.32
Evidence retrieval knowledge	0.55	0.24	0.36
Factor 2: Practice Reflection and Gap Identification			
Gap identification skills	0.17	0.69	0.20
Problem formulation skills	0.49	0.59	0.19
Practice reflection ability	0.19	0.55	0.27
Factor 3: Technical Information Literacy			
Database awareness	0.15	0.20	0.72
Search engine competency	0.09	0.17	0.70

The first factor, evidence application and critical analysis, emerged as the most dominant dimension, with loadings ranging from 0.55 to 0.76. The highest loading variable was practice monitoring frequency (0.76). This factor reflects higher-order cognitive and practical skills necessary for implementing evidence-based practice and translating research findings into clinical improvements. This finding mirrors earlier studies across the United States, which identified evidence appraisal as a central competency in EBP frameworks (Melnyk et al., 2014; Tilson, 2010). The dominance of this factor suggests that empirical knowing particularly critical evaluation

and application of research, is the defining characteristic of research competence in this population. However, studies worldwide demonstrate that although practitioners recognise the importance of evidence application, actual implementation is inconsistent due to contextual barriers (Abu-Odah et al., 2022; Li et al., 2018). Research competence development should be linked with quality improvement initiatives to enhance practical uptake.

The second factor represents competencies focusing on reflective practice capabilities and self-assessment skills. This factor includes three variables with moderate to strong loadings, with gap identification skills showing the highest loading (0.69). The factor captures the metacognitive aspects of research competence that enable practitioners to recognise limitations in their current practice and identify opportunities for evidence-based improvements. This is akin to earlier studies, which confirmed that reflective practice improves the professionalism and competency of clinical practitioners (Barkhordari-Sharifabad et al., 2025; Embo et al., 2015; Sadare, 2024). The moderate cross-loading of problem formulation skills with Factor 1 (0.49) suggests an interconnection between reflective practice capabilities and evidence application skills. This is consistent with the Iowa Model of EBP, indicating that effective problem formulation serves as a bridge between identifying practice gaps and implementing evidence-based solutions (Collaborative et al., 2017). This demonstrates that empirical knowing cannot function independently of reflective capacity. Practitioners are unlikely to apply research evidence without recognising gaps in practice. Reflective practice should be incorporated into training programmes like clinical audit training; and PICO (Population, Intervention, Comparison and Outcome), a structured framework for the formulation of clinical problem into the curriculum and in-service education.

The third factor, Technical Information Literacy, represents the foundational technical competencies required for accessing and retrieving research information. This factor includes two variables with strong loadings: database awareness (0.72) and search engine competency (0.70). Despite having fewer variables than the other factors, Factor 3 demonstrates clear conceptual coherence and statistical strength. The competencies within this

factor reflect the technical proficiency required to navigate contemporary information systems and databases effectively. They also align with international evidence identifying digital literacy as foundational for EBP implementation (Chan et al., 2020; Mudallal et al., 2025; Shamsaee et al., 2021). In contrast, in many LMICs, limited database access and insufficient training have been reported as major barriers to empirical knowledge use (Abu-Odah et al., 2022; Alqahtani et al., 2022; Bahadori et al., 2016; D'Sa & Varghese, 2020; Dagne & Ayalew, 2020; Jabonete & Roxas, 2022; Sadeghi-Bazargani et al., 2014; Tuppal et al., 2019). The factor represents the foundational layer upon which more sophisticated research competencies are built. Therefore, technical training on digital literacy must be prioritised alongside access to database provision.

Cross-loading patterns provide insights into the interconnected nature of research competence dimensions. Evidence retrieval knowledge showed moderate loadings on both Factor 1 (0.55) and Factor 3 (0.36), suggesting that information retrieval skills bridge technical literacy and evidence application capabilities (Chaliha et al., 2024). Similarly, critical analysis skills demonstrated distributed loadings across all three factors, indicating its fundamental role in all aspects of research competence. Competency development programmes should integrate information retrieval, critical appraisal and reflective applications within real clinical scenarios with simulation-based workshops and case-based learning approaches.

5.6.2 Hierarchical Structure and Competency Development

The factor analysis results suggest a hierarchical structure of research competence, with Factor 1 representing the most advanced level of competency, Factor 2 representing developmental capabilities, and Factor 3 representing foundational skills. This hierarchy implies that competency development should progress systematically from foundational technical skills to reflective practice capabilities, and ultimately toward advanced evidence-based application and critical analysis competencies. This parallels Benner's novice-to-expert framework (Benner, 1984) and is similar to staged development models proposed in EBP competency literature (Batt et al., 2021; Dusin et al., 2023). Professional development initiatives should adopt

scaffolded models to build progressively toward advanced evidence application.

6 Conclusion

This study assessed the information sources and patterns of knowing that guide clinical decision-making in nursing and midwifery practice in Ghana, an area that has been underexplored in LMIC contexts. By examining not only the sources of information used but also practitioners' ability to apply the empirical pattern of knowing, the study responds to longstanding calls to strengthen evidence-informed clinical decision-making. The statistically supported three-factor model aligns with international research on EBP competence while reflecting the epistemological complexity of clinical decision-making in nursing and midwifery. Although a substantial proportion of respondents reported using evidence-based sources, the limited use of journal articles and modest critical appraisal skills highlight a persistent gap between the availability of research evidence and its effective use in practice.

These findings have important implications for the future of nursing and midwifery education in LMICs. The strong reliance on formal education and institutional protocols suggests that pre-service training, in-service education and organisational policies play a decisive role in shaping clinical practice. Consequently, nursing and midwifery curricula must move beyond content delivery to deliberately strengthen research literacy, critical appraisal and evidence-application skills (Dwyer, 2023). Embedding these competencies within undergraduate, postgraduate and continuing professional development programmes is essential for preparing a workforce capable of engaging with evolving healthcare demands.

At the institutional level, the high dependence on hospital protocols underscores the need for healthcare managers and regulatory bodies to ensure that clinical guidelines are regularly updated and aligned with current evidence. While protocols support standardised care, overreliance on them may limit professional autonomy and critical judgement if not accompanied by opportunities to access, interpret and apply research

independently. Investment in digital infrastructure, access to research databases, mentorship and protected time for evidence-related activities is therefore crucial.

Overall, this study highlights that strengthening evidence-informed practice in LMICs requires coordinated action across education, regulation and service delivery. By situating empirical knowing within the broader patterns of knowing, the findings emphasise that improving patient outcomes depends not only on increasing access to research evidence but also on building the capacity of nurses and midwives to critically engage with and translate the evidence into contextually appropriate care.

7 Limitations and Recommendations

7.1 Limitations

The cross-sectional design used in the study limits the ability to identify patient outcomes based on the information source guiding the care. Additionally, the online survey limits the inclusion of participants who were not abreast with technology. Also, the study relied on self-reported measures of research competence and EBP activities without direct evaluation of applying empirical knowledge in clinical practice, which may be subject to bias and overestimation. Nonetheless, the study holds promise, as it has revealed contextually relevant findings applicable to low- to middle-income settings. Again, the discussion of the results in the domains of the patterns of knowing provided a comprehensive framework for examining the information sources. Additionally, the large sample size, with a 100% response rate, provided strong statistical power and representation across diverse healthcare settings.

7.2 Recommendations that guide nurses and midwives on using all patterns of knowing to facilitate knowledge translation into practice in clinical decision-making, with an emphasis on the empirical pattern of knowing

7.2.1 Empirical Knowing (Scientific knowledge)

- Facilitate regular evidence-based practice workshops on reflective models and patterns of knowing in clinical practice.
- Establish EBP research hubs in hospitals for staff to have access to databases and journals.
- Establish journal clubs among health professionals to review articles and implement EBP in patient care.
- Encourage research projects conducted by clinical nurses and midwives to improve quality of patient care.
- Embed PICO formulation and clinical audit training in CPD programmes.

7.2.2 Ethical (Ethical Dimensions of Care) and Sociopolitical (Working Environment) Knowing

- Provide ongoing education on professional codes of conduct, patient advocacy, and human rights in care.
- Ensure regular review and updating of hospital protocols with current evidence.
- Integrate policy literacy and systems-thinking modules into continuing nursing and midwifery education.

7.2.3 Personal Knowing (Self-awareness)

- Promote reflective journaling and self-assessment portfolios for nurses and students during training.
- Establish preceptorship and mentorship programmes where experienced nurses model self-awareness and reflective practice.

7.2.4 Aesthetic Knowing (Art of Nursing)

- Encourage the use of different teaching models in clinical practice through preceptorship to enhance ethical and empathetic patient care.
- Recognise and reward nurses who demonstrate excellence in applying multiple ways of knowing in patient care.

7.2.5 Emancipatory Knowing (Social Justice and Equity)

- Empower nurses to challenge inequities in care delivery and advocate for resource allocation to solve these problems.
- Incorporate training on health equity, advocacy and social determinants of health.
- Encourage nurse-led quality improvement initiatives addressing contextual inequities.

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