

Evidence Based Care Journal

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The online version of this article can be found at

http://ebcj.mums.ac.ir/article_13414.html

Evidence Based Care Journal 2019 09:17 originally published
online 01 July 2019

DOI: 10.22038/ebcj.2019.40598.2068

Online ISSN: 2008-370X

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System Factors Influencing the Australian Nurses' Evidence-based Clinical Decision Making: A Systematic Review of Recent Studies

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Received: 31/05/2019
Accepted: 03/07/2019

Evidence Based Care Journal, 9 (2): 17-30

Abstract

Background: There is growing attention to evidence-based practice in Australian clinical contexts and nursing literature. Recent research explores the dimensions of evidence-based practice; however, the implementation of evidence-based clinical decision making has been identified as a cumbersome process.

Aim: This study aimed to review the literature systematically regarding the system factors and their possible impacts on the process of evidence-based practice implementation.

Method: An electronic search on major databases, including MEDLINE, PsycINFO, PubMed, ProQuest, Google Scholar, and CINAHL was conducted from January 2018 to March 2018. A rigorous selection process focusing on the inclusion of nurses in the study population and the system factors related to their practices resulted in the selection of 18 articles. Data were extracted from the studies and grouped into categories using a thematic analysis.

Results: The factors affecting the nurses' evidence-based practice were identified at the individual, team, and organizational culture levels. The individual domain included a lack of education and clinical expertise, inadequate research skills, time constraint, and low levels of confidence and autonomy in changing practices. The factors identified at the team level associated with a lack of research orientation and peer support. At the organizational culture level, poor research culture and infrastructure were identified as important factors.

Implications for Practice: The findings of the system factors would help policymakers to redefine the nursing practice. Moreover, the results raise the nurse's awareness about the importance of using evidence-based practice in decision making.

Keywords: Clinical decisions, Evidence-based practice, Health system factors, Nurses

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Introduction

The nursing science is growing at an increased pace and the integration of research evidence into care practice becomes a priority in clinical contexts. Evidence-based practice (EBP) is referred to careful and systematic use of best research evidence in the clinical decision-making process (1). The EBP approach integrates three aspects of clinical practice, such as personal knowledge and experiences, available research evidence and values, as well as the preferences of patients in ensuring high quality and safe care (1, 2). However, an 8- to 30-year gap was found in the literature regarding the availability of research and its application into nursing practice (2, 3).

In Australia, nurses have been increasingly cast in the role of active decision makers in clinical practices (4). Nowadays, these nurses consider EBP in their everyday practices and possess a positive attitude towards it because of its efficiency in the promotion of transparency and accountability in the decision-making process (4). While effective decision making is an integral part of their clinical practice, a lack of EBP is involved with a high cost of care provision, degradation of service quality, and lower levels of a harmonious interprofessional working environment (3).

There are several identified factors that hinder the implementation of EBP, including a lack of knowledge and authority to change treatment procedures, not enough time to deal with new ideas, lack of resources, and inadequate support from colleagues and management (5, 6). Although evidence is growing on the identification of these factors, the literature seems to represent a fragmented picture due to inadequate understanding of barriers from the nurses' perspective (6, 7, 8).

Additionally, the clinical tasks and competency standards have been outlined by the Nursing and Midwifery Board of Australia for nurses, which clearly links between research knowledge and its utilization to ensure EBP in the decision-making process (9). The EBP guideline developers agree that guidelines need to be periodically updated due to rapid accumulation of evidence and the upcoming challenges (10, 11). Therefore, this study aimed to review the literature systematically regarding the system factors and their possible impacts on the process of EBP implementation in clinical practices among Australian nurses.

Methods

This literature review was a part of a research project entitled "Adopting evidence-based practice in clinical decision making by nurses", which has been approved by the Social and Behavioral Research Ethics Committee (*Project No. 7625*). A literature search was conducted across major electronic databases, including MEDLINE, PsycINFO, PubMed, ProQuest, Google Scholar, and CINAHL from January 2018 to March 2018 to identify the research studies on nurses' knowledge and attitudes towards EBP, management, and the implementation of EBP in clinics and hospitals.

A search string was used in the literature with several keywords, such as "evidence based practices or evidence-based practices", "evidence based decisions or evidence-based clinical decisions", "EBP and nursing practices", "nursing decision making or nursing clinical practices", "nurses or registered nurses", "clinicians", "nursing AND factors", "challenges", "barriers", "impediments", "logistic supports", "time constraints", "understanding AND integrating", "technology skills", "research skills", "healthcare providers", "financial problems", "barriers", "challenges", and "Australia".

A manual search was also undertaken to include the relevant references of the retrieved articles, citations by authors, and important articles. The search string was developed by the first and second authors after consulting with a librarian in the Flinders University. The peer-reviewed research studies published from January 2015 to February 2018 were considered in this study. Furthermore, the studies which included nurses as participants and investigated their perspectives on the implementation of EBP were regarded eligible for the review. Additionally, the intervention studies targeted at the exploration of the factors of EBP implementation were included in this review.

On the other hand, the literature reviews and reports based on the secondary data were excluded from this study. In the same line, the exclusion criteria included studies focusing on the factors of EBP implementation from a non-clinical perspective. It is worth noting that an Australian context and English language were applied in this study. There were 8353 articles identified from the initial electronic and manual search. Out of 8353 citations, 286 articles were considered for the examination of the full texts. In total, 18 articles, including quantitative, qualitative, and mixed-methods ones met all inclusion and exclusion criteria (Figure 1). The systematic literature review guidelines of the Centre for Reviews and Dissemination were employed to assess the quality of each study (12). The

quality assessment checklist included items, such as relevant objectives, methodology, and employed methods, the generalizability of findings, and the quality of reporting. Table 1 summarizes data on the authors, years, settings, participants, research methods, and findings on the system factors related to the EBP implementation from each study.

The meta-analysis of the research findings was not appropriate due to the heterogeneity in the selected studies. The extracted data were tabulated according to the research outcomes presented in the selected studies. Multi-layered relationships were found among the factors of EBP implementation, and these factors were grouped into themes and sub-themes using thematic analysis method. This approach thematized the findings into sub-themes and themes, and it was employed to provide a structure to the identified factors of EBP in the data analysis and discussion sections of this review (13).

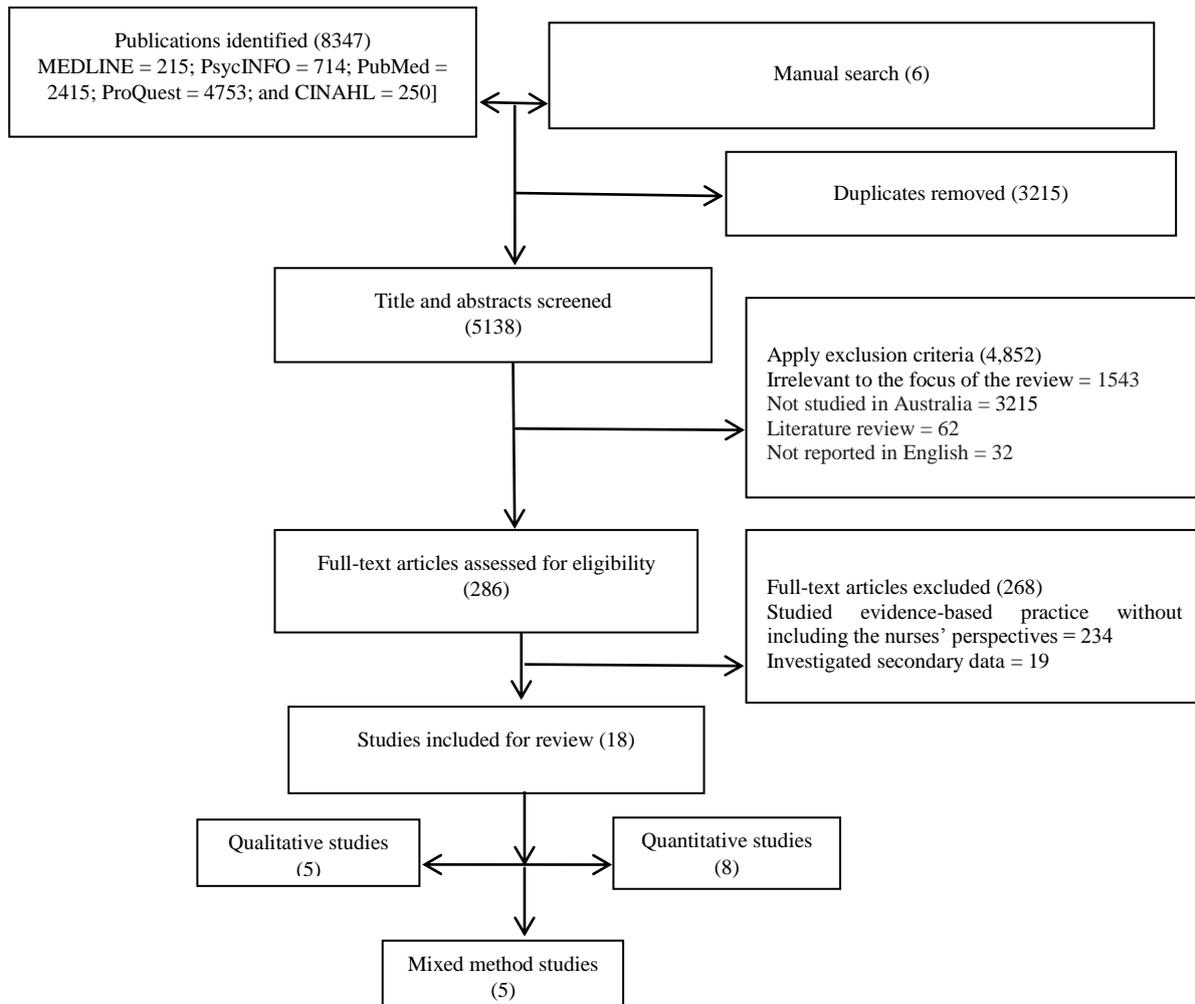


Figure 1. PRISMA flow diagram in the selection of reference list for literature review

Table 1. Characteristics and Findings obtained from the Review Table of Qualitative Studies Pertaining to the challenges in evidence-based practices of nurses

Author (s) Year	Study aim	Design of the study	Sampling (Data collection tool, Sampling method, and Sample size)	Findings (Factors and issues in evidence-based practices)
Alison, Zafiroopoulos, and Heard (2017)	To identify key factors affecting research capacity and engagement of allied health professionals	Quantitative study Randomized control trial An exploratory factor analysis	Survey questionnaire Randomly selected 276 participants	Organizational factors: 1. Research infrastructure available 2. Research culture within the organization Team factors 1. Research orientation within the team 2. Research support within the team 3. Disseminating results in seminars Individual domain 4. Research skill of the individual

Table 1 Continued.

Bennett et al. (2016)	To explore the influence of organizational initiatives to support evidence-based practice on workplace culture and clinical practice	Qualitative study An interpretative approach is used	Semi-structured interviews Participants were recruited at a hospital staff meeting at which the purpose of the research was explained and 30 participants were selected to participate in the study	Firmly embedding a culture valuing research and EBP 1. Valuing research and EBP in organization 2. Cultural change 3. Literature review: Frances perceived that staff reviewed journal articles less 'haphazardly' than some other allied health departments. Maree stated: 'I'm more accountable for what I'm doing. I ask myself: is that really the right thing to be doing? ... I'm more aware of what I'm doing and why I'm doing it.' 4. EBP coordinator's role Aligning professional identity with the Research and Evidence in Practice model 1. Competencies 2. High level of clinical skills 3. Clinical experience 4. Performance plans 5. Mentoring Experiences of change: pride, confidence, and pressure 1. A feeling of pride 2. Motivation 3. Competing demands creating pressure Making evidence-based changes to clinical practices 1. Organizational initiatives 2. Policy for EBP
Borkowski, McKinstry and Cotchett (2017)	To evaluate research capacity and culture across individual, team, and organization domains	Mixed study A descriptive survey design	Survey questionnaire Purposive sampling 164 participants	1. Competing priorities: '... in practice there isn't time to undertake additional activities in my role to research ...' 2. Resources: 'Generally the organization is supportive; however, the volume of resources (support from experts, time, finance) allocated is low' 3. Research culture: '[Research] is not our core businesses.' 4. Quality service and self-improvement: 'Improved patient outcomes with best practice. Improved service delivery'. Work roles taking priority (72%), Lack of time for research (69%) and A lack of research skills (40%)
Dadich, Abbott, and Hosseinzadeh (2015)	To identify strategies to increase Practice Nurse capacity to promote evidence-based sexual healthcare within general practice	Mixed study A descriptive research design	Survey questionnaire Purposive sampling 217 participants	1. Training on EBP 2. Method of EBP – easy to follow the method 3. Lack of support from the workplace
Duff et al. (2016)	To compare individual nurse and organizational characteristics with high evidence-based practice (EBP) use	Quantitative study Intervention study Univariate and multivariate binary logistic regression	Questionnaire Randomly selected 484 Participants	Individual factors 1. Postgraduate education (OR 1.69, 95% CI 1.07–2.6, p=0.02) 2. Previous research experience (OR 1.9, 95% CI 1.6–2.4, p=0.01) Organizational factors 1. Access to the internet (OR 2.04, 95% CI 1.3–3.0, p=0.001) 2. Access to ongoing EBP education (OR 1.6, 95% CI 1.1–2.5, p=0.01)

Table 1 Continued.

Fairbrother et al. (2016)	To establish self-reported skill levels, behaviors and barriers in relation to evidence-based practice	Quantitative study A descriptive survey design	Evidence-based practice survey questionnaire Purpose sampling 169 participants	EBP behaviors and skills 1. Lack of sources of knowledge Barriers to finding and reviewing the evidence 1. Research reports are not readily available 2. Difficulties in understanding research reports 3. Lack of enough time to find research reports 4. Confidence in judging research quality Barriers to changing practices 1. Insufficient time at work to implement changes in practice 2. Do not feel confident about beginning to change my practice
Fairbrother et al. (2016)	To establish correlates of self-reported skill levels and behaviors in relation to evidence-based practice	Quantitative study cross-sectional research design	Evidence-based practice survey questionnaire Purpose sampling 169 participants	EBP skills level factors 1. Higher educational level ($P<0.0001$) 2. Lower emotional exhaustion ($P=0.001$) 3. Higher relational job satisfaction ($P=0.01$) 4. Sense of personal accomplishment ($P=0.04$) 5. Working part-time ($P=0.003$)
Hines et al. (2017)	To compare the effects of participation on EBP continuing professional education on nurses' and midwives' knowledge, attitudes, and practices	Quantitative study Cross-sectional research design	Survey questionnaire Purposive sampling 198 participants	1. Education level: statistically significant influence on mean total KAP scores, $F(4, 111) = 4.05, P=.004$ 2. Job category: clinical nurses (a more senior clinical position than an RN) had significantly different total KAP scores than RNs ($MD=.27, SE=.09, P=.02$)
Leung, Trevena, and Waters (2016)	To develop a competency framework for measuring evidence-based knowledge and skills in nursing	Mixed study A descriptive survey design	Survey questionnaire Purposive sampling 42 participants	1. Competency in EBP 2. Nurses' level of autonomy: 'in my practice context (acute public hospital) a first year RN would probably not have the opportunity to change practice via guidelines/protocols or to apply evidence to a clinical scenario in a formal manner. Would have to consult with senior staff'.
Malik, McKenn, and Plummer (2015)	To explore NE', CCs' and nurse specialists' knowledge, skills and attitudes associated with EBP	Mixed study Descriptive statistics using SPSS and thematic analysis for qualitative data	Survey questionnaire Comprehensive sampling 135 participants	NEs', CCs' and CNSs' attitudes towards EBP The highest mean of 4.34 ($SD=0.536$) demonstrated positive attitudes towards EBP. Totally, 59% and 37% of the participants agreed and strongly agreed, respectively, that EBP was fundamental to their professional practice (median=4.00). In addition, beliefs about the implementation of EBP being of benefit to their professional development were also strong (Mean = 4.32, Median = 4.00). Participants also felt there were benefits to change their practice based on research (Mean = 4.19, Median = 4). Knowledge and skills in terms of EBP: Nearly half of the participants (48%) agreed that research findings were not easily transferable into practice (Mean=3.31, Median=4). In addition, 66% of the participants reported that it was hard for them to implement changes (Mean = 3.17, Median = 4), and 53% of

Table 1 Continued.

				<p>them found it difficult to keep up to date with current evidence (Mean=3.16, Median=4).</p> <p>Factors affecting the implementation of EBP</p> <p>Time: One participant stated, 'Having someone to assist in supply research articles would be good as I don't have enough time to do it all myself. No time to find and read research articles.'</p> <p>Staff/Organization:</p> <p>'Staff resistant to change-go back next week it is still being done the same way.'</p> <p>'Sometimes there is little or no evidence for some current and planned practices on the network website.'</p> <p>'I find the evidence-based practice a new concept to many of my colleagues. During my training a great deal of time was spent looking at research, critiquing, and putting evidence into practice. However, I did not train in Australia and since qualifying, I had to provide evidence of professional development. Once this becomes a training requirement, it might increase the use of EBP.'</p>
Malik, McKenna, and Plummer (2016)	Reports findings through an exploration of nurse educators', clinical coaches' and nurse specialists' perceptions of factors associated with using EBP	Mixed study Descriptive statistics using SPSS and thematic analysis for qualitative data	Survey questionnaire Comprehensive sampling 135 participants	<p>Factors facilitating EBP</p> <ol style="list-style-type: none"> 1. Support from nursing colleagues (Mean=3.59, Median=4.00) 2. Support from management (Mean=3.53, Median=4.00) 3. Research-related activities supported by the organization (Mean=3.62, Median=4.00) <p>Barriers to EBP</p> <ol style="list-style-type: none"> 1. Lack of opportunities to up-skill in utilizing EBP (Mean=2.85, Median=3.00) 2. Need for educational opportunities (85% agreed) 3. Insufficient time (Mean=3.79, Median=4.00) 4. No incentives to develop research skills (Mean=3.61, Median=4.00) 5. Insufficient resources to change practice (Mean=3.42, Median=4.00) 6. Difficulty in identifying implications of research findings (Mean=3.12, SD=0.947) 7. Lack of authority to change practice (Mean=3.04, SD=0.953).The organization supports in theory but practically it does not help. One participant stated: "I find the organization voices supportive but when it comes to money/resources to implement any changes, the attitude changes".
Malik, McKenna, and Griffiths (2016)	To explore processes used while incorporating EBP into teaching and learning practices.	Qualitative study Grounded theory	Interview and observation Purposive sampling 32 participants	<ol style="list-style-type: none"> 1. Heavy workloads 2. Limited time 3. Lack of commitment 4. Lack of confidence 5. The complexity of EBP application
Malik, McKenna, and Griffiths (2017)	To investigate processes undertaken when integrating evidence-based practice in clinical decisions	Qualitative study Constructivist grounded theory approach	Interview and observation Purposive sampling 32 participants	<ol style="list-style-type: none"> 1. Incompetency in EBP 2. Lack of motivation 3. Workplace culture 4. Having less credibility of academic work in practice settings 5. Lack of partnership between academic and practice setting

Table 1 Continued.

Whiteside et al. (2016)	To examine the evidence-based practices among healthcare practitioners	Qualitative study Thematic analysis	Focus group and face to face interview Purposive sampling 17 participants	Individual factors: 1. Clear understanding 2. Knowledge and skills 3. Motivation and passion Organizational factors: 1. EBP culture in an organization 2. EBP support services 3. Professional development activities 4. Supervision and mentorship 5. University partnerships
Wilkinson, Hough, and Hinchliffe, (2016)	To measure the effect of training and organizational change on EBP measure	Quantitative study Cross-sectional research design	Online survey Purposive sampling 201 rtipicants	1. Self-efficacy 2. EBP knowledge 3. EBP training in the use of computers, literature searching, an EBP course, and research design and analysis
Wilkinson et al. (2016)	To repeat an EBP survey to measure and compare change over time amongst AH disciplines' EBP self-efficacy, EBP outcome-expectancy, and EBP-use	Quantitative study Cross-sectional research design	Online survey Purposive sampling 139 rtipicants	1. Significant differences over time were observed in the number of staff undertaking EBP training (P=0.008) and training in research design and analysis (P=0.003). 2. A significant increase in training undertaken by staff who had completed at least two surveys (i.e., repeated measures) was observed for training in the use of computers (P=0.001), literature searching (P=0.006 and P<0.0001), EBP course training (P<0.0011 and P=0.01), and research design and analysis (P=0.006).
Wright et al. 2016	Focuses on an EBM decision process involving an operation management problem	Qualitative approach Fast track case study	Interviews Purposive sampling 51 participants	Decision process: Problem recognition and assigning a mandate assembling literature and internal evidence
Ziviani et al. (2015)	To determine whether any differences existed based on organizational affiliation, profession, and any previous training to inform a strategy to enhance EBP	Quantitative study Cross-sectional research design	Online survey Purposive sampling 138 participants	1. Previous training 2. EBP knowledge: a significant effect on health service (t77=2.47, P=0.015) 3. EBP training

Results

The selected studies used varying research designs including two randomized control trails; five cross-sectional studies, six descriptive studies; two interpretive approaches; and three constructivist methods. Data collection methods used in the studies were: interviews (2); surveys (13), two studies used a combination of interview and observation; and another study used a combination of focus group and interview. In the selected studies, sample size was ranged from 17 to 484 participants. Three themes emerged from the synthetization of the system factors identified in the literature: individual capacity, interpersonal support and organizational provision (Table 2).

Individual capacity

The first major theme of "individual capacity" represented a situation where the nurses' ability to implement EBP in decision making associated with their clinical knowledge and experience, research skills, time, confidence, and autonomy. According to the results of eight studies, nurses' ability to implement EBP in decision making correlated significantly with clinical education and experience. Duff et al. (2016) revealed a statistically significant association between postgraduate education and

Table 2. System factor categories influencing on nurses' evidence-based practice

Themes	Factors	Number of studies
Individual capacity	Clinical education and experience	8
	Lack of research skills	8
	Limited time and increased workload	5
	Confidence and autonomy in changing practice	9
Interpersonal support	Research orientation by the experts	8
	Lack of research support from the colleagues and management	10
Organizational provision	Workplace culture	12
	Inadequate research infrastructure	11
	Lack of funding	5
	Shortage of equipment	6

the implementation of EBP (OR 1.69, 95% CI 1.07–2.6, $p=0.02$) (14). On the other hand, a lack of higher education had a negative impact on nurses' ability to implement EBP in clinical settings ($P<0.0001$) (15).

In another study, 85% of the participants stated that they required ongoing educational opportunities to implement EBP (16). Moreover, the results obtained from a qualitative study showed that the lack of clinical skills and experience due to limited educational opportunities restricted nurses to implement EBP in their practices (17). As such, the lack of education and clinical experience in combination with little knowledge of the research process were negatively associated with an individual capacity of nurses to implement EBP.

In the same line, eight studies showed a relationship between research skills and the EBP implementation by nurses. Accordingly, due to the lack of research skills, nurses faced challenges regarding the review of the literature, data collection, and understanding the research findings (17).

In a study conducted by Borkowski, McKinstry, and Cotchett (2017), it was found that 40% of the participants had no research skills (18). Furthermore, nearly half of the participant in mixed-methods research confirmed that the research findings were not easily transferrable into practice (19). Consequently, limited knowledge and skills in research which caused by a lack of time resulted in failures to implement EBP in clinical decision making. Lack of time has an influence on nurses' ability to implement EBP in decision making. Competing demands impose pressure on the nurses in the clinical settings, and this hinders their promotion of EBP (17). In a mixed-methods study, one participant stated, "... in practice there is no time to undertake additional activities and do research" (18). According to the results of the aforementioned study, 69% of the participants agreed that they had no time to conduct research since job duties took the highest priority (18).

There were several identified barriers regarding time management during clinical practices, such as part-time shifts, sense of personal accomplishment, lack of available research reports, and lack of enough time to find research reports, assess the research design, and the quality of outcomes (15, 20). The prioritization of the job duties due to increased workload restricted the nurses to focus on the integration of research evidence into clinical practices. The results obtained from nine studies revealed that nurses' ability to implement EBP in decision making correlated with their confidence and autonomy. The findings of one study indicated positive attitudes of nurses towards the implementation of EBP (mean \pm SD=4.34 \pm 0.536). In this study, the results showed that 59% and 37% of the participants were agreed and strongly agreed, respectively, with this fact that EBP implementation was fundamental to their professional practice (19).

In the same line, confidence was another factor which was beneficial to the participants' professional development regarding the implementation of EBP in everyday care practice (Mean=4.32, Median=4) (19). However, two studies identified a lack of confidence in EBP implementation among nurses (15, 16). A lack of self-motivation and passion were blamed for making the nurses unsure about their capacity in doing research and implementing EBP (21, 22). In a study, a question was raised on the authority of nurses to change their practice (Mean \pm SD=3.04 \pm 0.953) (16). One participant stated in a mixed-methods study that: "...in my practical context (i.e., an acute public hospital), a first-year registered nurse would probably not have the opportunity to change practices via guidelines/protocols or to apply evidence to clinical scenario in a formal manner, and s/he would have to consult with senior staff " (23). Lack of authority and confidence makes it difficult for nurses to implement EBP,

and this is also associated with their commitment to their job duties and patients.

In summary, lack of knowledge of EBP, confidence, autonomy, and access to ongoing educational opportunities led to the shortage of clinical skills among nurses, which had effects on their EBP implementation. In addition, the lack of research skills was also identified to have negative effects on the implementation of EBP, which might be a result of a lack of higher education. Continuous attempts of nurses to meet the work role demands made it difficult for them to collect data and conduct research, and this has resulted from their lack of confidence in the implementation of EBP and authority to change the practices. This individual capacity was shaped by the interpersonal professional relationships among colleagues in clinical settings.

Interpersonal support

The second major theme of "interpersonal support" was articulated based on the prevailing professional relationships and support that played a role in restricting nurses to implement EBP. The identified factors associated with interpersonal support included research orientation by the experts and research support within the team. According to the results of several studies, a correlation was observed between the research orientation in the team and the role of EBP coordinator with a lack of EBP implementation among nurses. In a study conducted by Malik, McKenna, and Plummer (2015), one participant stated: "I find the evidence-based practice a new concept to many of my colleagues" (19). The identified factors with the highest scores that had effects on the implementation of EBP at the team level (Median ≥ 7) were a lack of a team leader to introduce and support research, difficulties in the dissemination of the research outcomes to the colleagues and research forums/seminars, a lack of planning for the implementation of EBP that is guided by evidence, and no collaborative research orientation relating to practice (24).

In addition, a lack of supervision and mentoring was identified regarding the use of computers, literature search, EBP courses, as well as research design and analysis from the EBP coordinator (21). This lack of research orientation caused limited research support from the colleagues which had negative effects on the nurses' ability to implement EBP in clinical decision making. In a study, one participant stated a need for assistance: "...there is a need to have someone to provide the nurses with research articles. It would be really good since we don't have enough time to find and read research articles" (19).

Support from nursing colleagues (Mean=3.59, Median=4.00) and management (Mean=3.53, Median=4.00) in terms of data collection and analysis, as well as a review of the literature, were found significant in the implementation of EBP (16). Therefore, a lack of collaborative effort and presence of an EBP coordinator in research orientation within the team along with limited support from colleagues and management created difficulty for nurses to implement EBP. The lack of team effort resulted from organizational culture and research support infrastructure in clinical settings.

Organizational provision

The final theme of "organizational provision" included the research culture and supportive infrastructures in clinics and hospitals, which correlated significantly with the implementation of EBP among nurses. The policies and workplace culture were important to understand the organizational aims and goals. Several studies identified the workplace culture as a key determinant in nurses' ability to implement EBP in clinical decision making. Regarding the organizational research culture, in a mixed methods study, one participant mentioned that: "...Research is not our core business" (18). The cultural practices in the clinical setting associated with the implementation of EBP included lower levels of credibility of academic projects in practice setting (22, 25), a lack of partnership between academic and practice settings (21, 22), undervaluation of research and EBP implementation (17), a lack of policies for organizational changes (17), and a lack of incentives to develop research skills (25).

However, the cultural change correlated significantly with an increase in the number of staff undertaking training regarding EBP implementation ($P=0.008$), as well as research design and analysis ($P=0.003$) (7). Therefore, the organizational culture in the implementation of EBP underwent some changes although there was a lack of identified research infrastructure for the nurses.

The results obtained from 11 studies revealed research infrastructure as one of the factors of the organizational provision in clinical settings. With regard to the support from the organization, one

participant in a study stated that: "...I find the organization voices supportive but when it comes to money/resources to implement any changes, the attitude changes" (16). The organizational research infrastructure associated with a lack of access to the Internet, EBP education and training (14), as well as support from experts (18).

Some other factors at the organizational level (Median \leq 4) were the lack of funds and equipment, inadequate administrative support for research activities, and no software to support research activities (24). In addition, a lack of research support was identified as a reason for nurses' inability to implement effective and efficient EBP.

The obtained results suggested several factors at the individual, team, and management levels regarding the implementation of EBP by nurses. It was evident that at the individual level, nurses had a lack of education and clinical experience as well as research skills to implement EBP in clinical decisions making. A lack of time due to work role demands along with the nurses' lack of confidence and autonomy to change their practices were identified as disempowering factors.

At the team level, research orientation in the team by the EBP coordinators and research support from colleagues were identified as facilitating factors regarding the implementation of EBP in clinical decision making. Additionally, at the organizational level, there were two major limiting factors, such as lack of research culture and research support infrastructure, which hindered nurses from adopting EBP. The individual, team, and management factors influenced the nurses' effective participation in clinical decision making.

Discussion

This review contributes to the understanding of the major factors influencing the EBP implementation by nurses within the Australian healthcare system. The factors represented the individual, team, and organizational capacities in the implementation of EBP in clinical practice, which are also reported in the studies published before 2015 (26, 27). The findings of this review study revealed a lack of knowledge about EBP and research skills among the nurses that were significantly associated with their clinical practice. In addition, competing role demands, as well as nurses' lack of confidence and autonomy to change the current practices were reported as important factors.

Regarding the team domain, the facilitating factors to the implementation of EBP were the role of an EBP coordinator in research orientation and support from colleagues. Moreover, the factors in the organizational domain included the culture and research infrastructure in the organization. These cross-sectional factors signify that different policies and strategies are required at each domain to improve EBP capacity and culture among the nurses.

The factors on the individual level were identified as important in all types of quantitative, qualitative, and mixed methods studies. These factors associated with the nurses' knowledge and experience, research skills, time constraint, confidence, and autonomy. Similar to the other studies conducted internationally (26, 28), the results of the present study showed a lack of involvement in research due to insufficient knowledge of EBP implementation as a result of inadequate education and clinical experience.

The research skills of the nurses was another key factor influencing research capacity at the individual level, which included data collection, selecting articles for literature, critical literature review to understand research outcomes, writing for publications, submitting an ethics application, and securing research funding (29). Poor research skills in the clinical setting might result from a lack of research-based education and training (30, 31) since the nurses receive only educations on basic research in undergraduate courses. The nurses' individual capacities to conduct meaningful research are limited, which are also influenced by the time constraint. High expectation from nurses has an influence on their implementation of research practices in the clinical setting; therefore, the work role demands are prioritized by them to meet the job duties. This finding is in line with the results obtained from studies conducted in other developed countries, such as Norway and the USA (32, 33).

This review identified two unique factors, namely working part-time and a sense of accomplishment that hinder the nurses from implementing research-based practices. At the individual level, the most important factor was the lower level of confidence and autonomy in performing research and changing the practices. Several studies showed lower levels of confidence among nurses in conducting research. The nurses believed in this dominating perception that they did not have the ability to conduct research; moreover, they stated that there was no easy method to follow in research

procedures (28).

A lack of autonomy in changing the practices in clinical settings led to nurses' inability to implement EBP in clinical decision making. This finding is also consistent with the results obtained from quantitative and qualitative studies (23, 28). The EBP training can lead to a significant and immediate improvement in research knowledge and skills, as well as attitudes, confidence, and behavior (34). These factors can change educational programs with emphasizing on educational strategies. Consequently, changes in educational programs may increase nurses' skills and confidence levels, thereby enabling them to undertake EBP in clinical decision making.

There were two factors influencing the EBP implementation at the team level, namely the role of an EBP coordinator and research support from colleagues. Research orientation by the EBP coordinator was identified as a determinant in the implementation of EBP. This concept encompasses several components, such as attitudes of the EBP coordinator to the needs of nurses, the value of research, involvement in EBP implementation, integration of research findings into clinical practices, and becoming aware of new knowledge and information (35).

Research orientation at team level included sharing of research knowledge and skills, which was inadequate in the clinical practices and had negative effects on the implementation of EBP (36). The other determinant factor was support from colleagues which was associated with the nurses' day to day clinical practices. This factor has been defined by several authors and included components, such as administrative support, time for colleagues, dissemination of information, and access to the library. Accordingly, lack of collaborative efforts at the team level has an impact on the nurses' inability to implement EBP in making decisions (24, 36). This result is in line with the findings obtained from the present review study.

At the organizational level, the culture of the organization and research infrastructure, from a broader perspective, were identified as key factors. The healthcare organization in the present review study had poor research culture in clinical practices. This finding is consistent with the results of other studies (24, 37) in which they showed a lack of partnership between academic and clinical practitioners and less credibility of research projects in the clinical settings. Positive research culture in the organization has been described by Cooke et al. (2006) in terms of organizational policies, valuation of the research activities, and incentives to initiate EBP (36). Such a research-focused culture is considered practical for the adoption of EBP initiatives and behaviors of the nurses employed in any healthcare organization (24, 37). The integration of research culture by the organization to the strategic planning and mission statement may be a key strategy that can foster research culture by signifying that research activities receive high value and become an integral part of the workplace role (38, 39).

The research infrastructure was also identified as an effective factor in EBP implementation. The required research resources and facilities include funds, equipment, the access to computers, the Internet, and software, as well as library resources, such as copies of journals and databases, and workstations for conducting meaningful research and data management (36, 39). Lack of these services in an organization hinders the promotion of EBP in the clinical setting; therefore, it should be ensured that the resources and support are available to assist nurses in performing research.

Overall, the system factors identified at the individual, team, and organizational levels, indicate the challenges in whole-systems approaches. The recognition of the individual capacities in terms of their educational level, clinical expertise, research skills, time, confidence, and autonomy is important since all of these factors have impacts on the nurse's ability to implement EBP which will, in turn, affect the research capacity of the team and organization. The factors at the team level that have a remarkable impact on the performance of nurses' skills and confidence in carrying out clinical research include research orientation and research support from colleagues. In addition, at the organizational level, the most important factors were research culture and infrastructure since they can direct and assist an EBP coordinator, research team, and nurses to implement EBP, thereby ensuring successful clinical decision making.

Although this review paved the way on the factors affecting the EBP implementation in the clinical setting, it suffers from several limitations since it included all quantitative, qualitative, and mixed-method studies in one review, and it was limited to peer-reviewed articles. A review of all types of studies would add value to the growing body of knowledge regarding nurses' EBP implementation in clinical decision making. Excluding book chapters, grey literature, non-English language studies, and

country specificity were important decisions in the review because of the practical reasons, such as the complexity of data extraction and analysis as well as focus on topic relevance.

Implications for Practice

This review suggests several system factors the identification of which indicates that healthcare policies and strategies should consider each factor to improve the research capacity of nurses. Nursing educational strategies that contribute to the development of clinical and research skills should be tailored to the nurses' interests and needs to be operative. Teaching EBP at the undergraduate level may have a great impact on nurses since they will be aware of how to become evidence-based practitioners. Another strategy at the team level that can promote research orientation and support is a collaboration between university academics, EBP coordinators and novice nurse researchers within a research team. The involvement of a nurse researcher in the team can provide an opportunity to monitor the activities and prepare performance plans of the nurses. At the organization level, the strategies should include the EBP focus that may increase the confidence and autonomy of nurses in changing their clinical practices.

Acknowledgments

The authors are thankful to the College of Nursing and Health Sciences at the Flinders University of South Australia for funding this project.

Conflicts of Interest

The authors declared no conflicts of interest.

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