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The Measurement of Evidence-Based Healthcare Competence of Nurses and Associated Background Factors: A Scoping Review

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ABSTRACT

Advancing evidence-based practice requires nurses to have competence in the spectrum of evidence-translation process known as evidence-based healthcare. A scoping review was conducted to identify the instruments used to measure nurses evidence-based healthcare competence and map the associated background factors. The review followed the JBI guidelines with a search made to seven databases CINAHL (EBSCO), PubMed, Scopus, Medic and gray literature EBSCO Open Dissertations & MedNar in 2021 and 2023. A total of 52 studies were included. Nurses' evidence-based healthcare competence related areas were measured with various instruments ($n = 23$). A total of 24 background factors were examined of which the six most frequently examined with reported associations to nurses' evidence-based competence were: educational level, work experience, EBP education, age, clinical setting, and research experience. Future research should examine the relation of measurement instruments to evidence-based healthcare competence, healthcare requirements and nursing roles, with further exploring the significance of background factors.

1 | Background

The increasing prevalence of aging populations and individuals with multiple chronic conditions (Skou et al. 2022) presents growing challenges to the delivery of high-quality, cost-effective services (Dieleman et al. 2017). Translating the best available evidence into healthcare policy and practice has thus become essential for achieving global health goals.

This process is captured by the concept of evidence-based healthcare (EBHC), which encompasses the generation, synthesis, transfer, and implementation of research evidence to inform clinical decision-making (Jordan et al. 2019; Pearson et al. 2012) When healthcare professionals apply the best available evidence in their decisions, evidence-based practice (EBP) is achieved (Jordan et al. 2019) contributing to improved health outcomes (Fontaine et al. 2024). Achieving EBHC requires that all stages of the evidence translation process are

[†]Pirjo Kaakinen passed away prior to publication. This manuscript includes her contributions made before her passing, and the co-authors honor her memory and work.

embedded in clinical practice, which in turn demands a high level of competence from healthcare professionals.

As the largest group of healthcare professionals (World Health Organization 2025), nurses play a central role in promoting EBHC (Jylhä et al. 2017). Nursing competence is a complex and evolving concept that includes knowledge, skills, attitudes, beliefs, performance, and motivation (Cowan et al. 2005; Mrayyan et al. 2023). EBP is widely recognized as a core component of nursing competence (European Federation of Nurses Associations (EFN) 2024; Wit et al. 2023).

Despite growing expectations for nurses to engage in research, innovation, and evidence implementation, studies consistently show that many lack the necessary competence to meet these demands (Hines et al. 2021; Melnyk et al. 2018; Mohamed et al. 2024), indicating a gap between practice and requirements (Dolezel et al. 2021). There is an increasing imperative to develop tailored, multi-component educational programs (Fontaine et al. 2024; Pereira et al. 2025), that are responsive to learners' prior knowledge, clinical experience, and contextual factors (Fontaine et al. 2024) This underscores the necessity of a deeper understanding of the determinants and requirements for developing competence in EBHC.

Previous research have examined healthcare professional and nursing competence measurement in research utilization (Squires et al. 2011), clinical decision-making (Belita et al. 2022), and EBP-related knowledge, skills, and attitudes (Adombire et al. 2024; Haavisto et al. 2023; Landsverk et al. 2023; Leung et al. 2014; Silva et al. 2021)-focusing on isolated components or stages of the entire evidence translation process. Similarly, investigations into the background factors influencing EBP have typically addressed a limited range of individual or contextual variables (S. Li et al. 2019; Mathieson et al. 2018; Ominyi and Agom 2020) Moreover, existing reviews exploring EBHC competence have focused on leaders (Koivunen et al. 2024), educators (Immonen et al. 2022) or advanced practice nurses (Ylimäki et al. 2024), leaving a gap in understanding how EBHC competence is developed and supported in broader nursing roles.

Consequently, a comprehensive scoping review is indicated to identify the instruments used to measure nurses' EBHC competence and to map the associated background factors. The findings of this study can provide insights into understanding the competence requirements of nurses and guide future research in exploring how EBHC competence evolves across nursing roles, settings, and career stages. Furthermore, these findings can inform the refinement of measurement tools and the development of tailored educational and organizational support programs and strategies.

2 | Methods

2.1 | Aim of the Study

The aim of this scoping review was to identify the instruments used to measure nurses' EBHC competence and map the associated background factors. Results of this review can be used to understand the EBHC competence of nurses and to guide future research, as well as the development of tailored educational and organizational interventions.

The research questions were:

1. What instruments are used to measure the EBHC competence of nurses?
2. What background factors have been measured in association with the EBHC competence of nurses?

2.2 | Study Design

This scoping review was conducted in accordance with the JBI manual for evidence synthesis scoping reviews (Peters et al. 2024). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement for scoping Reviews (PRISMA-ScR) is used for reporting the review process (Tricco et al. 2018).

The review was initially registered as a mixed methods systematic within PROSPERO (CRD42021285179). Due to the large and diverse data, the quantitative and qualitative findings were initially analyzed and reported separately. The review was then adapted into a scoping review to better capture and organize the heterogeneous findings and guide future systematic reviews.

2.3 | Search Strategy and Inclusion Criteria

The search strategy was designed in co-operation with the university information specialist and preliminary searches were made to identify key search terms and phrases relevant to the research questions. The final database search was conducted in October 2021 to 4 academic databases CINAHL (EBSCO), PubMed, Scopus, Medic, and 2 gray literature databases EBSCO Open Dissertations and MedNar. Due to an extended screening and extraction process, an updated search was made to the same databases in November 2023. The search strategy for the Pubmed database is presented in Table 1.

Identified articles were processed in Covidence (Covidence 2022). A pre-defined inclusion and exclusion criterion was used in the screening process (Table 2). The main objective/aim in the studies had to consider the association of background factors to measure outcomes related to nurses‘ EBHC competence.

The title and abstract and consequent full-text screening were performed by two independent researchers with consensus made by a third reviewer. Reasons for the exclusion of studies are reported in the PRISMA flowchart (Figure 1). The most common reasons for exclusion were wrong outcomes (i.e., outcomes not related to evidence-based healthcare competence) or that the nurse-related outcomes were inseparable from other professional groups in the study.

TABLE 1 | Search string for PubMed database.

Search terms
Nurses [Mesh]) OR (Midwifery [Mesh]) OR ((Nurs* [Text Word]) OR (practitioner* [Text Word]) OR health visitor*OR midwi*[Text Word]) OR (paramedic*[Text Word]))))
AND Evidence-Based Practice"[Mesh]) OR (informed-based [Text Word] OR research utilization[Text Word] OR research implementation[Text Word] OR evidence transfer [Text Word] OR evidence synthesis[Text Word] OR evidence generation[Text Word] OR evidence utilization[Text Word] OR evidence-based
AND Professional Competence"[Mesh]) OR "Attitude of Health Personnel"[Mesh])) OR ((competenc*[Text Word] OR knowledge[Text Word] OR skill*[Text Word] OR attribute[Text Word] OR attitude*[Text Word] OR expertise [Text Word] OR knowhow[Text Word] OR capability[Text Word] OR capacity[Text Word] OR qualification*[Text Word] OR abilit*[Text Word]))))))))
AND (healthcare[Text Word] OR health care[Text Word] OR hospital*[Text Word] OR health clinic*[Text Word] OR primary care[Text Word] OR special* care[Text Word] OR emergency department*[Text Word] OR emergency care [Text Word] OR emergency unit*[Text Word] OR community care[Text Word] OR inpatient*[Text Word] OR outpatient*[Text Word]))))))))
NOT (((((((("Randomized Controlled Trials as Topic"[Mesh]) OR "Clinical Trials as Topic"[Mesh]) OR "Non-Randomized Controlled Trials as Topic"[Mesh]) OR "Systematic Reviews as Topic"[Mesh]) OR "Meta-Analysis as Topic"[Mesh]) OR (intervention*[Text Word] OR randomized control trial* [Text Word] OR quasi-experimental[Text Word] OR experimental[Text Word] OR trial stud*[Text Word] OR review*[Text Word] OR meta-analysis[Text Word]))))

2.4 | Critical Appraisal

Although not required for a scoping review (Peters et al. 2024) the included studies were first appraised independently by two researchers the JBI Checklist for Analytical Cross-Sectional Studies (JBI 2023) with all the researchers in the group participating. Consensus was reached through discussion. A third reviewer with expertise in research methodology was consulted to resolve disagreements concerning statistical procedures or the control of confounding variables. Regardless of methodological quality, all studies were included in the review.

2.5 | Data Extraction and Synthesis

A pre-defined data template was used for extraction, including author, year, country, study design, aim/purpose, participants, setting, instruments and outcomes associated with background factors. The data was extracted by two researchers independently and compared, with disagreements resolved through discussion between them and finally verified by a third researcher. Data were descriptively summarized and presented narratively in relation to the study's research questions and described in tables.

3 | Results

3.1 | Description of the Studies

A total of 14,247 articles were identified from databases, with 12,586 in the initial search and 1661 in up-dated search (Figure 1). A total of 490 full text articles were retrieved and evaluated. Ultimately, 52 studies were included in the review (Supporting material A).

The overall quality of studies was rated high with most (92%) of the studies scoring 6–8 from 8 questions (Supporting material B). The highest risk for bias was related to the identification and strategies to control confounding variables.

The included studies ($n = 52$) were conducted in North America 29% ($n = 15$), Asia 27% ($n = 14$), Europe 33% ($n = 17$), Africa 12% ($n = 6$). Studies were published between 2000 and 2010 ($n = 7$), between 2011 and 2016 ($n = 9$) and after 2016 ($n = 36$). Studies were quantitative with designs as: cross-sectional ($n = 49$), cohort ($n = 1$) and mixed methods studies ($n = 2$).

The nurses ($n = 27{,}735$) in the studies were working in various healthcare settings such as teaching-, government-, and private-hospitals, from primary and community care to tertiary care and with the scope of patients ranging from infants to elderly. The nurses also worked in various professional roles (e.g., school nurse, midwife, perfusionist).

3.2 | Instruments Measuring EBHC Competence

A total of 23 instruments measuring nurses' EBHC competence were identified (Table 3). The three most used instruments were the Evidence-Based Practice Questionnaire (EBPQ) developed by (Upton and Upton 2006), The EBP Beliefs scale and The EBP Implementation scale developed by (Melnyk et al. 2008).

The EBPQ includes 24 items rated on a 7-point Likert scale and measures three dimensions of EBP competence: practice, attitudes, and knowledge/skills. The practice subscale measures the frequency of EBP-related behaviors (e.g., "I use evidence to support my clinical decisions"), the attitudes subscale measures beliefs on the value of EBP (e.g., "I believe that evidence-based practice is necessary in the provision of effective patient care"), and the knowledge/skills subscale measures self-perceived competence in EBP-related tasks (e.g., "I am confident in my ability to critically appraise research evidence").

The EBP Beliefs Scale includes 16 items rated on a 5-point Likert scale and measures overall EBP beliefs across four conceptual domains: knowledge-, value-, resource-, and time and difficulty beliefs. The knowledge beliefs domain measures confidence in understanding and applying EBP (e.g., "I know how to implement EBP sufficiently"), the value beliefs domain measures perceived benefit of EBP (e.g., "I believe that EBP improves the quality of patient care"), the resource beliefs domain measures perceived access to tools and support (e.g., "I

TABLE 2 | Inclusion and exclusions criteria (PCC) for the review.

PCCs	Inclusion criteria	Exclusion criteria
(P) Participants	Nurses in all healthcare settings working in direct patient care	Allied healthcare professionals
	Nurses with varying educational degrees	Students
	Nurses with professional titles such as practical nurse, registered nurse, licensed nurse, public health nurse, health visitor, occupational health and healthcare nurse, midwives, healthcare practitioner, first aid nurse and paramedics.	Nurses with advanced practice roles with professional job titles such as clinical nurse specialist, advanced practice nurse, nurse practitioner
	Specialized nurses	
	Studies with different professional groups if results regarding nurses can be drawn separately	
(C) Concept	Quantitative measurement instruments of evidence-based healthcare (i.e., global health, evidence generation, synthesis, transfer, and implementation) competence (e.g., knowledge, skills, and attitudes/values).	
	Measured association of background factors (e.g., age, education, work experience) with evidence-based healthcare competence	
(C) Context	Evidence-based healthcare (i.e., global health, evidence generation, synthesis, transfer, and implementation) competence (e.g., knowledge, skills, and attitudes/values).	
(s) Studies	Nonexperimental quantitative studies (e.g., single-variable research, comparative design, correlational research, cross-sectional research) and mixed method studies	Non-original studies (e.g., systematic reviews) Mixed-method studies where quantitative components cannot be clearly extracted
	Original research articles published in English, Swedish or Finnish	
	No publication time limit.	

know how to access the best resources to implement EBP"), and the time and difficulty beliefs domain measures perceived barriers to implementation (e.g., "EBP is too time-consuming for my practice").

The EBP Implementation Scale includes 18 items rated on a 5-point frequency scale (0 = 0 times to 4 = > 8 times) and measures the frequency of EBP-related behaviors over the past 8 weeks (e.g., "Used evidence to change clinical practice," "Critically appraised evidence from a research study," and "Generated a PICO question about a clinical practice issue."

A total of 10/23 (30.4%) instruments were used in 2 or more studies and 13/23 (52.2%) instruments were used in a singular study. In 10 studies (Aynalem et al. 2021; Barako et al. 2013; Boström, Kajermo, et al. 2009; Boström, Ehrenberg, et al. 2009; Boström et al. 2013; Gebresilassie et al. 2022; Karlberg Traav et al. 2022; Lee et al. 2019; Rodgers 2000; Rudman et al. 2000; Shashidhara and Shakuntala 2017), the used instrument was designed for the study by utilizing other studies, literature and parts of instruments.

3.3 | Background Factors Associated to Nurses' EBHC Competence

A total of 24 background factors were examined in relation to EBHC competence (Figure 2). The 6 most frequently examined factors, and those with the highest number of reported associations, were educational level, work experience, age, clinical setting, EBP education, and research experience. Gender was also among the most frequently examined factors, with the lowest proportion of studies reporting an association to EBHC competence.

3.3.1 | Educational Level

Educational level was examined in 40 (76.9%) studies with association reported in 27/40 (67.5%) (Abuejheisheh et al. 2020; Adams and Barron 2009; Alqahtani et al. 2022; Ammouri et al. 2014; Barako et al. 2013; Belowska et al. 2020; Rose Bovino et al. 2017; Chung 2015; Crawford et al. 2020; Eaton et al. 2017; Ghuloom et al. 2022; Ginex et al. 2021; Hasheesh and AbuRuz 2017; Abou

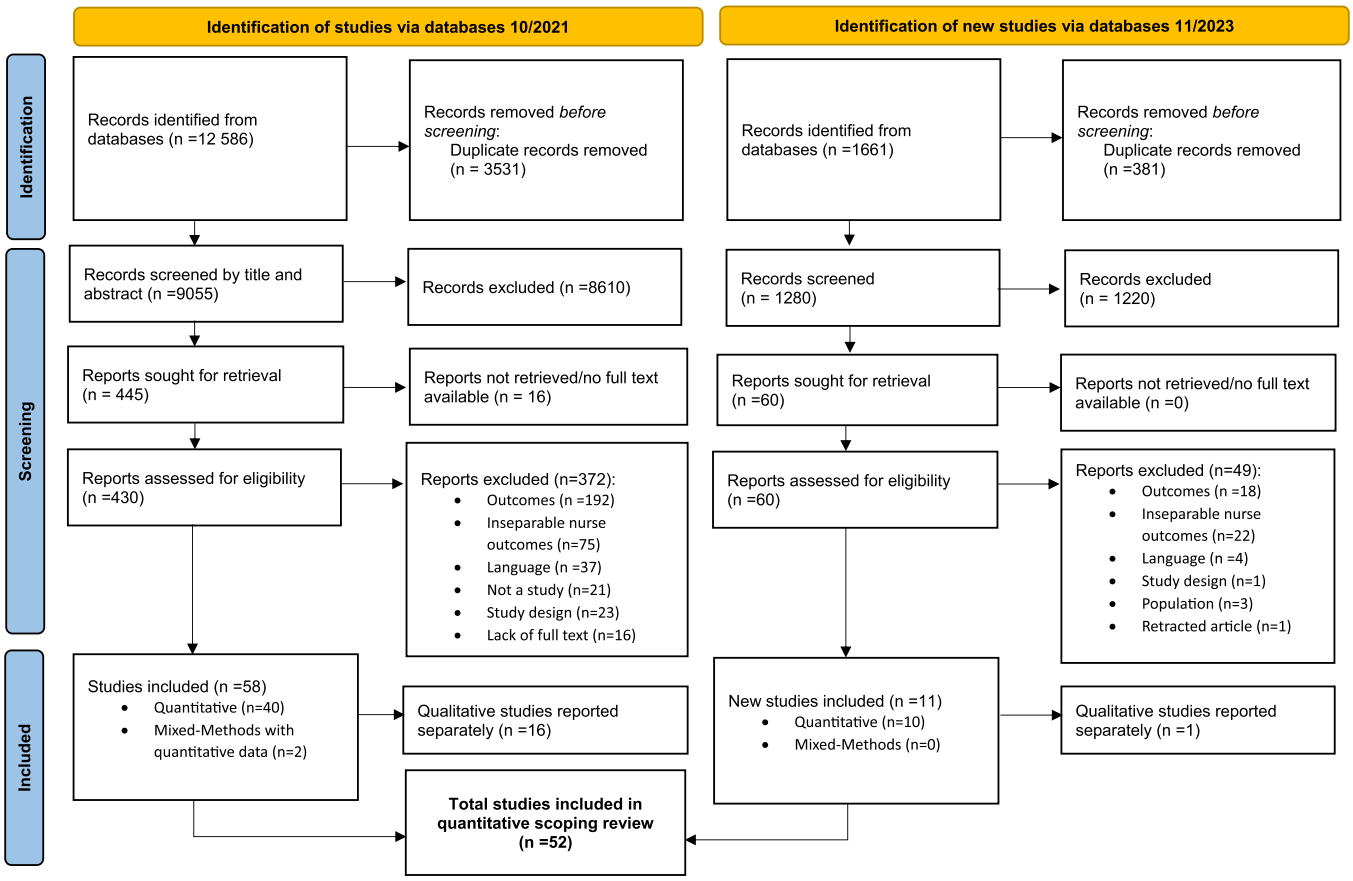

FIGURE 1 | Flowchart of the study selection process. *Source:* Page MJ, et al. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. This study is licensed under CC BY 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/. [Color figure can be viewed at wileyonlinelibrary.com]

Hashish and Alsayed 2020; Hsieh et al. 2018; Karlberg Traav et al. 2022; Kilicli et al. 2019; Long and Matthews 2016; Negarandeh et al. 2022; Ozsoy and Ardahan 2008; Park et al. 2015; Rodgers 2000; Šabanė et al. 2022; Schetaki et al. 2023; Shashidhara and Shakuntala 2017; Skela-Savič et al. 2016; Skela-Savič and Lobe 2021) and not reported in 13/40 (32.5%) (Adams 2009; Al-Busaidi et al. 2019; Alqahtani et al. 2020; Aynalem et al. 2021; Boswell et al. 2020; Falk et al. 2023; Hweidi et al. 2017; Kang and Yang 2016; Kenny 2005; Newman et al. 2014; Phillips 2015; Pryse 2012; Thompson 2016).

Educational levels were described with varying definitions across the included studies but were generally categorized from lowest to highest as: associate/diploma degree, baccalaureate/bachelor's degree, master's degree, and doctoral degree. In the studies that reported an association between educational level and EBHC competence, higher levels of education (master's or doctoral degree), were most commonly associated with greater competence. Reported associations were described as improved knowledge, more positive attitudes toward EBP, greater use of EBP, and fewer report-ed barriers to finding and evaluating research.

3.3.2 | Work Experience

Work experience was examined in 33 (63.5%) studies with association reported in 18/33 (54.5%) (Abuejheisheh et al. 2020; Adams and Barron 2009; Al-Busaidi et al. 2019; Ammouri et al. 2014; Antwi and Palaganas 2023; Aynalem et al. 2021; Eaton et al. 2017; Hamaideh 2017; Hasheesh and AbuRuz 2017; Abou Hashish and Alsayed 2020; Kenny 2005; Mulenga and Naidoo 2017; Negarandeh et al. 2022; Park et al. 2015; Shashidhara and Shakuntala 2017; Skela-Savič et al. 2016; Skela-Savič et al. 2017; Skela-Savič and Lobe 2021) and not reported in 15/33 (45.5%) (Alqahtani et al. 2020; Barako et al. 2013; Boström, Kajermo, et al. 2009; Boswell et al. 2020; Rose Bovino et al. 2017; Chung 2015; Ginex et al. 2021; Hweidi et al. 2017; Kang and Yang 2016; Karlberg Traav et al. 2022; Kilicli et al. 2019; Newman et al. 2014; Phillips 2015; Pryse 2012; Rudman et al. 2000). The reported associations between work experience and EBHC competence varied across studies. Studies that reported an association described both shorter and longer durations of work experience as having positive or negative effects on competence.

3.3.3 | EBP Education

EBP education was examined in 14 (26.9%) studies with association reported in 12/14 (85.7%) studies (Alqahtani et al. 2020, 2022; Aynalem et al. 2021; Chung 2015; Hasheesh and AbuRuz 2017; Hsieh et al. 2018; Hweidi et al. 2017; Park et al. 2015; Rodgers 2000; Skela-Savič et al. 2016; Skela-Savič et al. 2017; Skela-Savič and Lobe 2021) and not reported in 2/14 (14.3%) studies (Antwi and Palaganas 2023; Kilicli et al. 2019). EBP education was in described in the studies as EBP-,

TABLE 3 | Instruments used to measure EBHC competence.

EBHC-instrument	Used in a study (*n*)	Studies (authors, year)
Evidence-based practice questionnaire (EBPQ)	12	Abuejheisheh et al. (2020); Al-Busaidi et al. (2019); Alqahtani et al. (2020); Alqahtani et al. (2022); Ammouri et al. (2014); Chung (2015); Ghuloom et al. (2022); Hasheesh and AbuRuz (2017); Hashish and Alsayed, 2020; Negarandeh et al. (2022); Long and Matthews (2016); Phillips (2015).
EBP beliefs scale	11	Antwi and Palaganas 2023; Rose Bovino et al. 2017; Eaton et al. 2017; Kang and Yang 2016; Ginex et al. 2021; Phillips 2015; Pryse 2012; Skela-Savič et al. 2016; Skela-Savič et al. 2017; Skela-Savič and Lobe 2021; Thompson 2016.
EBP implementation scale	8	Rose Bovino et al. 2017; Eaton et al. 2017; Kang and Yang 2016; Pryse 2012; Skela-Savič et al. 2016; Skela-Savič et al. 2017; Skela-Savič and Lobe 2021; Thompson 2016.
Barriers to research utilisation scale (BARRIERS scale)	4	Abuejheisheh et al. (2020); Hweidi et al. (2017); Kang and Yang (2016); Phillips (2015).
Developing evidence-based practice questionnaire (DEBPQ)	3	Ammouri et al. (2014); Hamaideh (2017); Newman et al. (2014).
Nursing evidence-based practice survey and modified 2005 version	2	Boswell et al. (2020) (original); Crawford et al. (2020) (modified)
Research utilization questionnaire (RUQ)	2	Antwi and Palaganas 2023; Boström, Kajermo, et al. 2009
Research utilization survey	2	Kenny (2005); Ozsoy and Ardahan (2008)
School nurse evidence based practice (SN-EBP) questionnaire	2	Adams (2009); Adams and Barron 2009
Evidence-based practice profile questionnaire (EBP^2Q)	2	Belowska et al. (2020); Šabanė et al. 2022
Attitude toward evidence-based nursing questionnaire (AEBNQ)	1	Kilicli et al. (2019)
Evidence-based attitude toward nursing scale	1	Balci et al. (2023)
Evidence-based clinical efficacy and practice questionnaire (QECPBE-20)	1	Teixeira et al. (2020)
Evidence-based practice capabilities Beliefs scale (EBPCBS)	1	Falk et al. (2023)
Evidence-based practice competency questionnaire professional version (EBP-COQ prof)	1	Antwi and Palaganas 2023
EBP knowledge assessment questionnaire	1	Ginex et al. (2021)
Evidence-based Nursing practice self-efficacy scale (EBPSE)	1	Boswell et al. (2020)
EBP competency scale	1	Ginex et al. (2021)
Implementation self-efficacy for EBP (ISE4EBP) scale	1	Ginex et al. (2021)
Evidence-based practice competency Questionnaire for professional registered nurses (EBP-COQ Prof)	1	Schetaki et al. (2023)
Korean EBP questionnaire for doctors (modified and adapted for nurses)	1	Park et al. (2015)

(Continues)

TABLE 3 | (Continued)

EBHC-instrument	Used in a study (*n*)	Studies (authors, year)
School nurse evidence-based practice questionnaire	1	Hsieh et al. (2018)
Carlson's prior conditions instrument	1	Eaton et al. (2017)
Total amount of instruments: 23		

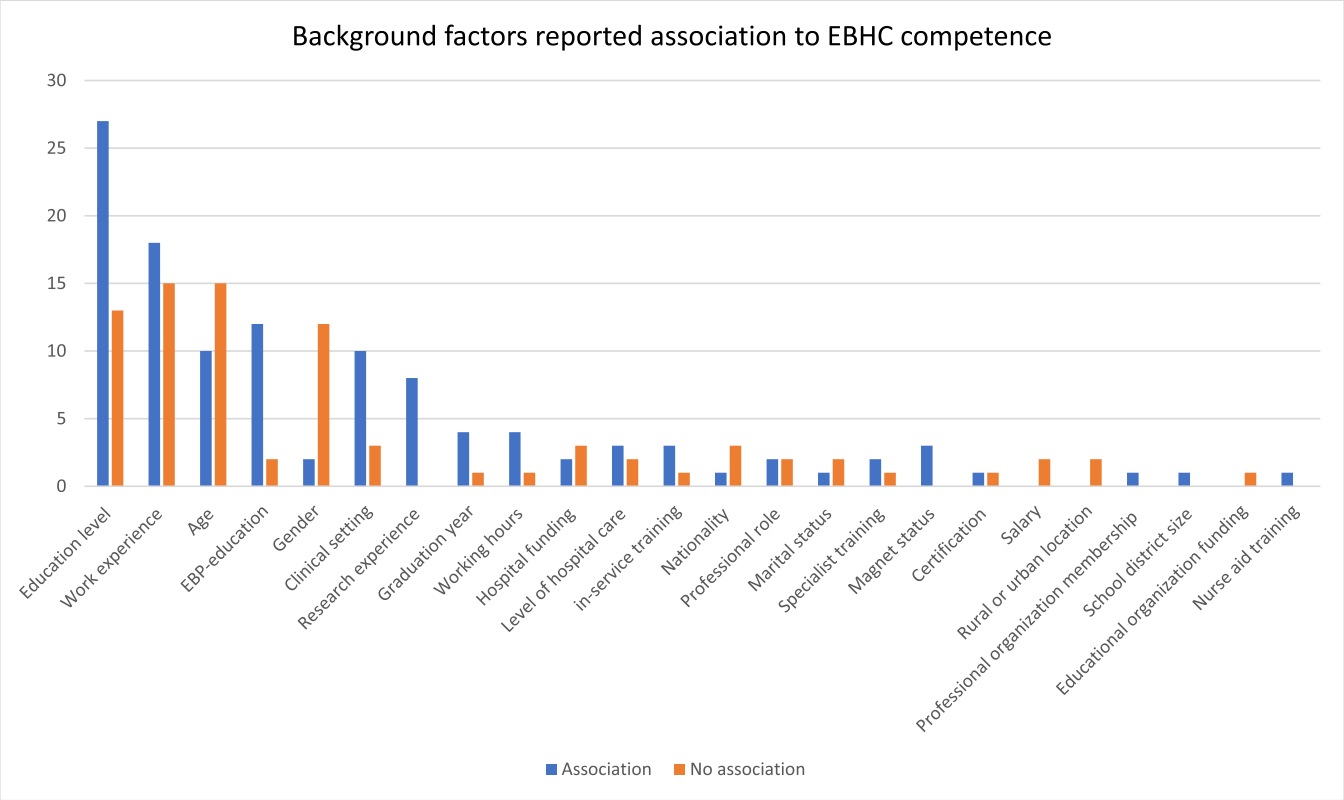

FIGURE 2 | Measured background factors and reported association to nurses EBHC competence. [Color figure can be viewed at wileyonlinelibrary.com]

research- and professional development workshops, EBP training, -classes and lectures, and special training courses.

3.3.4 | Age

Age was examined in 26 (50%) studies with association reported in 10/26 (38.5%) (Abuejheisheh et al. 2020; Al-Busaidi et al. 2019; Rose Bovino et al. 2017; Hamaideh 2017; Hasheesh and AbuRuz 2017; Abou Hashish and Alsayed 2020; Mulenga and Naidoo 2017; Šabanė et al. 2022; Skela-Savič et al. 2016; Skela-Savič et al. 2017) and not reported in 16/26 studies (61.5%) (Alqahtani et al. 2020; Aynalem et al. 2021; Barako et al. 2013; Boström, Kajermo, et al. 2009; Boström et al. 2013; Boswell et al. 2020; Ginex et al. 2021; Hweidi et al. 2017; Kang and Yang 2016; Karlberg Traav et al. 2022; Kilicli et al. 2019; Negarandeh et al. 2022; Newman et al. 2014; Ozsoy and Ardahan 2008; Rudman et al. 2000; Shashidhara and Shakuntala 2017). The reported associations between age and EBHC competence varied across studies. Studies that reported an association described both younger and older age as having positive effects on EBHC competence. Reported associations were described as more positive attitudes, and greater knowledge, and use and practice of EBP.

3.3.5 | Clinical Setting

Clinical setting was examined in 13 (25%) studies with association reported in 10/13 (76.9%) (Alqahtani et al. 2022; Antwi and Palaganas 2023; Boström, Kajermo, et al. 2009; Boström, Ehrenberg, et al. 2009; Boström et al. 2013; Crawford et al. 2020; Ghuloom et al. 2022; Kilicli et al. 2019; Rudman et al. 2000; Šabanė et al. 2022) and not reported in 3/13 (23.1%) (Aynalem et al. 2021; Barako et al. 2013; Boswell et al. 2020). The reported associations of clinical setting varied across studies. Clinical setting was described in the studies as the work environments or units of the nurse participants with comparisons made

between units, hospitals, and levels of care. The reported associations were described as positive effects of various clinical settings such as elderly care, surgery, emergency rooms to EBHC competence.

3.3.6 | Research Experience

Research experience was examined in 8 (15.4%) studies with association to EBHC competence reported in all 8/8(100%) (Alqahtani et al. 2020, 2022; Chung 2015; Gebresilassie et al. 2022; Hasheesh and AbuRuz 2017; Hsieh et al. 2018; Kilicli et al. 2019; Schetaki et al. 2023). Research experience was described in the studies as involvement and participation in research activities or programs with duties such as collection of data, reviewing nursing research and writing academic or professional nursing articles. Reported associations were described as increased confidence, knowledge, skills, attitudes, perceptions and use of EBP.

3.3.7 | Gender

Gender was examined in 14 (26.9%) studies, with association to EBHC competence reported in 2/14 (14.3%) studies (Hasheesh and AbuRuz 2017; Karlberg Traav et al. 2022) and not reported in 12/14 (85.7%) studies (Abuejheisheh et al. 2020; Al-Busaidi et al. 2019; Alqahtani et al. 2020; Ammouri et al. 2014; Aynalem et al. 2021; Barako et al. 2013; Boström, Kajermo, et al. 2009; Boström et al. 2013; Hweidi et al. 2017; Kang and Yang 2016; Kilicli et al. 2019; Negarandeh et al. 2022). The reported association of female gender was described as better research utilization and more positive attitudes towards EBP.

3.3.8 | Less Examined Background Factors

Total of 17 background factors were examined in 5 or less studies, that were: graduation year (Ammouri et al. 2014; Boström, Kajermo, et al. 2009; Kilicli et al. 2019; Lee et al. 2019; Rudman et al. 2000), working hours (Balci et al. 2023; Boström, Kajermo, et al. 2009; Boström et al. 2013; Kilicli et al. 2019; Negarandeh et al. 2022), hospital funding (Abuejheisheh et al. 2020; Boswell et al. 2020; Abou Hashish and Alsayed 2020; Long and Matthews 2016; Rodgers 2000), level of hospital care (Chung 2015; Eaton et al. 2017; Gebresilassie et al. 2022; Kang and Yang 2016; Schetaki et al. 2023), in-service training (Hsieh et al. 2018; Shashidhara and Shakuntala 2017; Skela-Savič et al. 2016), nationality (Al-Busaidi et al. 2019; Alqahtani et al. 2020; Ammouri et al. 2014; Ghuloom et al. 2022), professional role (Alqahtani et al. 2020; Boström, Kajermo, et al. 2009; Mulenga and Naidoo 2017; Park et al. 2015), marital status (Al-Busaidi et al. 2019; Aynalem et al. 2021; Hweidi et al. 2017), specialist training (Boström, Kajermo, et al. 2009; Rudman et al. 2000; Teixeira et al. 2020), magnet status (Alqahtani et al. 2022; Boswell et al. 2020; Rose Bovino et al. 2017; Ginex et al. 2021; Rodgers 2000), certification (Rose Bovino et al. 2017; Ginex et al. 2021), salary (Aynalem et al. 2021; Hweidi et al. 2017), rural or urban location(Adams 2009; Adams and Barron 2009), professional organization membership (Adams and Barron 2009), school district size (Adams and Barron 2009) and nurse Aid training (Boström et al. 2013). (Supporting material C).

4 | Discussion

This scoping review included 52 original studies, covering a period of 24 years, diverse nursing populations and settings, and a rather even geographic distribution across North America, Europe, and Asia, with fewer from Africa. This reflects a sustained interest in nursing competence and EBHC across diverse healthcare systems. Findings included the identification of 23 instruments in the measurement of nurses EBHC competence and 24 measured background factors in association to EBHC competence.

4.1 | Measurement of EBHC Competence

The findings highlight the complexity of measuring nursing competence in the evidence translation process of EBHC. In line with (Haavisto et al. 2023) this review identified both widely used and study-specific instruments. The three most frequently used tools, the EBPQ, EBP Beliefs Scale, and EBP Implementation Scale, assess a broad range of competencies (e.g., attitudes, beliefs, knowledge, skills, and performance) and cover several EBHC phases, such as identifying knowledge needs, evidence synthesis, transfer, and implementation. However, they may not capture the full scope of EBHC competence.

Previous studies have shown that nurses generally have positive attitudes, but lack knowledge and skills in EBHC (Adombire et al. 2024), especially in activities such as research participation, retrieving, appraising and disseminating research (Hines et al. 2015; Melnyk et al. 2018; Mohamed et al. 2024; Ominyi and Agom 2020). Competency frameworks also emphasize role-specific competencies, separating general direct care nurse roles from more advanced roles (European Federation of Nurses Associations (EFN) 2024; Wit et al. 2023) suggesting a need for refining existing or creating new assessment tools with clearer benchmarks for competence at different levels of practice.

Future research should examine which aspects of EBHC are measured for registered nurses by current instruments, but also how well they align with evolving healthcare needs and nursing roles. The JBI model offers a useful framework for mapping relevant competencies (Jordan et al. 2019). Previous studies have called for the need of target populations in instrument development (Landsverk et al. 2023) and thus, qualitative or mixed-methods research could provide deeper insights into role-specific requirements and registered nurses' own perceptions of EBHC in practice, especially in underrepresented regions and specialties to develop meaningful and practical tools.

4.2 | Background Factors

The studies in this review examined and reported various background factors in relation to nurses' EBHC competence, but many did not clearly explain the nature or direction of these associations. As a result, their significance to influence EBHC

competence remains unclear. A systematic review focused specifically on these associations could also help synthesize and quantify the evidence more robustly. Future research should also use longitudinal or controlled designs to better establish causality and account for confounding variables.

Educational level was the most frequently examined background factor associated with EBHC competence. Consistent with previous research, higher education—such as master's and doctoral degrees—has been linked to more positive attitudes, greater confidence, and improved skills in the practice and implementation of EBP (Connor et al. 2017; Ominyi and Agom 2020). However, most nurses in direct care hold lower degrees. Since different educational levels produce varying EBHC competencies (Immonen et al. 2022; Koivunen et al. 2024; Ylimäki et al. 2024) healthcare systems should better recognize and utilize the advanced skills through differentiated roles. Approaches with clearly defined roles, fostering collaboration support with strong organizational structures and leadership can potentially improve both patient outcomes and staff satisfaction (Melnyk et al. 2014). Professional ladder programs can further support this by providing structured pathways for nurses to develop and apply EBHC competencies across different stages of their careers (Y.-H.; Li et al. 2022).

In line with previous research, the significance of EBP education in enhancing the competence of nurses and healthcare professionals was noted (Häggman-Laitila et al. 2016; Hines et al. 2021). Studies emphasize the need for EBP education that is multimodal (e.g., lectures, online and face-to-face), clinically integrated, and team-based, incorporating mentorship and case-based discussions (Sapri et al. 2022) Beyond individual competence, such education fosters organizational empowerment, strengthens team cohesion, and contributes to improved patient outcomes (Wu et al. 2018). However, the positive effects of EBP education may diminish over time, high-lighting the need for research into both the short- and long-term impacts of EBP education on EBHC competence, as well as strategies that ensure sustained benefits through continuous organizational support, a supportive culture, and engaged leadership (McNett et al. 2022).

Mixed effects were reported with both work experience and age on EBHC competence. Nurses with longer work experience may have a better understanding of organizational systems and processes that support evidence implementation. However, they may lack formal education in EBP or EBHC. In contrast, younger nurses often show more positive attitudes toward EBHC, likely due to recent exposure to EBHC education during their training (Labrague et al. 2019; S. Li et al. 2019; Melnyk et al. 2018). While work experience contributes to overall nursing competence (Meretoja et al. 2015), it may also have a negative impact (Connor et al. 2017; Melnyk et al. 2018). Combining individual and group learning strategies, along with intergenerational learning and mentorship, supports the development of EBHC competence across experience levels and helps reduce competence gaps within the workforce (Fontaine et al. 2024; Pereira et al. 2025).

The reported association between clinical setting and EBHC competence varied, with no specific care environment—such as elderly care or intensive care—consistently linked to higher competence. Instead, workplace-related factors, including leadership, organizational culture, availability of resources, infrastructure, and dedicated time for evidence-based activities, are more likely to influence the relationship between EBP education, clinical setting, work experience, and EBHC competence (Gorsuch et al. 2020; S. Li et al. 2019; Ominyi and Agom 2020).

Research experience was reported to be associated with EBHC competence in all examining studies and described as participation or conduction of research or membership in research council. Magnet-status hospitals have supportive structures (e.g., research councils, journal clubs) and involve nurses in research, but it may not improve their overall competence (Melnyk et al. 2020). Nurses have expressed a lack of confidence in their research abilities and do not consider it to be part of their work (Khoddam et al. 2023), emphasizing the shift to supporting nurses in direct care to implementing evidence into care and decision-making, with advanced roles for leading EBP initiatives, conducting research, or mentoring.

Gender is a commonly examined background factor and was examined in many studies in this review, but the reported association was very low. This may be partly due to the gender imbalance in the nursing workforce, where most participants identify as female, limiting the representation of male-identifying nurses. Gender-related factors, such as stereotyping, may influence perceived competence and could be beneficial to consider in both research and the design of educational and support programs (Lyu et al. 2022; Prosen 2022). In addition, there were several background factors that were less examined in the studies. Future research could prioritize background factors with broad relevance, such as professional role, training, and working hours, while also exploring more context-specific variables through targeted or comparative studies.

5 | Limitations

This scoping review was conducted using a rigorous and transparent methodology, guided by the JBI and PRISMA-ScR guidelines. The inclusion of grey literature, a broad database search, and the involvement of a multidisciplinary team—including informatician—enhanced the reliability of the review. The methodological quality of included studies was assessed, with most rated as high, which adds credibility to the findings.

However, it is important to consider some limitations when interpreting the findings. The concept of EBHC competence is complex and the educational qualifications and professional roles for nurses vary between countries. This change might affect how we understand and measure competence, which could limit how widely the results can be applied. To focus on the skills of direct patient care nurses, many studies were excluded because they did not reliably separate outcomes from other professional groups or nursing roles (e.g., educators or managers). Also, the search was limited to studies published in English and Finnish, the languages understood by the research team. Most of the studies included were made in Western or high-income countries possibly affecting the application to other healthcare systems and cultural settings. Finally, the suitable change from a systematic review design to a scoping

review design due to varied data may have affected the depth of the analysis.

6 | Conclusions

Findings from this scoping review indicate that various instruments have been used to measure nurses' EBHC competence, though none capture it comprehensively. The most frequently examined background factors and consistently reported in association to EBHC competence were: educational level, work experience, evidence-based practice education, age, clinical setting, and research experience. Future research should focus on refining or developing assessment tools that accurately reflect EBHC competence in relation to current healthcare demands and the evolving roles of nurses. While the significance of these background factors warrants further investigation, healthcare organizations and educators may consider them when designing educational interventions and building supportive structures, such as clear career pathways, mentorship programs, and leadership development, to enhance nurses' EBHC competence in practice.

Author Contributions

Henna Härkönen: conceptualization, methodology, investigation, formal analysis, visualization, writing – original draft. **Hanna-Maria Hannila:** conceptualization, methodology, investigation, formal analysis, visualization, writing – original draft. **Anne Oikarinen:** project administration, conceptualization, methodology, investigation, formal analysis, validation, writing – original draft. **Maria Kääriäinen:** conceptualization, methodology, investigation, validation; writing – original draft. **Saija Ylimäki:** methodology, investigation, validation, writing – review and editing. **Anne-Mari Hietaniemi:** methodology, investigation, validation, writing – review and editing. **Arja Holopainen:** conceptualization, methodology, investigation, writing – review and editing. **Miia Jansson:** conceptualization, methodology, investigation, writing – review and editing. **Tarja Pölkki:** conceptualization, methodology, investigation, writing – review and editing. **Pirjo Kaakinen:** conceptualization, methodology, investigation, writing – review and editing. **Outi Kanste:** conceptualization, methodology, investigation, writing – review and editing. **Anna-Mari Tuomikoski:** supervision, project administration, conceptualization, methodology, validation, formal analysis, writing – review and editing.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this study the authors used Copilot and DeepL to improve readability and language of the manuscript as English is not their native language. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.