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Barriers, and Nurses' Knowledge, Attitude, and Practice towards Evidence-Based Nursing Practice: A Systematic Review

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Abstract

The use of research findings in health practice among nursing practitioners is indispensable. However, there are various obstacles faced by nurses in implementing evidence-based practices (EBP). This systematic review aims to review original studies that focused on barriers and, nurses' knowledge, attitudes, and practice towards EBP. The search strategy includes systematic electronic search in four electronic databases: ProQuest, Science Direct, Elsevier and Google from 2010 to 2015. The selection of articles is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Guideline (PRISMA). Two checklists were used: Evidence Based Librarianship Critical Appraisal checklist for quantitative studies and Consolidated Reporting Qualitative Criteria for Research for qualitative studies. All processes were conducted by both reviewers independently. A total of 4270 articles were identified; 44 articles were included in this review which were original research papers, in English Language, quantitative or qualitative or mixed methods design research as well as focusing on at least one of the following: nurses' knowledge, and /or attitudes toward EBP, implementation, and EBP barriers. It was found that knowledge and skills of nurses about EBP remains low to moderate. Most studies reported that nurses have a positive attitude towards EBP and use research findings in practice. Barriers encountered in implementing EBP were identified as the nurse characteristics, culture, facilities, organizations and working place. The systematic review revealed that although most of the nurses had positive attitude toward EPB, there are barriers that prevent the implementation of EBP.

Keywords: attitudes, barriers, evidence-based practice, knowledge, nurses, skills

Introduction

In nursing, evidence-based practice is essential to deliver high quality of care. The Institute of Medicine emphasize the importance of evidence-based practice in improving and ensuring the quality of health care (Rn, Knops, Ubbink, & Rn, 2012). It was stated that patients who received the recommended evidence-based course of treatment was only 55% , whereas according to Bach (2005), evidence-based practice (EBP) to the care of the general population was only 50% (Wood & Payne, 2012). According to (Pipe, Wellick, Buchda, Hansen, & Martyn, 2005), it is expected for research findings to be incorporated constantly and knowledgeably into nursing practice. But nurses face challenges when translating best evidence into clinical practice (Pipe et al., 2005; Forsman, Wallin, Gustavsson, & Rudman, 2012).

To Wood & Payne (2012) implementing scientific evidence into clinical practice is challenging and complex. Healthcare professionals should understand barriers to implementing clinical practice guidelines to ensure successful translation into practice. For example, the relevant research-based databases are not comprehensive in many areas. Also, there is an ongoing explosion in the amount and type of information available. Time constraints are inherent in clinical practice, and they are exacerbated by increasing demands for nursing care. A need also exists for accurate and systematic ways to make inferences from the research as applied to particular patient population (Craig & Smyth, 2002 in (Pipe et al., 2005).

The implementation of EBP in health care institutions need support, both individually as well as the organization itself. The successful implementation of evidence-based practice is a dynamic process and depends on a number of variables which include experiences, biases, and professional attitude; workplace factors and organizational culture (Brady and Lewin, 2007, Fineout-Overholt et al., 2005, Newman et al., 1998, Retsas, 2000).

Nurses as health professionals who deal directly with patients need to have motivation and competence to effectively implement EBP. However, there are various obstacles faced by nurses in implementing evidence-based practices. Such constraints are lack of knowledge of EBP (Knops, Vermeulen, Legemate, and Ubbink, 2009; Rn et al., 2012), vagueness of the research report (Knops et al., 2009), do not know the source of relevant information, and time constraints (Rn et al., 2012). The existence of these barriers can certainly make nursing practice unsupported by scientific evidence.

Research on evidence-based practice for nursing is very limited in Indonesia when juxtaposed with studies from abroad. This may be because the world of nursing in Indonesia began to develop only in the '80s. In 1985 marked the establishment of the educational program which is Bachelor of Nursing at University of Indonesia. In the period 1985-2015 (35 years) the world of nursing education in Indonesia has made various efforts to introduce scientific evidence-based practice either through the aspects of education / teaching, practice the profession of nursing, and research. Thus, it is important and timely conduct a systematic literature review on nurses' knowledge, attitudes, and practice towards EBP and barriers from various research sources.

Methods

The study design is an integrated review which followed the guidelines from Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009). Integrated review approach is adopted, where the text is used to summarize and explain the findings of reviews of synthesis, as appropriate and flexibly to diverse methodologies.

Search strategy

The search strategy systematically using electronic search database is ProQuest, Science Direct, Elsevier and Google from 2010 to 2015. Keywords, MeSH terms and their synonyms in combination with other subject headings using operators such as Boolean ('AND' and 'OR') such as knowledge / understanding of nurses to EBP, attitudes toward EBP, practice / implementation of EBP, EBP barriers to nurses were fed into the search engine to generate more specific hits which are

relevant to the objective. Only studies published in English were included in this study. Furthermore, reference lists of articles were searched checked to identify additional studies.

Inclusion criteria

Pre-defined criteria were used to include studies in the review. Titles, abstracts and studies were included if they fulfill these criteria. Studies published in English language only will be included because the authors are not conversant enough in a second language to critique a non-English research paper. Studies that focus on nurses as the population and uses quantitative qualitative or mixed method research designs were included. The search was refined by restricting to only full text. Discussion papers, reviews and editorials on EBP were also excluded in this integrated review as the aim of the review was to identify review original studies that focused on barriers and, nurses' knowledge, attitudes, and practice towards EBP.

Data collection and Analysis

Research Selection

In the first stage of selection of research, the titles and abstracts of research were stored in Eppi-reviewers 4, and then screened for exclusion criteria listed in Figure 1 by two reviewers independently.

Minimizing Bias and Sensitivity Analysis

To ensure the consistency of decisions, all reviewer assessed for interrater reliability. Interrater reliability tests were performed on the first round of screening, data extraction and quality assessment and implementation stages. The minimum value of interrater reliability for all stages was determined as 85% similarity. Reviewers seek a second opinion from a third reviewer if there is a difference.

The quality, validity and Application Assessment

Methods systematic review is not declared major research of poor quality. Therefore, an assessment of the strengths and weaknesses of the studies in a systematic review is very important.

In evaluating the studies, an appropriate tool must be selected. In this systematic review quantitative articles were assessed using Glynn's critical appraisal tool for library and information studies, EBL (Evidence Based Librarianship) critical appraisal checklist, which is of suitable quality and flexible enough (see Appendix 4). For the purpose of this review, evaluation assessed at 70% or greater are classified as high review score validity, and evaluation less of than 70% were classified as low validity of the review. Further articles qualitatively assessed using the Consolidated Criteria for Reporting Qualititative Research (COREQ) was modified to assess articles as strong, moderate or weak. Mixed-methods research articles were evaluated using both tools.

Extraction Data

Extraction of data from a study was conducted by two reviewers who are trained and checked for interrater reliability. Researcher one doing all the extraction of data using predefined templates, and both researchers are involved in reviewing the studies independently to ensure consistency and rigidity (rigour). The synthesis organized is around the theme: EBP barriers, attitudes, knowledge, and practice.

Approval of Conduct

Ethical approval is not required because it does not conduct primary research.

Screening Result

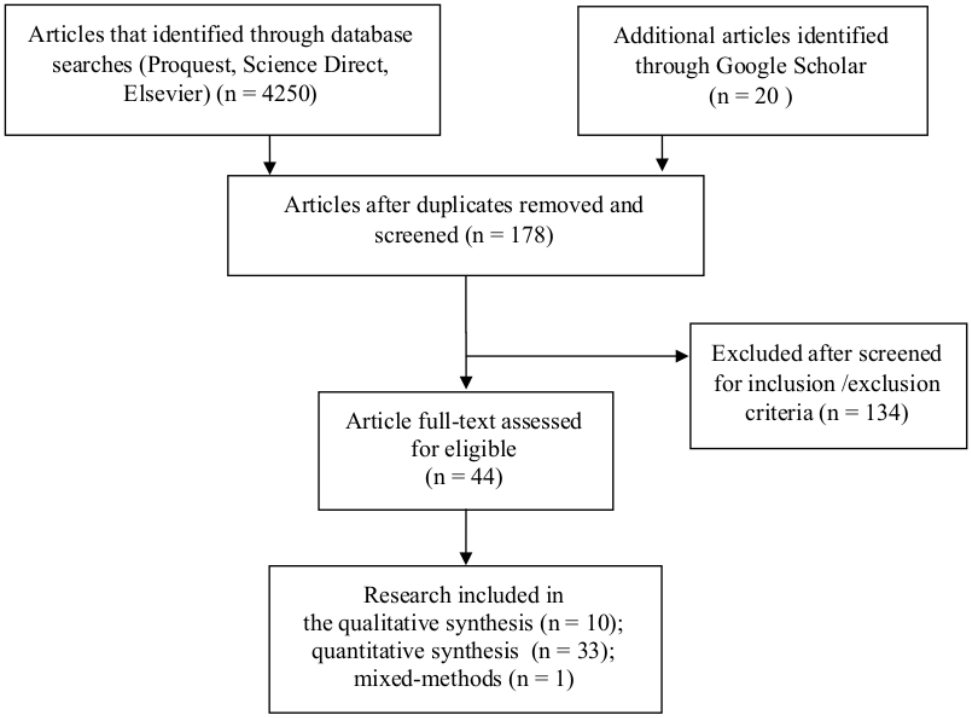
The results of the database searches were Proquest, Science Direct and Elsevier (4250 articles) and Google Scholar (20 articles). As point out in Figure 1. based on the inclusion criteria, 4270 articles were identified through database searches. Of the 4270 articles reviewed, 4092 were removed because of duplicates or similar content. Then, of the 178 articles screened, 134 were excluded after screened for inclusion /exclusion criteria. Finally, 10 qualitative articles, 33 quantitative articles and 1 mixed-methods articles were included in final review.

Results

Researchers have conducted a systematic review of the 44 articles were selected and fulfilled inclusion criteria has been established. To aid interpretation, in Table 1 presents the characteristics of the study and findings by region and years of research. The research location is spread on four continents, the three articles in

Australia, 12 articles in the United States and Latin America, 14 articles in Europe, and 12 articles in Asia, as well as 3 other article is held by an institute and 2 different countries in Europe and America. Following this is a process flow diagram of selection of research articles:

Flowchart retrieval and selection of studies is presented in Figure 1.



No.	Author(s), year, Country	Research title	Research design	Instrument	Result	Quality
1.	Stokke et. al., 2014, Norwegian	Evidence based practice beliefs and implementation among nurses: A cross sectional stdy	Quantitative, cross sectional	Evidence-based Practice Belief Scale; Evidence-based Practice Implementation Scale	• Nurses have faith / belief positively to EBP but on the positive practice between belief and implementation of EBP. • Four subscales EBPB namely knowledge, resources, values EBP, and the difficulty and time has a moderate relationship with EBPI, where subscale knowledge occupy the highest correlation value.	Moderate
2.	Ammouri et. al., 2014, Oman	Knowledge, attitudes, practice and perceived barriers among nurses in Oman	Descriptive, cross sectional	24-item self-reported Evidence-Based Practice Questionnaire (EBPQ); Developing Evidence-Based Practice Questionnaire (DEBPQ)	• Nurses' years of experience reported an increase in the use of EBP, a more positive attitude towards EBP, and fewer barrier research. • There is a positive correlation between the old experiences, practices and attitudes. • Nurses with a Bachelor of Education reported less barrier than nurse diploma. • The main Barrier to develop EBP is the lack of time study, and the inadequacy of resources to changes in practice	Moderate
3.	Fairbrother et. al., 2014, Australia	Evidence based nursing and midwifery practice in a regional Australian healthcare setting: Behaviours, skills, and barriers	Descriptive	Developing Evidence-Based Practice Questionnaire (DEBPQ)	• Sources of knowledge of scientific evidence is low, with the rank outside the top 10 compared to the subjective and personal resources. The main barrier in reviewing the scientific evidence is access to and understanding of the research materials. Time becomes a major barrier in changing practice. • Colleagues nursing or nurse managers rated unfavorable changes in practice based on scientific evidence than medical personnel.	Moderate
4.	Hickman et.	EVITEACH: A study	Mixed	University wide	• Quantitative data were collected using the	Strong

	al., 2014, Australia	exploring ways to optimise the uptake of evidence-based practrice to undergraduate nurse	methods study	evaluation tool: materials, resources, teaching and workload; and Reflextive statements	instrument for 3 years (2008, 2009, 2010), obtained a significant increase of satisfaction on the subject, evaluation materials, and teaching EBP. • Reflective statements give a deeper understanding of the preconceptions of students to research and EBP. • There are four main themes: 1) practice what it involves undergraduate nurses in the learning process, 2) nursing undergraduate learning trajectory, 3) prejudice to the undergraduate nursing research and evidence-based practices, 4) appreciate the importance of research and evidence-based nursing	
5.	Wang et. al., 2013, China	Barriers to and facilitators of research utilization: A survey of registered nurses in China	Cross sectional	BARRIERS Scale; Facilitators Scale	• Three greatest facilitators are to strengthen managerial support, continuing education to improve the knowledge base and improve time to review and implement. • Another facilitator of cooperation in the use of patient research, create a panel to evaluate the research and funding. Factors that affect the barriers and facilitators in three tertiary level hospital in China are hospitals, educational background, research experience and knowledge of evidence-based nursing. • Barrier related subscale setting more influential than the other subscales. • Barrier biggest is the lack of authority followed by lack of time and language barriers. • Barrier additional patients were identified, namely the rejection of the use of research, lack of funds and lack of legal protection.	Strong
6.	Hussein et. al., 2013, Egypt	The attitudes and barriers towards evidence-based practice among nursing	Descriptive	Nursing educators' attitudes towards	• Average score total attitude of the nurse educator to EBP was 71.1 ± 9.6 where the average highest score in the statement that the application EBP improve	Strong

		educators		EBP (13 items); Perceptions of its related barriers questionnaire (22 items)	the outcomes of patient care, research findings are useful for the fulfillment of nursing practice daily, and EBP encourage patient-centered care (4.6, 4.2, 4.0). • A positive attitude towards EBP increased the level of further education, academic rank, length of experience, and role in research and teaching. • The average score total barrier against EBP organization higher than individual barrier to EBP (73.8 ± 16.8; 65.0 ± 24.1). • The average score highest individual barrier is ignorance of the method of use of electronic databases, the difficulty of evaluating the quality of research reports, and difficulty understanding statistical analysis (3.9, 3.5, 3.5). • While the average score of the lowest in the low EBP benefits for themselves and have no interest in reading the research report (2.5, 2.9). • The average score highest organizational barrier was found on the organization's budget limitations and the limited budget EBP training organizations to update the database (4.1, 4.0)	
7.	Majid et. al., 2011, Singapura	Adopting evidence-based practice in clinical decision-making nurses' perceptions, knowledge, and barriers	Survey questionnaire	Demographic information: attitudes toward and knowledge of EBP including motivators and barriers to adopt EBP; solicited responses related to information sources	• More than 64% of nurses showed positive attitudes toward EBP. Nurses reported that the heavy workload makes them unable to keep up to date with scientific evidence. • Self-efficacy on the ability of EBP, the nurse felt to have intermediate level skills. Nurses also felt that EBP training, time available, and mentoring by experienced nurses EBP will encourage them to implement the EBP. • In a literature search showed that nurses use basic search feature, and less than 25% of nurses familiar	Moderate

					with Boolean operators. • Three major barriers in adopting EBP is a lack of time, inability to understand statistical terms, and the inadequate understanding of the terms on the research article.	
8.	Maaskant et. al., 2012, Netherlands	Evidence-based practice: A survey among pediatric nurses and pediatricians	Survey	McColl Questionnaire and Barrier Scale	• Pediatric Nurses and pediatricians believe that EBP will improve the quality of care. • Scores of nurses and doctors' attitudes toward EBP is moderate to good. • 52% of nurses and 36% of physicians stated not know the source of information on the questionnaire. • Nurses have little understanding of the term EBP. • Barrier is the lack of time and knowledge.	Strong
9.	Eizenberg, 2010, Northern Israel	Implementation of evidence-based nursing practice: Nurse' personal and professional factors	Cross sectional survey	Self-report questionnaire: demographic data, attitudes towards research in nursing, sources of knowledge and barriers to EBNP implementation skills and work environment support, actual implementation of EBNP	• There was no relationship nursing background (age, sex, and place of work) and EBNP. • There is a relationship the nurse's role (managerial and nonmanajerial) and EBNP. • Nurses with high educational background can read and implement the findings of the research literature in practice. • EBNP more occurs in the workplace that provides computers and internet facilities. • The variable that appears as a predictor EBNP: education, skills determine the source of various research, organizational support, a source of knowledge based on colleagues and system procedures, knowledge based on professional literature, and knowledge based on experience / intuition.	Weak
10.	Adams & Barron, 2010, Iowa	Development and testing of an evidence-based practice questionnaire for school nurses	Descriptive	School Nurse Evidence-Based Practice Questionnaire	• An earlier version consisted of 91 items in 5 parts and after having tested psychometric questionnaire to 69 items in 6 parts. • Cronbach's alpha coefficient for each section	Moderate

				(SN-EBP)	ranging between 0.62-0.89. • Charging This instrument takes about 20 minutes. • Part 1 of the questionnaire are EBP (27 items), section 2 of the current practice (15 items), section 3 skills and the use of computers (23 items), section 4 resources (11 items), section 5 barrier implementation (15 items), and demographic information section 6 (15 items).	
11.	Martinez et. al., 2013, Spain	Development and validation of the competence in evidence-based practice questionnaire (EBP-COQ) among nursing students	Development, Validation and Psychometric test	Evidence-Based Practice Evaluation Competence Questionnaire (EBP-COQ)	• Psychometric test values obtained Cronbach's alpha 0.888. This questionnaire has adequate reliability for measuring competencies owned EBP undergraduate nursing students.	Moderate
12.	White-Williams et. al., 2013,	Use, knowledge, and attitudes toward evidence-based practice among nursing staff	Descriptive correlational analysis	Clinical Effectiveness and Evidence Based Practice Questionnaire (EBPQ)	• Generally, nurses (96%) reported that they were aware of the EBP. • Average score highest on the attitude subscale, followed by subscale knowledge / skills and practices.	Moderate
13.	Chang et. al., 2010, Taiwan	Implementing evidence-based practice in Taiwanese Nursing Homes	Descriptive	Attitudes toward EBP in nursing homes, Barriers to using research in practice	• Most nurses reported a positive attitude towards research and EBP. • Barrier most experienced is the inadequate authority to change practice, difficulty understanding the statistical analysis, and the perceived isolation from colleagues to discuss the research. • EBP facilitators include increasing access to computers and the Internet in the workplace, training more effective research, and collaboration with academic nurse.	Moderate
14.	Bostrom et. al., 2013, Sweden	Factors associated with evidence-based practice among registered nurses in	Cross sectional	RNs' individual characteristics and work contextual	• Breadth practice activities EBP: RN reported breadth high in formulating questions (19%), database search (19%), the search for other sources	Strong

		Sweden: A national cross-sectional study		factors from the Longitudinal Analyses of Nursing Education/Employment (LANE) survey (independent variable). 6 single items measure respondents' extension in practice of EBP (dependent variable).	(56%), compile information (31%), the implementation of knowledge (30%), and evaluation practice (34%). • Individual factors: capability relates to the entire extension EBP EBP activity. • Meanwhile, organizational factors related to the extension of activities EBP is working in elderly care, support leadership and collective effectiveness is high.	
15.	Dalheim et. al., 2012, Norway	Factors influencing the development of evidence-based practice among nurses: A self-report survey	Cross sectional	Developing Evidence-Based Practice (DEBP) questionnaire	• Nurses using experience-based knowledge into practice rather than scientific evidence from research journals. EBP skills affect the use of the resources of knowledge and how nurses assess barrier EBP • The Barrier is the lack of time to search for and review of the research literature	Moderate
16.	Belden et. al., 2012, United State	The effect of evidence-based practice on workplace empowerment of rural registered nurses	Cross sectional	Demographic data questionnaire, Evidence-based practice questionnaire, Psychological empowerment instrument	• There is a strong and positive relationship between the use of EBP and empowering workplace • The educational background is a variable konfonding for the entire EBP use and the level of perceived workplace empowerment	Strong
17.	Shafiei et. al., 2014, Iran	Nurses' perceptions of evidence-based practice: A quantitative study at a teaching hospital in Iran	Cross sectional	Evidence-Based Practice Questionnaire (EBPQ)	• The average total score EBP 4:48 ± 1:26 of 7 Likert scale. On average subscale practices, attitudes and knowledge of EBP is also currently on a score of 4 ie 4:58, 4:57, and 4:39.	Moderate

					• The strongest relationship occurs between knowledge and practice of EBP with a correlation value of 0.73.	
18.	Al Hadid et. al., 2011, Jordan	Validating a tool that explores factors influencing the adoption of principles of evidence-based practice	Descriptive, cross sectional	54 item Evidence-based nursing education questionnaire 4 stages of validation approach: literature review, thematic analysis of the literature, expert opinion, psychometric testing	• Valid and reliable instrument. Cronbach's alpha 0.926 and a correlation coefficient from .86 to .89. • There are five factors that affect the adoption of the principles of EBP in this questionnaire that knowledge in the principles of education, discovery and review of scientific evidence, the faculty practice, a change in strategy / educational practices, and the discovery and establishment of scientific evidence	Moderate
19.	Wilkinson et. al., 2012, Australia	Baseline evidence-based practice use, knowledge, and attitudes of Allied Health Professionals	Prospective online survey	26 item EBP self-efficacy 8 item EBP outcome expectancy 7 item EBP knowledge 8 item EBP use	• The average score attitudes and knowledge of EBP (EBP self-efficacy, outcome expectancy EBP and EBP knowledge) is higher than the use of EBP. • Scores in the group of occupational therapists and social workers is lower than the physiotherapist, psychological, and nutritionist and diet. • Opt EBP courses and training in the analysis and design studies positive impact on the score EBP construct.	Strong
20.	Al Hadid et. al., 2012, Jordan	Factors influencing the adoption of evidence-based principles in nursing education: A Jordanian perspective	Descriptive, cross sectional	24 item Evidence-based nursing education questionnaire	• Five factors that influence the adoption of EBP principles into practice perceived by nurse educators, ie knowledge on the principles of education, review the findings and evidence, the ability to find and review the evidence, changes in educational strategies / practices, and faculty practice.	Moderate
21.	Lavoie-	Implementation of	Case study	Interview-guided,	• There are two themes, namely 1) the context,	Strong

	Tremblay et. al., 2012, Canada	evidence-based practices in the context of a redevelopment project in Canadian Healthcare Organization	(individual, project, dan organization)	internal document, and administrative data	purpose and role, and the skills and attributes of the members of the Project Management Office (PMO); 2) successful implementation.	
22.	Mollon et. al., 2012, California	Staff practice, attitudes, and knowledge/skills regarding evidence-based practice before and after an educational intervention	Descriptive pre and postsurvey online education of EBP	Evidence-Based Practice Questionnaire (EBPQ) (Upton & Upton, 2006)	• There were no significant differences in practices, attitudes, and knowledge / skills of nurses after following the online education EBP. The main predictor of practices, attitudes, and knowledge / skills of nurses is a formal class EBP and registered nurse status.	Moderate
23.	DeBryun et. al., 2014, Colombian	Barriers and facilitators to evidence-based nursing in Colombia: Perspectives of nurse educators, nurse researchers and graduate students	Qualitative, descriptive	In-depth interview and semi-structured	• Barrier in EBN include lack of recognition of nursing as a profession that has autonomy, lack of incentives for nurses to continue their education or engaged in the research, the availability and use of limited scientific evidence of nursing, and lack of communication between academic and practical environment	Moderate
24.	Rospendowis ki et. al., 2014, Brazil	Cultural adaptation to Brazil and psychometric performance of the "Evidence-Based Practice Questionnaire"	Instrument validation	Evidence-Based Practice Questionnaire	• Internal high consistency with Cronbach's alpha value of 0.92 and a high stability, namely the ICC of 0.90. • Assessment of construct validity showed that on average each domain and the total EBPQ group 1 (master / doctorate) was significantly higher compared with group 1 (undergraduate). • EBPQ is a valid instrument and stable.	Moderate
25.	Branham et. al., 2014, Texas USA	Lost in translation: The acute care nurse practitioners' use of evidence-based practice: A qualitative study	Phenomenolo gy	Interview	• Nurse practitioners acute care strongly supports the use of EBP and feel the benefits of using EBP in practice. • There are four factors that alleviate EBP factors beyond the constraints and balance, believe it or not believe it, the balance of clinical knowledge and scientific evidence, and patient-centered factors.	Strong

26.	Perez-Campos et. al., 2014, Spain	Knowledge, attitude and use of evidence-based practice among nurses active on the internet	Descriptive, cross sectional	Evidence-Based Practice Questionnaire (EBPQ); Practice Environment Scale of the Nursing Work Index (PES-NWI)	• The average score is 5.02 EBPQ total of 7 (moderate). • Variables related to the competence of EBP is the academic level, professional category, the country of employment, perceptions of environmental practices, and research activity. • Environmental practices perceived as a negative influence on the implementation of EBP.	Moderate
27.	Gerrish & Cooke, 2013, South Yorkshire	Factors influencing evidence-based practice among community nurses	Survey	Questionnaire	• Sources of knowledge that is used to inform practice derived from journal articles, textbooks, internet and pharmaceutical literature still less frequency. • Barrier the nurses in assessing and reviewing the scientific evidence-based information is the time and skills of assessing the quality of information.	Moderate
28.	Olfati et. al., 2011, Iran	Factors influencing evidence-based practice by Iranian general practitioners	Desvriptive	Questionnaire from Estrabrooks et al.	• Most of the respondents positively regard to the use of scientific evidence / research. • Average score of attitudes was 25.3. • The lack of facilities and resources, low authority to change practices, expectations of an increase in the duration of patient visits, poor access to research information is a major barrier EBP.	Weak
29.	Nakamura et. al., 2011, Hawai USA	Knowledge of and attitudes towards evidence-based practices in community child mental health practitioners	Exploration analysis	Knowledge of Evidence Based Services Questionnaire, EBPAS_Modified Practice Attitude Scale, Therapist Background Questionnaire (TBQ)	• Knowledge and attitudes related to the EBP general level continuing education of practitioners, a practice, and license status. • Lack of knowledge of EBP associated with a negative attitude.	Moderate
30.	Foo et. al., 2011,	Nurses' perception of evidence-based practice at	Instrument survey	Questionnaires were extracted	• Nurses generally give a positive opinion for the EBP though they need to digest and understand it.	Strong

	Singapura	the National University Hospital of Singapore		and adapted from questionnaires provided. Content validity by experts, internal consistency reliability (Cronbach's alpha 0,691 dan 0,954)	• Nurses assess themselves on average medium in displaying EBP activity. • Nurses identified six important factors for the adoption of EBP in the workplace: training, time available, EBP mentoring by experienced nurses, nurse managers who receive EBP, access to literature search system, and nursing colleagues who embrace EBP. • The nurse also assesses seven areas / topics of training, including the identification of clinical issues for implementation of EBP, EBP understanding of the constitution and implementation of the recommendations in practice. • The main Barrier in EBP is the time that is difficult to obtain a search and read the article / report in the workplace. Lack of time to implement changes to current practices in the workplace; difficulty assessing the quality of research articles; Inadequate understanding of the term in a research article; insufficiency of resources; inability to interpret the results appropriately; difficulties in determining the application of research results; inability to implement the recommendations of research to clinical practice	
31.	Grant et. al., 2012, California	Evidence-based practice for staff nurses	EBP projects and follow up	Quantitative evaluation of the pre-workshop and post-workshop qualitative	• Evaluation of the project is positive. • Workshop can raise awareness of the EBP, EBP overcome the main barrier is the lack of awareness or knowledge. • The workshop can also help participants to identify and implement projects of small and convenient to change / update the practices in their units.	Strong
32.	Yackel et. al., 2013,	Improving the adoption of evidence-based practice	Project with pre-posttest	The Organizational	• EBP Program successfully improve organizational culture and readiness.	Strong

	Virginia USA	among nurses in army outpatient medical treatment facilities	design	Culture and Readiness for System-wide Integration of Evidence-based Practice (OCRSIEP), Nursing Culture Assessment Tool (NCAT), EBP Beliefs (EBPB), dan EBP Implementation (EBPI)	• The nursing staff believe in the values of EBP and able to implement it.	
33.	Berland et. al., 2012, Norway	Evidence-based practice in primary care-An explorative study of nurse practitioners in Norway	Qualitative exploration	Focus group interview	• Investigation of EBP in primary care nurses gained against 20 of the main themes underpinning decisions is a base for nursing practice in primary care, as well as four themes, namely research, theoretical knowledge, clinical experience and patient participation. • Most nurses use their knowledge, knowledge of colleagues, the knowledge acquired during nursing education, nursing literature, and the guidance of experts, but rarely apply the results of these studies.	Strong
34.	Rudman et. al., 2012, Sweden	Registered nurses' evidence-based practice: A longitudinal study of the first five years after graduation	Cohort	The self-reported practice of EBP (six items)	• There is stability throughout the first five years after graduation on sustainability in practice EBP. • There is a wide variation in practice sustainability every component EBP, from irregular to regular.	Strong
35.	Hung et. al., 2015, Taiwan	Current state of evidence-based practice education for undergraduate nursing students in Taiwan: A questionnaire study	Descriptive	A self-developed questionnaire comprised 26 items that were intended to	• Of the 21 nursing schools that participated, 18 schools have implemented EBP education into the curriculum. • Among those schools, 22.2% carry out independent EBP courses, 50% include the concept of EBP into	Moderate

				explore EBP curriculum design (8 items), teaching resources (5 items), course evaluation (5items), qualification of teachers (4 items), and obstacles to EBP education (4 items)	other courses, and the rest combine both types of courses EBP. • Various strategies were implemented to teach EBP. Less than 35% have been designing or adopting instructional materials, standardized and objective evaluation of student learning. 39% of teachers who teach EBP EBP did not receive training. • The main obstacle is the low qualification to teach EBP teachers and limited opportunities to engage students in EBP application.	
36.	Upton et. al., 2015, United State and United Kingdom	The evidence-based practice profiles of academic and clinical staff involved in pre-registration nursing students' education: A cross sectional survey of US and UK staff	A cross-sectional online survey	Evidence-Based Practice Questionnaire (EBPQ), open-ended questions about EBP barriers, facilitators and successes	• Quantitative results showed that academic scores significantly higher on the knowledge and skills of EBP compared clinician, but there was no significant difference in usage or attitudes EBP among both US and UK staff. • Qualitative findings identify key themes related to EBP barriers and facilitators that evidence, organizational, and teaching-related issues. • Overview of success in implementation and teaching EBP are in wide ranges	Strong
37.	Brooke et. al., 2015, English and Slovenia	Student nurse perceptions on evidence-based practice and research: An exploratory research study involving students from the University of Greenwich, England and the Faculty of Health Care Jesenice, Slovenia	Phenomenology and analysed using Interpretative Phenomenological Analysis (IPA) including the three concepts of phenomenolo	Focus group discussion	• Four themes emerged related to students 'perception of EBP and research, namely 1) Provided confidence, knowledge and empowerment in clinical practice, 2) vital for improvements in patient care and safety, 3) students' responsibility to develop nursing as a profession, and 4) realities of research in clinical practice.	Strong

			gy, hermeneutics, and idiographic			
38.	Rapp et. al., 2010, Midwestern state	Barriers to evidence-based practice implementation: Results of a qualitative study	Qualitative	Observation, notes	• Category thematic a barrier in implementing EBP is the behavior of the front-line supervisors, front-line practitioner behavior, the behavior of other professional staff, the involvement of external stakeholders, and funding. • The most significant obstacle comes from the behavior of supervisors, practitioners and other professional staff. • Lack of synergy hamper implementation.	Moderate
39.	Llasus et. al., 2014, Arizona, California, Nevada, and Utah	Graduating baccalaureate students' evidence-based practice knowledge, readiness, and implementation	A descriptive, correlational, cross-sectional survey design	Stevens' Academic Center for Evidence-Based Practice—Evidence-Based Practice Readiness Inventory (ACE-ERI) Knowledge Test. The EBP Implementation Scale (EBPI). The ACE-ERI demographic questionnaire.	• Scores of students' knowledge about EBP is low, as is the involvement in the practice of EBP implementation. • However, the student's confidence in the readiness of EBP. • Readiness EBP is a significant mediator between knowledge and involvement in the implementation of EBP practice.	Moderate
40.	Irwin et. al., 2013, Institute for Evidence-Based Practice	The experience of implementing evidence-based practice change: A qualitative analysis	Qualitative	Narrative verbatim and observations during the process of implementation	• There are four main themes: 1) implementation of key actions, 2) critical success factors, 3) Difficulties and frustations, and 4) the process of discovery. • Key to the implementation of EBP include	Strong

	Change (IEBPC)			of EBP project	educational activities, marketing, recognition and incentives, the development of implementation tools, and obtain approval Instituonal Review Board (IRB). • EBP implementation success factors are time, support, teamwork and involvement, communication, planning, and focused retain / maintain. • Things become difficult and frustrating is the practice of the invention, the invention of one another, sparking a spirit of inquiry, empowerment through the evidence, and the challenge of maintaining the changes	
41.	Chang et. al., 2013, Taiwan	Exploring attitudes and barriers toward the use of evidence-based nursing among nurse managers in Taiwanese residential aged care facilities	Qualitative	In-depth interview	• Nurse managers in Residential Aged Care Facilities (RACFs) can carry out an important role in creating a climate of institutional strengthening and promoting the use of research findings into practice. • Most nurse managers express a positive attitude towards research and EBP but little experience in implementation. • Nurse managers need to provide access to technology, training and educational support, membership in the clinical governance committee, and the availability of time on this activity. • The main Barrier in EBP include a lack of motivation and confidence, difficulty understanding research articles and findings, lack of funds and time, workplace culture, and feel a lack of authority.	Strong
42.	Sari et. al., 2012, Turkey	Research activities and perceptions of barriers to research utilization amongTurkish nurses	Descriptive, cross sectional	The BARRIERS Scale (29 items), a self-administered questionnaire	• Nearly half of the participants (48.5%) following the academic conference two years ago. Participants generally do not publish research articles (90.5%) and 23.4% tdak ever read research articles. • 7 item on the subscale setting occupy the top 10	Strong

					barrier. • Five top barriers obtained namely the inadequate facilities, lack of relevant literature, lack of awareness of the research, the lack of cooperation by the doctor in the implementation of research findings, and lack of time to read the research report.	
43.	Butler et. al., 2011, Tennessee	Nurse practitioners and evidence-based nursing practice	Decriptive exploration	The Evidence-Based Practice Beliefs Scale (EBPB); The Evidence-Based Practice Implementation (EBPI, 18 item)	• Respondents reported positive beliefs and attitudes towards EBNP, critics believe that the important scientific evidence and the use of EBP guidelines improve patient care. • However, respondents did not implement EBNP actively and they do not know how to identify, measure, and evaluate the results of clinical care or how to establish a clinical research question.	Strong
44.	Forsman et. al., 2012, Sweden	Nursing students' intentions to use research as a predictor of use one year post graduation: A prospective study	Follow-up study	A 25-page questionnaire	• 34% of student's nurses plan to use the research in more than half or nearly every shift they work on clinical practice in the future. • Intention showed a direct effect on the usage behavior research. • Indirect effects on pengggunaan research capabilities demonstrated by the perceived attitude and support for research use (campus and clinical education), where the intention to act as a mediating factor to these effects.	Strong

Discussion

The knowledge and skills about EBP

The reviewed studies reported low to moderate nurses' knowledge and skills of nurses towards EBP. Rn et al. (2012) reported that nurses have little understanding of the term EBP. Nevertheless the average score of nurses' knowledge of EBP is higher than the use of EBP (Wilkinson, Hinchliffe, Hough, & Mphysio, n.d.) (Wilkinson et al, 2012). The nurse's knowledge about EBP is very important so that the nurses can practice the use of EBP well. Brooke, Hvali, & Skela-savi (2015) phenomenological study on nursing students' perceptions using focus group discussion reported the need to instill confidence, knowledge, and empowerment to clinical practice.

Nurses' knowledge about EBP was found to be influenced by their job designation. Upton, Scurlock-evans, Williamson, Rouse, & Upton (2015) scored the knowledge and skills of nurses EBP academics higher than nurse clinicians significantly. In addition to job designation, education also influence nurses' EBP skills. Eizenberg (2010) reported that nurses with high educational background have the ability to read research literature and implement it into nursing practice. Boström, Rudman, Ehrenberg, Gustavsson, & Wallin (2013) reported that only 19% of the registered nurses can formulate research questions and search database

In studies looking at nurses' perception, knowledge and barrier in adopting EBP in clinical decision, nurses feel they have intermediate level for EBP skills (Majid et al., 2011). It was found that less than 25% of the nurses know about operators Boolean as a search feature in literature search.

Attitudes about EBP

The majority of studies reported that nurses have positive attitude towards EBP and use research in practice (Stokke, Olsen, Espehaug, & Nortvedt, 2014; Ammouri et al., 2014; Hussein & Hussein, 2013; Majid et al., 2011; Rn et al., 2012; White-Williams et al., 2013; Chang, Russell, & Jones, 2010; Wilkinson et al., n.d.; Butler, 2011) (Chang et al., 2013). Hussein & Hussein (2013) stated that the nurse regarded EBP applications to improve outcomes, and patient care. The

research findings are useful in accomplishment of quality nursing practice and EBP encourage patient-centered care. It is also consistent with research Rn et al. (2012) who reported that caregivers for children and pediatricians believe EBP will improve quality of care.

The increased in positive attitude is in line with the increase in the level of education, and research rankings. Ammouri et al. (2014) reported that nurses with many years of experience have increased the use of EBP, have a more positive attitude towards EBP, and less likely to experience barriers in research. They also reported positive correlation between nurses' experiences, and nurses' practices and attitudes toward EBP.

Constraints / barrier

Barrier encountered in implementing EBP nurse arises from nurses' characteristics, nurses' culture, facilities, environmental and organizations i.e. working place. Hussein & Hussein (2013) reported that the average total score is higher than the organizational constraints barriers of individual to EBP. Based on studies reviewed, most obstacles encountered are due to heavy workload leading to lack of time both in changing practice based EBP, and in seeking, reading and reviewing the literature (Ammouri et al., 2014; Fairbrother et al., 2014; Wang, Jiang, Wang, Wang, & Bai, 2013; Majid et al., 2011; Rn et al., 2012; Dalheim, Harthug, Nilsen, & Nortvedt, 2012; Foo, Majid, & Mokhtar, 2011; Chang et al., 2013; Sari, Turgay, Genc, & Bozkurt, 2012).

Irwin, Bergman, & Richards (2013) used a qualitative approach to explore the nurses' experience implementing EBP project. They reported factors that included time, support, teamwork and involvement, communication, planning and focus. The themes identified included: difficulties and frustrating obtained discovery practice, the discovery of one another, sparking a spirit of inquiry, empowerment through scientific evidence, and the challenge of maintaining the changes.

Constraints of the individual against EBP include ignorance of how to search and use the electronic databases. It is difficult to evaluate the quality of research reports (Hussein & Hussein, 2013; Foo et al., 2011), difficulty in understanding

analysis and statistical terms (Hussein & Hussein, 2013; Majid et al., 2011; Chang et al., 2010; Foo et al., 2011; Chang et al., 2013), the inadequate understanding of the terms on the research article (Majid et al., 2011; Foo et al., 2011), difficulties in determining application of research results and implement the research recommendations in practice (Foo et al., 2011), as well as lack of motivation and confidence (Chang et al., 2013). Fairbrother et al. (2014) reported that the main obstacle in the review of scientific evidence is a barrier to access and understanding of the research materials.

Qualitative research conducted by Rapp, Doug, Callaghan, & Holter (2010) to explore the constraints in implementing EBP obtained five thematic categories, namely: the behavior of the front-line supervisors, front-line practitioner behavior, the behavior of other professional staff, the involvement of external stakeholders, and funding. The lack of synergy between the individual and their behavior may hinder the implementation of EBP. Problems funds are also reported as a barrier in the use of research in clinical practice (Wang et al., 2013), where limited funds organization devoted to providing training EBP and update the database (Hussein & Hussein, 2013), as well as the lack of incentives for nurses to continue education or engaged in research (DeBryun et al., 2014).

Sari et al. (2012) reported a perception barrier against the use of research by nurses Turkey and found that 7 item on the subscale setting occupy the top 10 barrier. The same was found in Wang et al. (2013) study that reported barrier on a subscale setting which more influential than some other subscales. The biggest barrier is the lack of authority / authorities (Wang et al., 2013; Chang et al., 2010; Mollon et al., 2012) as well as the language barrier (Wang et al., 2013) due to the plethora of research articles in English, especially for the country where English is not a primary language. Besides refusal of patients to use research and the lack of legal protection in the implementation of EBP was also identified as a barrier (Wang et al., 2013).

The organisational's support has a significant role in the implementation of EBP. This is supported by Eizenberg (2010) who reported that one of the variables that emerged as a predictor EBNP is the support from organization. This seems to

indicate for EBNP to occur more frequently in the workplace, computer and internet facilities should be available.

Workplace environments such as peer support and communication also enable the implementation of EBP. Foo et al. (2011) study identified six factors critical to the adoption of EBP in the workplace including EBP mentoring by experienced nurses and nursing colleagues who appreciate EBP. DeBryun et al. (2014) reported one of the barriers in EBP is the lack of communication between academic and practical environment.

Instruments

Instruments used in research on EBP diverse and used in accordance with the purpose of research. Table 2 presents an instrument that is used to find out about the knowledge, skills, attitudes, usage and barrier EBP.

Table 2. Variety of EBP's research instruments

Instrument	**Study**
Evidence-based Practice Belief Scale (n=3)	Stokke et al., 2014 Yackel et al., 2013 Butler et al., 2011
Evidence-based Practice Implementation Scale (n=4)	Stokke et al., 2014 Yackel et al., 2013 Llasus et al., 2014 Butler et al., 2011
24-item self-reported Evidence-Based Practice Questionnaire (EBPQ) (n=8)	Ammouri et al., 2014 White-Williams et al., 2013 Belden et al., 2012 Shafiei et al., 2014 Mollon et al., 2012 Rospendowiski et al., 2014 Perez-Campos et al., 2014 Upton et al., 2015
Developing Evidence-Based Practice Questionnaire (DEBPQ) (n=3)	Ammouri et al., 2014 Fairbrother et al., 2014 Dalheim et al., 2012
BARRIERS Scale (n=3)	Wang et al., 2013 Maaskant et al., 2012 Sari et al., 2012
Facilitators Scale (n=1)	Wang et al., 2013
McColl Questionnaire (n=1)	Maaskant et al., 2012
School Nurse Evidence-Based Practice Questionnaire (SN-EBP) (n=1)	Adams & Barron, 2010
Clinical Effectiveness (n=1)	White-Williams et al., 2013
24 item Evidence-based nursing education questionnaire	Al Hadid et al., 2011

n=1)	
Practice Environment Scale of the Nursing Work Index (PES-NWI) (n=1)	Perez-Campos et al., 2014
Knowledge of Evidence Based Services Questionnaire	Nakamura et al., 2011
Nursing educators' attituteds towards EBP (13 items) (n=1)	Hussein et al., 2013
Perceptions of its related barriers questionnaire (22 items) (n=1)	Hussein et al., 2013
The Organizational Culture and Readiness for System-wide Integration of Evidence-based Practice (OCRSIEP) (n=1)	Yackel et al., 2013
Nursing Culture Assessment Tool (NCAT) (n=1)	Yackel et al., 2013
Evidence-Based Practice Evaluation Competence Questionnaire (EBP-COQ) (n=1)	Martinez et al., 2013
University wide evaluation tool (n=1)	Hickman et al., 2014
Reflextive statements (n=1)	Hickman et al., 2014
Attitudes toward and knowledge of EBP including motivators and barriers to adopt EBP (n=1)	Majid et al., 2011
Solicited responses related to information sources (n=1)	Majid et al., 2011
Self-report questionnaire: demographic data, attitudes towards research in nursing, sources of knowledge and barriers to EBNP implementation skills and work environment support, actual implementation of EBNP (n=1)	Eizenberg, 2010
RNs' individual characteristics and work contextual factors from the Longitudinal Analyses of NursingEducation/Employment (LANE) survey (n=1)	Bostrom et al., 2013
54 items Evidence-based nursing education questionnaire (n=1)	Al Hadid et al., 2011
The self-reported practice of EBP (6 items) (n=1)	Rudman et al., 2012
A self-developed questionnaire comprised 26 items that were intended to explore EBP curriculum design (8 items), teaching resources (5 items), course evaluation (5 items), qualification of teachers (4 items), and obstacles to EBP education (4 items) (n=1)	Hung et al., 2015
Attitudes toward EBP in nursing homes (n=1)	Chang et al., 2010
Barriers to using research in practice (n=1)	Chang et al., 2010
Psychological empowerment instrument (n=1)	Belden et al., 2012
Open-ended questions about EBP barriers, facilitators and successes (n=1)	Upton et al., 2015
Stevens' Academic Center for Evidence-Based Practice—Evidence-Based Practice Readiness Inventory (ACE-ERI) Knowledge Test (n=1)	Llasus et al., 2014
A 25-page questionnaire (n=1)	Forsman, et al., 2012

From the table above it is known that the instrument, a 24-item self-reported Evidence-Based Practice Questionnaire (EBPQ) is predominately being used in the study to identify nurses' knowledge / skills, attitudes, and practices of EBP (n = 8).

Intervention

There are two studies that are pre-post intervention study (Mollon et al 2012, Grant, Hanson, & Johnson, 2012). Mollon et al. (2012) reported that there were no significant differences in practices, attitudes, and knowledge / skills of nurses after following the online education about EBP. The major predictors for nurses' practices, attitudes and knowledge include formal class about EBP and the registered nurse status. This is congruent with Grant et al. (2012) study that reported that the workshop EBP is able to raise awareness of and address the main barrier is the lack of awareness and knowledge. Besides the workshop is also capable to help participants in identifying and implementing small projects on EBP to change practices in their work units.

Conclusions and recommendations

Based on the results of the study it can be concluded that a large proportion of nurses have low to moderate knowledge / skills about EBP. However, most nurses have a positive attitude and intention to implement EBP in clinical practice in the future. The practice of EBP in the work unit nurses perceived by various constraints, which is usually due to time constraints because of a heavy workload leading to difficulties in finding, reading and reviewing research literature. The characteristics / background of the nurse determines the ability of nurses to access and use the search feature in the research database. Besides the characteristics and the support of institutions is also very important in improving the knowledge, attitude and practice of EBP by nurses.

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