Title Knowledge, attitude and use of evidence based practice (EBP) among Registered Nurse-Midwives practicing in Central Hospitals in Malawi: A Cross-Sectional Survey

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Research Article

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Abstract

**Background:** Even though EBP is being considered as a critical element in improving the quality of health services and achieving excellence in patient care, there is currently little knowledge of how EBP relates to nursing and midwifery in Malawi. This paper is a report of a study describing EBP knowledge, attitudes and use of registered nurses-midwives practicing in central hospitals in Malawi.

**Methods:** The descriptive, cross-sectional research design was conducted with a convenient sample of 183 nurse-midwives (response rate of 86%). The study used a questionnaire to collect data. Data were analysed using both descriptive and inferential statistics in the Statistical Product and Service Solutions version 23. Descriptive statistics were calculated to summarize overall knowledge levels, attitudes and use of nurse-midwives as percentages based on their scores from the assessment scale (1 to 7 Likert scale) in the EBP questionnaire. Non-parametric Mann-Whitney and Kruskal-Wallis tests were carried out to compare evidence-based practice scores based on demographics. Pearson's correlation (r) and stepwise regression analysis were further performed to analyse the relationship between the knowledge, attitude and use of nurse-midwives on the overall EBP of nurse-midwives.

**Results:** The average scores (mean±SD) of evidence-based practice amongst nurse midwives were 78.7±19.6 for attitude, 70.6±15.1 for knowledge levels, 57.8±23. for use, and 68.9±14.2 for the overall EBP. Higher educational qualification was associated with higher scores in knowledge levels (P=0.02). Research experience was associated with higher scores in nursing use (P=0.005), and higher overall evidence based practice were associated with both research experience (P=0.035) and educational qualification (P=0.004). Nurse-midwives attitude was affected by clinical experience (P=0.006) and the hospital where nurse-midwives worked (P=0.016). There was no significant difference in the EBP scores of nurse-midwives based on gender and/or their administrative roles in their respective central hospitals.

**Conclusion:** It is important to develop the knowledge/skills of nurse midwives in order to enhance evidence based practice amongst nurse midwives in Malawian hospitals. The results can be used by nurse managers, nurse educators, Ministry of Health policy makers, Nurses and Midwives Council of Malawi and donors to enhance implementation of EBP.

1. **Background**

Evidence based practice (EBP) is now being recognized by health care policy makers, healthcare staff, researchers and regulatory agencies, as the gold standard for the provision of safe and compassionate health care(1, 2). EBP is being considered as a critical element in improving the quality of health services and achieving excellence in patient care(3). EBP has been described as a decision-making process for patient care through integration of knowledge provided by the best available evidence, with a practitioner’s clinical experience and judgement, and combined with patient’s own values and preferences(4). Registered nurse-midwives have a key role to ensure that high-quality and consistent services are provided to their clients(5). The international Council of Nurses (ICN) has demonstrated a
commitment to nurses being active in developing a core of research-based professional knowledge that supports evidence-based practice (EBP)(6).

Previous studies have suggested that incorporating research findings into clinical practice brings about a higher level of nursing care as well as improved patient outcome, increased patient satisfaction, reduced hospital stay, efficient use of resources, elimination of unnecessary practices and improved cost efficiency(7–9). For example, in a study by Hansen & Severinsson(9), using EBP enabled nurses to remain up-to-date with health care trends and improved the care by promoting the use of the most appropriate and effective interventions which led to improved outcomes for the patients, nurses and hospitals. Moreover, nurses who are involved in EBP have been found to raise their status in multi-professional teams and express a sense of professionalism and growth which contributes to their professional identity (10).

While EBP is rapidly progressing in many developed countries like Ireland, Colombia, Chile, Spain, United States of America and United Kingdom(11–14), several published studies in Africa just indicate that EBP in nursing and midwifery is at its infancy stage(15–18) where requests for the provision of evidence do not come from the practice sites(19) as most of the evidence is in form of secondary evidence that comes as clinical guidelines. In some African countries the EBP utilization is below 20%. For example in Ethiopia only 15.7% of nurses use research evidence in clinical practice, while in Kenya only 8% utilize research evidence when providing nursing and midwifery care(15, 18).

The call for the use of evidence in health decision has become very strong in low and middle income countries where there is high burden of diseases and illnesses. According to Oxman, Lavis, Lewin& Fretheim(20), countries in the sub-Saharan Africa can double their efforts in improving health outcomes only if measures to prevent death and disability take into consideration local conditions and if choices of health interventions and policies are based on solid scientific evidence. This is in conformity with the World Health Organization (WHO) recommendation that health and social services in general and nursing practice in particular should be based on the best research evidence (21). According to Vorthems, Spoden and Wilcken(22), implementation of an evidence-based oncology outpatient staffing system increased working efficiency, reduced overtime, and improved patient and nurse satisfaction after just 6 months. Similarly, Muhumuza, Gomersall, Fredrick et al. (23) reported that best practice implementation improved healthcare worker hand hygiene in a low-resource setting in Uganda.

In a recent systematic review, Lizarondo, Lockwood and McArthur(24) observed that even though EBP demonstrated to positively impact patient outcomes, nurses and midwives in Africa had difficulty in incorporating it into practice. This collaborates with other studies that have also proved that nursing is still not based on best available evidence(1, 16, 25–29). The consistently reported barriers include lack of knowledge and skills to evaluate research findings, lack of time, lack of authority to change practice, lack of administrative support, organizational cultures rewarding routine task-based practice, poor attitude towards EBP, lack of value for research in practice, lack of understanding of databases, difficulties in accessing research materials and lack of comfort in accessing and navigating through nursing
databases, poor understanding of statistics and critical appraisal, lack of knowledge among nurses without university education and heavy workload (28, 30, 31).

Van Achterberg, Schoonhoven and Grol (2008) point out that nurses are not a uniform target group but are professionals with various educational levels, specializations, work settings and patient populations to be served. All these variations are potentially relevant to determining knowledge, attitudes and practices. According to Ammouri, Raddaha, Dsouza, et al. (30) approaches to promote EBP among nurse-midwives should be based on evidence that address current barriers to the adoption of EBP in clinical practice. This is what motivated the researchers to explore knowledge, attitude and use of EBP among registered nurse-midwives (RNMs) practicing in central hospitals in Malawi. The study was conducted to add knowledge to the nursing and midwifery professions by establishing an empirical foundation for the current knowledge, attitudes and practices of RNMs on EBP. This helped in facilitating appropriate strategies needed to help RNMs across the healthcare delivery system to utilize evidence in their practices. It is expected that findings from this study will help come up with recommendations for appropriate education and clinical programs to ensure successful implementation of EBP in Malawian hospitals. This will result in improved and cost effective patient care in Malawi which is a low income country.

This study was conducted to assess how EBP was perceived and used by the RNMs practicing in central hospitals in Malawi. Specifically the study was designed with the following objectives: 1) to determine the EBP knowledge or skills, attitudes and practices of RNM practicing in central hospitals in Malawi? 2) to explore if there were any differences between knowledge or skills, attitudes and practice among clinical RNMs based on their education level? 3) to determine if there were any differences between knowledge or skills, attitudes and practice among clinical RNMs based on their gender? 4) to determine if there were any differences between length of work experience and RNMs knowledge or skill, attitudes and practice of EBP?

2. Materials And Methods

2.1 Study Design

This study used a descriptive, cross sectional design to investigate knowledge, attitude and use of EBP among RNMs practicing in central hospitals across Malawi from January to March 2019.

2.2 Study setting

The study was conducted in all four central hospitals in Malawi. Central hospitals in Malawi are tertiary level institutions which provide specialist care(32). The study was conducted in the central hospitals because they serve as referral centres for all other facilities in all the three regions of Malawi (i.e. northern, central and southern regions). The central hospitals have the majority of RNMs.

2.3 Population and sampling
The study population consisted of the RNMs from all the units in the four central hospitals. The target population was two hundred and eight (208) permanently employed RNMs, registered with Nurses and Midwives Council of Malawi (NMCM) and practicing in all the settings of the central hospitals in Malawi. According to the statistics obtained from the central hospitals in October 2018, there were 326 RNMs in all the central hospitals in Malawi. There were 120 RNMs at Queen Elizabeth Central Hospital (QECH), 107 RNMs at Kamuzu Central Hospital (KCH), 55 RNMs at Mzuzu Central Hospital (MCH) and 44 RNMs at Zomba Central Hospital (ZCH). The total population for this study was therefore 326 RNMs with diploma and above as their highest qualifications.

- Using Open-Epi sample size calculator

\[
\text{Sample size } n = \left[ \text{DEFF} \times Np(1-p) \right] / \left[ (d^2/Z_{1-\alpha/2}^2 \times (N-1)+p \times (1-p)) \right]
\]

Population size for finite population correction factor (N): 326
Hypothesized % frequency of outcome factor in the population (p): 50%+/-5
Confidence limit as of 100 (absolute +/-%)(d): 5%
Design effect (for cluster survey-DEFF): 1
Confidence level (%): 95%
Sample size = 177
Response rate of 85% = 208

In this study a stratified random sampling was used to maximize representativeness. First, all central hospitals were classified based on size (large or small). The size of the central hospital in this study was based on current number of RNMs working at each central hospital. From these four hospitals, participants working within them were selected, stratified by workplace size and field of study (nursing and midwifery). The resulting sample consisted of 208 individuals with all central hospitals proportionately represented relative to the size of the stratum in the population.

2.4 Data Collection Instrument

A self-administered Evidence-Based Practice Questionnaire (EBPQ) was used to explore respondents’ practice, knowledge, attitude and use associated with EBP. This data collection tool was developed by Upton and Upton (33) in the United Kingdom to assess the EBP knowledge, attitudes, and practice among nurses. This instrument identified through literature review and previously published studies (2, 17, 30) is a self report scale which explores the day-to-day use of EBP.

This EBPQ is a self-completion questionnaire, composed of 24 items distributed among three subscales: knowledge/skills (14 items), attitudes (4 items), and use (practice) (6 items). Each item is scored on a
scale of 1–7, with a higher score being associated with a more positive attitude towards EBP or use and knowledge of EBP and lower score associated with negative attitude or use and knowledge of EBP. Responses of each item were considered positive if scores were greater than 4 (30). This instrument consists of three sub-scales: practice, knowledge/skills, and attitudes. Internal reliability has been established by a Cronbach's alpha of 0.87 for the entire questionnaire, 0.85 for the practice of EBP sub-scale, 0.79 for the attitudes sub-scale, and 0.91 for the knowledge/skills sub-scale(33). Construct validity was established using an independent EBP measure yielding a moderately positive relationship between scales(33). For the data analysis, we applied both means of total and average EBPQ scores to report each subscale, in order to perform comparison with similar studies.

The tool's demographic data was slightly changed to collect more data. Information on nationality, age, sex, highest level of education, workplace, years of nursing experience, nursing position/grade and an open-ended question to elicit information related to EBP not covered in the questionnaires or respondents’ opinions were collected.

2.5 Data collection procedure

RNMs recruited in this study were those that were practicing in the central hospitals and certified for clinical practice by NMCM regardless of the professional qualification. A convenience sample of RNMs of any gender and cultural background or ethnicity who agreed to participate in the study and met the following inclusion criteria were included: 1) holding at least a university diploma in nursing and above; 2) employed permanently in the selected facilities; 3) have at least one year of clinical experience; 4) signed an informed consent. Nurse midwife technicians, enrolled nurse midwives, auxiliary nurses and community midwife assistants were not included in the study as these categories of nursing or midwifery staffs are not expected to have knowledge and skills of EBP, based on the training syllabi and curriculum which they undergo during their training. All qualified RNMs from all units and all shifts were included, but RNMs who were not permanently employed in the facilities were excluded. Data collection took place between January and March 2019.

2.6 Data analysis

All collected data were analysed using both descriptive and inferential statistics in the Statistical Product and Service Solutions (SPSS) version 20. Descriptive statistics were calculated to summarize overall knowledge levels, attitudes and practices of nurse midwives as percentages based on their scores from the assessment scale (1 to 7 Likert scale) in the EBP questionnaire. Non-parametric Mann-Whitney and Kruskal-Wallis tests were carried out to compare EBP scores based on demographics. Pearson's correlation (r) and stepwise regression analysis were further carried out to analyse the relationship between the knowledge, attitudes and practices of nurse-midwives on the overall EBP of nurse-midwives.

2.7 Validity and reliability

To ensure validity and reliability, a sample size calculation ensured that a substantial high number of RNMs were recruited for generalizability of the study. The study questionnaire was also pretested to ensure that questions used in this study were clear.
3. Results

3.1 Demographic Characteristics

Out of 210 questionnaires distributed, 183 questionnaires were returned (response rate 87.14%). Among the participants, 182 were Malawians and one was a Filipino. The majority of participants (79.2%) were females, with 20.8% males. Forty-seven percent of the participants were aged between 20 and 29 with 5.5% aged between 50 and 59 years. The majority (78.7%) had a bachelors’ degree as their highest qualification, with 14.2% having a master degree and 6.6% having university nursing diploma.

Of all the participants, 59.6% had less than 5 years of practical experience, 33.3% had 5 to 10 years of practical experience and 6.1% had more than 10 years of practical experience. The demographic characteristics are highlighted in Table 1.
Table 1  
Participants’ demographic characteristics (n = 183)  

|                           | Frequency | Percentage |
|---------------------------|-----------|------------|
| **Gender**                |           |            |
| Female                    | 145       | 79.2       |
| Male                      | 37        | 20.8       |
| **Total**                 | 183       | 100        |
| **Age (years)**           |           |            |
| 20–29                     | 87        | 47.5       |
| 30–39                     | 65        | 35.5       |
| 40–49                     | 21        | 11.5       |
| 50–59                     | 10        | 5.5        |
| **Total**                 | 183       | 100        |
| **Highest professional qualification obtained** | | |
| Diploma in nursing        | 12        | 6.6        |
| Bachelors Degree in nursing and midwifery | 144 | 78.7 |
| Masters Degree in nursing or midwifery | 26 | 14.2 |
| **Total**                 | 182       | 99.5       |
| **Current position and Grade** | | |
| Nursing sister (Diploma)  | 12        | 6.6        |
| Nursing and Midwifery Officer (I) | 144 | 78.7 |
| Senior Nursing and Midwifery Officer (H) | 15 | 8.2 |
| Principal Nursing and Midwifery Officer (G) | 5  | 2.7 |
| Chief Nursing and Midwifery Officer (F) | 4  | 2.1 |
| Deputy Hospital Director (Nursing and Midwifery) (E) | 3 | 1.6 |
| **Total**                 | 181       | 99.9       |
| **Place of work**         |           |            |
| QECH                      | 64        | 35.0       |
| KCH                       | 61        | 33.3       |
|                  | Frequency | Percentage |
|------------------|-----------|------------|
| MZCH             | 31        | 16.9       |
| ZCH              | 27        | 14.8       |
| **Total**        | **183**   | **100**    |

| Practical (clinical) experience | Frequency | Percentage |
|---------------------------------|-----------|------------|
| < 5 years                       | 109       | 59.6       |
| 5–10 years                      | 63        | 33.3       |
| > 10 years                      | 11        | 6.1        |
| **Total**                       | **181**   | **99.0**   |

|                  | Frequency | Percentage |
|------------------|-----------|------------|
| **Total**        | **183**   | **100**    |

**Participants’ Knowledge, Attitudes and Practices of EBP**

In this study, participants self-rated their knowledge/skills, attitude and practice on a 7 point Likert scale where 1 represented poor and 7 represented excellent. The items’ scores of 1 to 4 were combined and represented as negative items and the scores of 5 to 7 were combined and represented as positive items. The average scores of the total EBPQ ranged from 3.56 ± 1.9 to 6.16 ± 2.9, with a mean of 4.86. The subscale of attitude was the highest one with mean of (4.85 ± 1.92 to 6.16 ± 2.9), followed by that of knowledge (4.34 ± 1.53 to 5.46 ± 1.49), and the lowest one was practice (3.56 ± 1.9 to 3.85 ± 1.7) (Table 2).

The lowest score and the most negative one for attitude was for the item “making time in a work schedule for research.” (Table 2). The lowest scores for knowledge were received in areas to do with converting information needs into research questions, research skills, critically analyzing evidence against set standards and retrieving evidence. The highest mean score (5.46 ± 1.49) in knowledge was for sharing ideas and information with colleagues. The nurse midwives in this study scored relatively low in the entire practice on EBP section. The item with the lowest practice score was “critically appraising literature.” The respondents’ mean score for this item was 3.56 ± 1.9 out of 7 and it was also the most negative one in practice subscale, with 50.9% negative rate (Table 2).
Table 2
Scores of each EBP questionnaire item from all respondents (n = 187)

| ITEM                                                   | Score (mean ± SD) | Score (%) | Priority item rank |
|--------------------------------------------------------|-------------------|-----------|--------------------|
| **Practice**                                           |                   |           |                    |
| Critically appraising literature                       | 3.56 ± 1.9        | 50.9      | 1                  |
| Evaluating the outcomes of own practice                | 4.41 ± 1.96       | 63        | 2                  |
| Sharing information with colleagues                    | 4.49 ± 1.95       | 64.17     | 3                  |
| Integrating evidence with expertise                     | 4.14 ± 2          | 59.09     | 4                  |
| Finding relevant evidence                              | 3.84 ± 1.9        | 54.8      | 5                  |
| Formulating clear questions                            | 3.85 ± 1.7        | 55.04     | 6                  |
| **Attitudes**                                          |                   |           |                    |
| Making time in a work schedule for research            | 4.85 ± 1.92       | 69.16     | 1                  |
| Welcoming questions in own practice                    | 5.65 ± 1.66       | 80.72     | 2                  |
| Changing practice due to evidence found                | 5.59 ± 1.58       | 79.94     | 3                  |
| EBP is fundamental to professional practice            | 6.16 ± 2.9        | 84.86     | 4                  |
| **Knowledge/skills**                                   |                   |           |                    |
| Research skills                                        | 4.34 ± 1.53       | 62.37     | 1                  |
| Critically analyzing evidence against set standards    | 4.87 ± 1.52       | 69.71     | 2                  |
| Retrieving evidence                                    | 4.77 ± 1.65       | 68.23     | 3                  |
| Determining the validity (close to the truth) of material | 4.93 ± 1.42     | 70.41     | 4                  |
| Converting information needs into research questions   | 4.11 ± 1.56       | 58.63     | 5                  |
| Awareness of major information types/sources           | 4.57 ± 1.44       | 65.11     | 6                  |
| Determining how useful (clinically applicable) material is | 5.33 ± 1.43     | 76.11     | 7                  |
| IT skills                                              | 4.53 ± 1.43       | 64.72     | 8                  |
| Monitoring and reviewing practice                      | 4.74 ± 1.51       | 67.68     | 9                  |
| Applying information to individual cases               | 5.55 ± 1.31       | 79.08     | 10                 |
| ITEM                                                         | Score (mean ± SD) | Score (%) | Priority item rank |
|-------------------------------------------------------------|-------------------|-----------|--------------------|
| Identifying gaps in professional practice                    | 5.4 ± 1.38        | 77.05     | 11                 |
| Reviewing own practices                                      | 5.57 ± 1.34       | 79.47     | 12                 |
| Disseminating new ideas about care to colleagues             | 5.28 ± 1.55       | 75.41     | 13                 |
| Sharing ideas and information with colleagues                | 5.46 ± 1.49       | 77.91     | 14                 |

Comparisons of groups of Registered Nurse Midwives

Relationships

Results on the effect of different demographics on the knowledge/skills, practice and attitude of nurse-midwives in Malawian central hospitals is presented in Table 3.

The study revealed statistically significant differences in the nursing practice (P=0.005), knowledge levels (P=0.02) and total EBP (P=0.004) based on educational qualification of nurse-midwives. Higher scores were obtained in nurse-midwives in possession of Masters degrees for nursing practice (67.5%), knowledge levels (78.4%) as well as total EBPQ (75.9%), in contrast to nurse-midwives with Diplomas and Bachelor's degrees for nursing practice (42.5%; 57.8%), knowledge levels (65.6%; 70.5%) and total EBP (61.1%; 68.8%) respectively. However, the nursing attitude did not significantly differ amongst nurse-midwives based on their educational qualifications (P=0.308).

Furthermore, the results revealed no statistically significant differences in nursing practice, attitude, knowledge levels and overall EBP based on gender (P>0.05). Similarly, EBP amongst nurses and midwives was not influenced by administrative roles or positions held by nurse-midwives in hospitals (P>0.05), even though significantly higher scores in nursing attitude (P=0.016) of nurse-midwives were obtained from Queen Elizabeth Hospital (QECH: 83.2%) and Zomba Central Hospital (ZCH: 83.1%) as compared to Mzuzu and Kamuzu Central Hospitals (MCH:78%, KCH:73%).

As regards the work-experience of nurses and midwives, results from the current study revealed that both clinical work and research experience had an effect on some facets of EBP. For clinical work experience, it was particularly pronounced (P=0.006) that nurse-midwives with less than 5 years of clinical experience had the highest scores in their nursing attitude (82.2%) as compared to those both with 5 to 10 years (76%) and greater than 10 years of clinical work experience (64%). Furthermore, the results also showed significant differences in nursing practice (P=0.013) and overall EBP (P=0.035) between RNMs with research experience (Practice: .60.8%, EBP: 73.4%) and those without it (Practice: 55.9%, EBP: 78.1%). The
rest of the differences in EBP amongst RNMs were not statistically significant (P>0.05) amongst nurse-midwives based on both their clinical work and research experiences.
Table 3
Summary of comparisons for nursing practice, attitude, knowledge levels and total EBP scores (%) based on different nurse demographics

| Characteristics            | Nursing Practice | Nursing Attitude | Knowledge level | Total EBP |
|----------------------------|------------------|------------------|-----------------|-----------|
| Gender                     |                  |                  |                 |           |
| Male                       | 61.1             | 79.8             | 73.2            | 71.3      |
| Female                     | 57.4             | 78.9             | 70.8            | 68.8      |
| p-value                    | 0.497            | 0.593            | 0.355           | 0.357     |
| Clinical experience        |                  |                  |                 |           |
| < 5 years                  | 60               | 82.2             | 71.6            | 70.5      |
| 5–10 years                 | 55.6             | 76               | 71.7            | 68.4      |
| > 10 years                 | 53.7             | 64               | 64.4            | 61.6      |
| p-value                    | 0.321            | 0.006*           | 0.305           | 0.093     |
| Position/Nursing administrator |              |                  |                 |           |
| Yes                        | 57.8             | 75.5             | 73.5            | 68.9      |
| No                         | 58.2             | 79.7             | 70.9            | 69.2      |
| p-value                    | 0.919            | 0.4              | 0.345           | 0.756     |
| Specialty/Research experience |              |                  |                 |           |
| Yes                        | 60.8             | 80.5             | 74.5            | 73.4      |
| No                         | 55.9             | 78.7             | 70.3            | 68.1      |
| p-value                    | 0.013*           | 0.97             | 0.206           | 0.035*    |
| Education/Qualification    |                  |                  |                 |           |
| Diploma                    | 42.5             | 72.9             | 65.6            | 61.1      |
| Bachelors                  | 57.8             | 79.3             | 70.5            | 68.8      |
| Masters                    | 67.5             | 80.8             | 78.4            | 75.9      |
| p-value                    | 0.005*           | 0.308            | 0.02*           | 0.004*    |
| Institution/Facility       |                  |                  |                 |           |
| MCH                        | 54.8             | 78               | 72.2            | 68.8      |
| KCH                        | 58.9             | 73               | 71.4            | 68.6      |
| Characteristics | Nursing Practice | Nursing Attitude | Knowledge level | Total EBP |
|-----------------|------------------|-----------------|-----------------|-----------|
| QECH            | 59.7             | 83.2            | 71.5            | 70.5      |
| ZCH             | 57               | 83.1            | 70.1            | 69        |
| p-value         | 0.871            | 0.016*          | 0.995           | 0.583     |

NB: All scores for the different characteristics are percentages (%). Scores of the respondents within each category are significantly different where p-value < 0.05 is flagged by an asterisk (*).

| Variables*      | Total EBP | Practice | Attitude | Knowledge levels |
|-----------------|-----------|----------|----------|------------------|
| Total EBP       | 1         |          |          |                  |
| Practice        | 0.782     | 1        |          |                  |
| Attitude        | 0.539     | 0.305    | 1        |                  |
| Knowledge levels| 0.891     | 0.487    | 0.293    | 1                |

*Correlations between all variables (%) are significantly different at P < 0.001.

Upon running correlation analysis, results in Table 4 showed that total EBP amongst nurse-midwives was most strongly correlated to their knowledge levels (r = 0.891, P < 0.001). Nursing practice had only a strong relationship with total EBP (r = 0.782) whereas a moderate relationship between total EBP and nursing and midwifery attitude (r = 0.539) was revealed. The influence of the different aspects of EBP (attitude, practice and knowledge level) on each other was generally weak (0.487 – r – 0.293) though statistically significant (P < 0.001). As such, after further proceeding to carry out stepwise regression analysis, the model summary (Table 5) and ANOVA for the regression model 3 (Table 6) revealed that all the models were found to be statistically significant (P < 0.001). Using the model coefficients highlighted in Table 7, it was revealed that for every unit increase in the knowledge levels of RNMs, a 0.57% increase in the total EBP is expected assuming nursing and midwifery practice and attitude of the RNMs are constant. Furthermore, total EBP for every unit increase in both nursing and midwifery practice and attitude of the RNMs is also expected to increase.
### Table 5
Model summary for Step-wise multiple linear regression analysis.

| Model | R    | \( R^2 \) | Adjusted \( R^2 \) | Std. Error of the Estimate | Change Statistics |
|-------|------|-----------|---------------------|-----------------------------|-------------------|
|       | \( \Delta R^2 \) | \( \Delta F \) | \( \Delta p \) |
| 1     | .891a | 0.794     | 0.793               | 6.436                       | 0.794 696.782 0.000 |
| 2     | .976b | 0.953     | 0.952               | 3.082                       | 0.159 609.239 0.000 |
| 3     | 0.999c| 0.999     | 0.999               | 0.034                       | 0.047 1462753.64 0.000 |

- **a.** The predictors for model 1 include: (Constant), score of knowledge levels (%).
- **b.** The predictors for model 2 include: (Constant), score of knowledge levels (%), score of nursing practice (%).
- **c.** The predictors for model 2 include: (Constant), score of knowledge levels (%), score of nursing practice (%), score of nursing attitude (%).

### Table 6
Analysis of Variance (ANOVA) summary for the regression model

| Modela | Sum of Squares | df | Mean Square | F-statistic | p-value |
|--------|----------------|----|-------------|-------------|---------|
| Regressionb | 36361.991 | 3  | 12120.664 | 10369182.119 | 0.000  |
| Residual | 0.209 | 179 | 0.001 |
| Total   | 36362.199 | 182 |

- **a.** The dependent variable for the model is Total Evidence-based Practice score (%).
- **b.** The independent variable for the regression models include the (Constant), Practice, Attitude and Knowledge level scores (%).
Table 7

Predictors | $\beta$ | Std. Error | t-statistic | p-value | VIF*

(Constant) | -0.0138 | 0.0140 | -0.983 | 0.327 |

Practice | 0.2499 | 0.0001 | 1948.043 | 0.000 | 1.36 |

Attitude | 0.1668 | 0.0001 | 1209.443 | 0.000 | 1.14 |

Knowledge level | 0.5834 | 0.0002 | 2996.279 | 0.000 | 1.35 |

*VIF is the variance inflation factor used to test for multicollinearity (values less than 5 are ideal, 5–10 are tolerable, values greater than 10 represent a faulty model).

4. Discussion Of Findings

To the best of our knowledge, this is the first study to describe RNMs knowledge, attitude and use of EBP among registered nurses and midwives in central hospitals in Malawi.

This study has shown that RNMs' attitude towards EBP had the highest mean score followed by the knowledge/skills and then practice. This shows that the RNMs viewed EBP positively and their attitude towards EBP seemed to be more positive than their knowledge/skills and use of EBP. This result is consistent with previous studies describing attitude, practices and knowledge/skills associated with EBP(1, 2, 34–36). Over 80% of the respondents agreed that EBP was 'fundamental to professional practice'. They also reported ‘welcoming questions in own practice’ and ‘changing practice due to evidence found’. These findings suggest that the nurses and midwives realize the importance of EBP and need for implementing it. The positive attitude as Van Achterberg, Schoonhoven and Grol(37) observed allows for better strategies pertaining to EBP dissemination and implementation.

In this study, the RNMs showed that they had some knowledge about EBP. An overall mean score 5.46 ± 1.49 was received in the section of self-rated knowledge on EBP. However, knowledge was lacking relating to EBP skills, for instance, critical analysis of evidence against set standards (4.87 ± 1.52), retrieving evidence (4.77 ± 1.65), awareness of major information sources (4.57 ± 1.44%), information technology (4.53 ± 1.43), appropriate research skills (4.34 ± 1.53) and converting information needs into research questions (4.11 ± 1.56). As depicted in the results (Table 2) the RNMs scored high mean scores on identifying the research problem and sharing ideas and information with colleagues rather than the actual skills of obtaining the evidence. A similar response was also observed in previous studies(2, 9, 38–40). Hansen and Severinsson(9) support the view in their study that EBP is the way to clinical decision making. They emphasize the use of scientific research, sound judgment and patient preference in respective contexts using various expertise. Brown et al (2) also observed that although participants
understood EBP as a new way of clinical decision making, it required skills in its application to practice and also skills to research further on evidence that is relevant to the context of the investigation. It is important, therefore, that helping RNMs improve such aspects of their knowledge and/or skills in order to improve the overall EBP of RNMs in Malawian central hospitals. The central hospital managers should consider recruiting hospital librarians in their hospitals to promote EBP among RNMs and other staff. Where librarians have been used, they have introduced various programs on information literacy, importance of EBP, and implementation of EBP(41). Nurse leaders and nurse and midwife specialists should also intensify the use of performance appraisals so that specific needs of the nurses and midwives can be identified and applied during the continuing professional development programs.

There was a moderate relationship between knowledge levels and practice \((r = 0.487)\). An improvement in the knowledge levels of RNMs could translate into their improved practice and thus again improve the overall EBP amongst RNMs in Malawian central hospitals. These results therefore demonstrate that EBP amongst RNMs can be improved most rapidly and significantly by improving primarily their knowledge levels, followed by improving their practical skills and lastly their attitude to the discipline. This explains the results presented in Table 3 which have shown that higher education qualifications are associated with high scores in knowledge levels amongst RNMs, whereas available work (research) experience is associated also with higher scores in nursing and midwifery practice. In the end, both educational qualification and research experience affect the overall EBP.

The female participants dominated the study (79.2%), a finding that is consistent with other international results especially in the nursing and midwifery professions where more females are reported than males(42). The current study has revealed no statistically significant differences in RNMs’ practice, attitude, knowledge levels and overall EBP based on gender \((P > 0.05)\). Even though AbuRuz, Hayeah, Al-Dweik and Al-Akash(3) reported that female nurses conduct research less, have less positive and less knowledge about research compared to their male counterparts, Hasheesh and Ruz, (43) reported contrary results.

In this study, EBP amongst RNMs was not influenced by administrative roles or positions held by nurse-midwives in hospitals. This finding is consistent with a study done in Ethiopia(15). This may be due to lack of managerial skills and EBP training. However, leadership is described as a key for creating an environment for generation and implementation of EBP(44). Leaders have a responsibility to engage staff at all levels, support an EBP culture and allocate resources to provide the necessary infrastructure to promote clinical decision making based on best available evidence (10). These leaders should introduce (where necessary) and motivate the RNMs to participate in research activities like research trainings, scientific conferences and journal clubs to strengthen EBP in the clinical area. Nursing and midwifery leaders at the central hospitals need to understand the EBP process and be able to clearly articulate its meaning, use and impact on patient care(45). It is time RNMs in this country had a shared vision and developed a model consisting of clinical bedside nurse midwives and leaders at an individual hospital that can be used to standardize and support EBP.
This study has found that RNMs who had masters' degrees in nursing or midwifery tended to perceive fewer barriers to finding research compared to nurses-midwives with diplomas. This is consistent with recent studies (3, 36, 46, 47). For instance, a study by Grant, Stuhmacher and Bonte-Eley(47), found that RNMs with masters degrees often promoted EBP among their clinical nursing colleagues. Al Qadire(46) observed that teaching of EBP and its related skills are emphasized during postgraduate studies. This is supported by AbuRuz, Hayeah, Al-Dweik and Al-Akash (3) who indicated that the masters degree curricula often contains more specialized courses about nursing and midwifery research methodology than those below them. At masters level, RNMs are required to find significant clinical problems, perform integrated literature reviews, read and implement research findings, critique previous research, write proposals and publish scientific papers. This preparation makes the students at masters level apply the steps of research and learn how they can effectively implement EBP. RNMs with Master qualifications should, therefore, take an upper hand in facilitating a culture of EBP in the clinical area. This suggests that RNMs who have diplomas or even bachelor degrees who have not received any research or EBP training need additional education. This could be done by initiating comprehensive in-service training programmes on EBP (48) and/or offering scholarships for those who wish to complete a Bachelors or Masters degree(49). There is need to incorporate a course on EBP into RNMs training programs in higher educational institutions to enable these cadres to integrate EBP into their work after graduation.

This study found that RNMs who acquired their current qualification within 5 years perceived fewer barriers to finding research than those who obtained their current qualifications more than 5 years ago. This is consistent with previous studies(45, 50). This greater knowledge of EBP with novice RNMs, when compared to experienced RNMs, is most likely attributable to modern-day nursing curriculums that include EBP which most seasoned RNMs lack(45). Majid, Foo, Luyt etальной (51) also found that when nurses graduated from higher levels, including the baccalaureate programme, they were more capable to benefit from EBP activities. These RNMs are exposed to research process before they graduate. The main purpose of EBP is to recognize, appraise and apply the best available research finding(35). This is probably why RNMs who had research experience had better knowledge, attitude and practice due to exposure. As Chen, Wu, Zhou et al.(36) observed, there is need to offer EBP training programs in form of workshops, conferences and lectures to those who had not received EBP education in college for them to obtain knowledge and skills about EBP at the workplace

Failure to “make time in a work schedule for research” in the attitude subscale was identified as the main barrier to using EBP among RNMs in Malawi. This study also concurs with several previous studies(1, 18, 33, 38). In a study by Majid, Foo, Luyt et al. (51), more than half of study participants reported perceived lack of time at their workplaces as one of the priority barrier to accessing and reviewing literature. According to Cummings, Estabrooks, Midodzi, Wallin and Hayduk(52), a better understanding of the nursing practice environment is crucial to the understanding and development of interventions to advance EBP. Hospital management and policy decision makers, therefore, should consider making adjustments to RNMs work schedules or recruiting more so that they have additional time to attend classes on conducting EBP, reviewing relevant literature and planning practice changes(30). However, previous researchers argued that lack of knowledge and skills in EBP could be underling aspects of lack
of time (18, 29, 33). Without proper knowledge and skills for critically analyzing evidence against set standards, retrieving evidence, determining the validity of material and converting information needs into research questions scored very low in this study (refer Table 2) might be too time consuming. Clinical integrated teaching on evidence based processes would improve the knowledge, skills, attitude and practice on EBP. Capacity building of RNMs on EBP processes is required to increase their knowledge on EBP to reduce time for searching for EBP information. This calls for cooperation between academic faculty and clinical RNMs.

The results of this study also showed that RNMs practicing at QECH and ZCH have higher levels of knowledge, attitude and practice on EBP compared to MCH and KCH. QECH is the biggest hospital in Malawi and better resourced in terms of human resource and medical equipment than any other central hospital in the country. The proximity of University of Malawi’s constituent colleges namely College of Medicine and Kamuzu College of Nursing, and Malawi College of Health Sciences to the facility makes it a better teaching facility than the rest. Since the EBP means scores observed among the four care settings in this study were small, future EBP educational programs should target RNMs practicing in all the four settings including those in the academia for better results.

Strengths and Limitations of the study

The study has some strengths. First, the study had a response rate of 87.14% which makes the results to be generalised to the study population. Secondly, the study used an adopted validated instrument. The instrument was developed in the UK (33) with the aim of reporting development and validation of a self report measure of knowledge practice and attitude of EBP among nurses. Reliability was established using Cronbach Alpha. Validity was established using construct and discriminant validity. The tool has been extensively used previously in USA (2, 40)

However, this study needs to be considered in light of certain limitations. First, the study is cross-sectional in nature. As such, the ability to infer cause and effect conclusions between study variables was hindered. Secondly, this study was based on self reported data which may be less accurate than other forms of measurement due to an inherent bias. Participants may answer scale items in a socially desirable manner. Thirdly, the study used convenient sampling as a recruitment method and may not be truly representative of the nursing population in Malawi although four different sample groups strengthen the external validity. Fourthly, the study was conducted with RNMs of public hospitals and cannot be generalized to non-governmental hospitals (i.e. private, Christian Health Association of Malawi (CHAM) facilities and other populations). Despite the mentioned limitations, this study provides some into insight in knowledge, attitude and use of EBP among RNMs in Malawi.

For future research, we propose that a Delphi study regarding the continuing professional needs of nurses and midwives on EBP should be done which should be followed by an education intervention. Replication of this study involving other nongovernmental hospitals in all regions of the country is recommended as some private hospitals have better resources than public facilities.
5. Conclusions

Our findings add support for continued efforts to increase nurse-midwives’ education and create opportunities for RNMs to participate in career advancement opportunities and research. Higher levels of education may empower RNMs to act as autonomous practitioners who advocate for evidence-based innovations, and allow a spirit of inquiry to flourish.

The RNMs in this study were lacking knowledge and skills of EBP like research skills or critically analyzing evidence against set standards, retrieving evidence, determining the validity of material found and converting information needs into research questions. Furthermore, emphasis was put on ‘the sharing of information with colleagues’ rather than ‘tracking evidence or critical appraisal of evidence’ under practices. The fact that RNMs indicated that they were not fully practicing EBP due to some challenges which included lack of time show that they had a positive attitude towards EBP. This study indicates that although they were knowledgeable about EBP, there is need for further development of their capacity to retrieve and critically appraise evidence so that they can advocate more on EBP to the junior nurses and midwives, colleagues as well as their management.

List Of Abbreviations

|   | ANOVA          | Analysis of variance |
|---|----------------|----------------------|
| 2 | EBP            | Evidence based practice |
| 3 | EBPQ           | Evidence based practice Questionnaire |
| 4 | ICN            | International Council of Nurses |
| 5 | KCH            | Kamuzu Central Hospital |
| 6 | MCH            | Mzuzu Central Hospital |
| 7 | NMCM           | Nurses and Midwives Council of Malawi |
| 8 | QECH           | Queen Elizabeth Central Hospital |
| 9 | RNM            | Registered Nurse Midwife |
| 10| SPSS           | Statistical Package for Social Scientists |
| 11| VIF            | Variance Inflation Factor |
| 12| ZCH            | Zomba Central Hospital |

Declarations

Consent for publication

Not applicable
Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request. Email: kasekapaul2016@gmail.com

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Authors contributions

PUK conceived and designed the study. PUK and BCM contributed to the development of the study protocol and supervised data collection and entry and analysis. Both authors read and approved the final manuscript.

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