

The Effect of Different Learning Strategies on Nursing Students' Knowledge and Attitudes Towards the Use of Evidence-Based Practice: A Systematic Review

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To cite this article

Naji Alqahtani. The Effect of Different Learning Strategies on Nursing Students' Knowledge and Attitudes Towards the Use of Evidence-Based Practice: A Systematic Review. *International Journal of Nursing and Health Science*. Vol. 2, No. 6, 2015, pp. 83-90.

Abstract

Evidence-based practice (EBP) is a way to change healthcare practice worldwide. Systematic research in the relevant literature was conducted using the Medline, CINAHL, and Web of Science from 2005 until October 2015. Five studies were included in the review. Five primary quantitative research studies on integrating learning strategies and its effect on nursing student's knowledge and attitudes. Four studies were a quasi-experimental studies and one was a cross-sectional study. This review supports that different EBP learning strategies improved nursing students' knowledge towards the use of EBP. However, the effect of different learning strategies on nursing students' attitudes requires further studies.

Keywords

Evidence-Based Practice, Nursing Education, Knowledge, Attitudes, Learning Strategies

1. Background

The demand of evidence-based practice (EBP) has been increasing in health care after the Institute of Medicine (IOM) mandated in 2003 that "all health professionals be educated to deliver patient-centered care as members of the interdisciplinary team, emphasizing evidence-based practice (EBP), quality improvement approaches, and informatics" (p. 3) [14]. EBP has grown to influence health care practices worldwide and affects the quality of health care outcomes [4]. Health care providers are expected to base their decisions making processes on EBP [14]. Nursing, as part of the interdisciplinary team, is similarly expected to employ EBP. However, nursing is only now beginning to integrate EBP into practice [27].

Nursing is challenged to meet the demand of using EBP. Nurse education programs are responsible for preparing nurses to fulfill this need and to engage future nurses in EBP [20]. In doing so, nursing education programs have grown to include EBP education in their core curricula. Consequently, different learning strategies exist in order to educate nursing

students about the use of EBP and its implementation. What is not known, however, is how these different learning strategies impact the knowledge and attitudes of nursing students toward the use of EBP. To answer this question, this systematic review will identify and examine research studies that examine the effectiveness of different learning strategies on nursing students' knowledge and attitudes toward the use of EBP. The studies will be critically analyzed in terms of their findings and appraised accordingly, with recommendations for educational practice and future research offered.

EBP is a worldwide trend to influence health care practice according to the best available evidence. EBP is a result of combining best research findings with clinical knowledge and patients' beliefs and values [26], [31]. Studies show that EBP improves nursing practice and patient outcomes [10], [34]. In order for nursing education programs to increase the use of EBP among their students, they must develop appropriate learning strategies. Learning strategies are educational plans of actions taking by nursing educators to achieve learning goals [36].

Baccalaureate-level nursing students are the future of nursing. Baccalaureate nursing students are anticipated to use

EBP in their clinical practice while learning and after they graduate [6], [7]. Nursing students are expected to engage in the EBP process by asking questions and finding, appraising, and applying research findings [6], [9]. Studies have demonstrated that nursing students tend to have negative and weak clinical decision-making skills [21], [22]. In addition, the American Association of Colleges of Nursing (AACN) recommends that EBP is an important competency for new BSN students [1]. However, the literature indicates that EBP does not feature prominently in the curricula of nursing baccalaureate programs and that nursing students are usually take traditional research classes that focus on producing evidence rather than how to apply such evidences [6], [8], [11]. Consequently, students' use of EBP in their clinical practicum is limited and it is argued that the nursing faculty members should incorporate EBP throughout the curriculum [8], [9]. Conversely, another study showed that nursing students were moderately confident in applying EBP in their practice [20].

Little is known about nursing students' knowledge and attitudes with respect to EBP, or their ability to integrate research findings into practice during clinical practicums or post-graduate practice. Knowledge is the sum of a person's understanding, experience, and awareness of facts, information, and skills [19]. Attitudes are a person's feelings about something [2]. Knowledge and attitudes toward EBP and its use can be measured using reliable and valid measurement tools, such as Knowledge, attitudes, and behavior questionnaire for EBP (KAB) [17]. In this systematic review, nursing students are defined as students who are in a program to earn a baccalaureate degree in nursing. Baccalaureate-nursing students were chosen as the IOM recommended that 80% of nurses in United States should hold at least a baccalaureate in nursing (BSN) by the year of 2020 [15].

The objective of this systematic review is to summarize and explore the effect of different learning strategies on nursing students' knowledge and attitudes toward the use of EBP.

2. Methods

2.1. Search Strategy

On October 3rd, 2015, a systematically searched of three

databases, Medline, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Web of Science was conducted for quantitative studies published between January 2005 and October 2015. This time period was chosen because of IOM mandated in 2003 EBP be incorporated into practice. The search was limited to the English language. Key terms included were nursing students, nursing education, attitudes, evidence-based practice, and evidence-based nursing. Zotero citation management software from Roy Rosenzweig Center for Health and New Media [29] was used to manage and remove duplicate studies (see Figure 1).

2.2. Inclusion and Exclusion Criteria

After removing duplicates, studies were screened according to set inclusion and exclusion criteria. Quantitative studies or the quantitative portion of mixed methods studies were included. Studies were included with subjects comprised of nursing students in a nursing baccalaureate program who have attended a minimum of one semester. Studies with the following outcomes were included: knowledge, attitude, or experience toward the use of EBP. Qualitative studies, systematic reviews, and meta-analyses were excluded. Studies used nurses or staff and students of other health care professionals as subjects were also excluded.

2.3. Grading Criteria

The strength and quality of eligible studies were graded based on John Hopkins Nursing Evidence-based Practice (JHNEBP) grading scale [25]. For strength of evidence, studies that are experiment, randomized controlled trial (RCT), or meta analysis of RCT were graded as level I. Level II was for quasi-experimental studies. Studies that are non-experimental, qualitative, or meta-synthesis were graded level III. The quality of the studies was measured according to JHNEBP based on result consistency, sufficiency sample size, control adequacy, and conclusion definitively, and recommendations consistency. For evidence quality grade of A indicated high quality, B for good quality and C for low quality [25]. Table 1 provides the grade for level and quality for each included study.

Table 1. Review matrix. *Level and quality of evidence (I = RCT, II = quasi-experimental, III = cross-sectional or non experimental), (A = high quality, B = good quality, C = low quality).

Authors (Year)	Design & Purpose	Sample & Setting	Intervention & Instruments	Finding & Conclusion	Grading*
Kim et al. (2009)	Design: A quasi-experimental, controlled, pre- and post-test study. Purpose: "to evaluate the effectiveness of the (E-FIT) strategy; the main objectives are to compare the knowledge, attitudes, use and future use of EBP between the experimental and control groups and to determine the strength of E-FIT intervention as a	Sample: A convenience sample of 233 senior baccalaureate-nursing students. Most of the participants in both groups were between 20-29 years. Setting: two universities in southern California in United States.	Interventions: EBP-focused interactive teaching intervention included three phases. Phase 1: problem identification and evidence synthesis. Phase 2: implementation strategy. Phase 3: dissemination. Instrument: Researchers designed EBP-focused interactive teaching (E-FIT) to measure knowledge; (KAB) was used to measure students attitudes and behavior [17].	Attitude: Not statically significance difference in attitude toward the use of EBP between two groups. Knowledge: There is a statically significance difference ($P = 0.001$) in post-test nursing students knowledge. EBP use: There is a statically significance difference ($P = 0.015$) in post-test nursing students toward the use of EBP.	II B

Authors (Year)	Design & Purpose	Sample & Setting	Intervention & Instruments	Finding & Conclusion	Grading*
Oh et al. (2010)	<p>predictor variable for the knowledge, attitudes, use and future use of EBP." (p. 1219).</p> <p>Design: A quasi-experimental pretest-posttest study design.</p> <p>Purpose: "To examine the effects of integrating EBP into clinical practicum on EBP efficacy and barriers to research utilization among Korean RN-to-BSN students" (p. 388).</p>	<p>Sample: A convenience sample of 81 Korean RN-to-BSN nursing students in their second semester of first year at nursing school and completed a research course. The average age was 25.6 years.</p> <p>Setting: Nursing school and five tertiary hospitals in Korea.</p>	<p>Interventions: EBP clinical practicum that incorporate two sessions about EBP to improve students' competencies regarding EBP knowledge, skills and attitudes. The two sessions were provided in the middle of the semester and at the end of semester; each session was held for three full days.</p> <p>Instrument: Researchers structured tools and questionnaires, for efficacy toward EBP, barriers scale for research utilization, and demographic data.</p>	<p>Pre EBP clinical practicum students scored in an overall mean 2.30 where 1 indicates not confident at all and 4 very confident. Students were little confident. Post EBP clinical practicum students scored of an overall mean 3.05 that indicate that the students' confidence levels were increased. $P < 0.05$ for all scales that all related to knowledge in using EBP. In conclusion, the student knowledge was statically significance.</p> <p>Students' experiences of educational support for research utilization: students experienced higher support in campus education compared to clinical education. $P < 0.001$ in all three subscales measuring the educational support in campus education. This means that there is a large significance difference between the 26 universities.</p>	II B
Florin et al. (2011)	<p>Design: Cross-sectional survey design. The researchers used self-administrated postal questionnaires.</p> <p>Purpose: "To investigate Swedish university nursing students' experience of educational support for research utilization and capability beliefs regarding evidence-based practice skills." (p.890)</p>	<p>Sample: A national sample 2107 of nursing students who were in their last semester of undergraduate nursing education. The average age was 30 years.</p> <p>Setting: 26 universities in Sweden.</p>	<p>Interventions: Self-administered postal questionnaires for educational support for EBP provided by different universities.</p> <p>Instrument: Questionnaire from Longitudinal Analyses of Nurses Education/Entry in working life (LANE) [30].</p>	<p>Capability beliefs regarding EBP skills: significance was found in most of subscales except participating in implementation of research-based knowledge in practice and participating in evaluating if practice reflects current research-based knowledge that showed no statistically significance.</p> <p>Results showed that there is a moderate correlation between educational support of research utilization and capability beliefs regarding EBP skills.</p>	III B
Jalali-Nia et al. (2011)	<p>Design: A quasi-experimental post-test study design.</p> <p>Purpose: To investigate and assess the impact of EBP on nursing students knowledge and attitudes. And to compare students knowledge who received EBP education and traditional approach teaching</p>	<p>Sample: A convenience sample of 41-second year baccalaureate Iranian nursing students.</p> <p>Setting: a university in Iran.</p>	<p>Interventions:</p> <p>Phase 1: Training for educators regarding EBP approach to education.</p> <p>Phase 2: One-day workshop for intervention group about the principles of EBP.</p> <p>Phase 3: two medical-surgical courses were taught simultaneously for 12 weeks during the semester.</p> <p>Phase 4: Evaluation of nursing students' final grades.</p> <p>Instrument: Researchers developed five questionnaires to measure and assess knowledge and attitude.</p>	<p>Attitude: There was a statistically significant difference between the two groups' attitude ($P=0.000$).</p> <p>Knowledge: There was no statistically significant difference between the average scores of knowledge between two groups.</p>	II C
Zhang et al. (2012)	<p>Design: A quasi-experimental design with a one-group. Pre-post interventions survey.</p> <p>Purpose: "to evaluate the effectiveness of an</p>	<p>Sample: A convenient sample 85 senior undergraduate nursing students. Age is from 20-23 years.</p> <p>Setting: A hospital in</p>	<p>Interventions:</p> <p>Phase 1: SDL process for EBP basics.</p> <p>Phase 2: Workshop for critical appraisal of literature.</p> <p>Instrument:</p>	<p>Pre-interventions: 10.7% had training in EBP, 12% had EBP experience.</p> <p>Pre-interventions: Mean: Knowledge: 11.51.</p> <p>Attitudes: 35.67.</p>	II C

Authors (Year)	Design & Purpose	Sample & Setting	Intervention & Instruments	Finding & Conclusion	Grading*
	educational program on the knowledge, attitudes and beliefs, and behavior of EBP in undergraduate nursing students as well as to promote independent learning and cooperative abilities through self-directed learning (SDL) and workshop learning strategies" (p. 571)	China.	Knowledge, attitudes, and behavior questionnaire for EBP (KAB) questionnaire for EBP [17].	Behavior: 10.99. Post Interventions: Mean: Knowledge: 17.11. Attitudes: 38.99. Behavior: 15.32. There is Statistically significant differences on nursing students attitudes and knowledge when using learning strategies through SDL and workshop.	

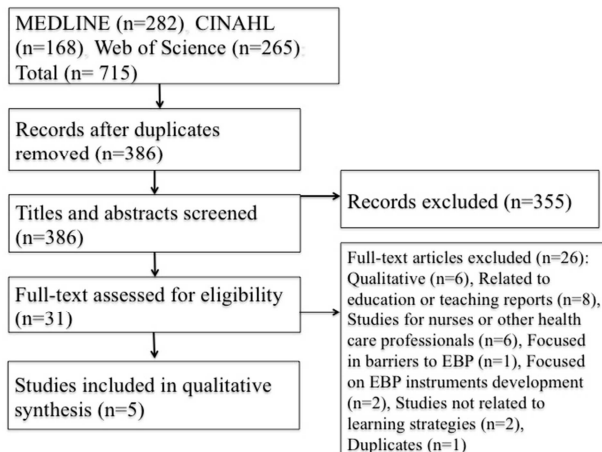


Fig. 1. Flow diagram of search strategy adopted from PRISMA.

3. Results

3.1. Search Results

The search of the three databases revealed 715 articles (see Figure 1). After removing duplicates, I screened titles and abstracts for eligibility. Then, I assessed the full-text of 31 articles for eligibility. I excluded 26 studies that were qualitative, related to education or teaching reports, related to nurses or other health care professionals, related to barriers to use EBP, related to EBP instruments development, and not related to learning strategies. I ended up including five quantitative studies for this systematic review. Four of the studies were quasi-experimental studies and one was cross-sectional study (see Table 1).

3.2. Synthesis

Synthesis of this systematic review was made by looking at the consistency of concepts, findings, methodological rigor, internal and external validity and strengths and limitations of the body of research.

3.2.1. Consistency of Concepts

Learning strategy

Reference [18] examined the EBP-focused interactive teaching (E-FIT) learning strategy consisting of a 2-hour EBP introductory lesson. In E-FIT, students have to identify a clinical problem, synthesize the evidence, implement their

findings to practice, and then share their findings with their peers as a presentations. The authors designed E-FIT based around the model of diffusion of innovation [28], [32] and self-efficacy theory [3]. Reference [24] conceptualized an EBP learning strategy for clinical practices for nursing students and teaching the staff the principles of EBP. The strategy incorporated two EBP sessions to improve students' EBP competencies regarding their knowledge, skills and attitudes. These two sessions were provided in the middle and at the end of semester, with each session being conducted over three full days. Reference [12] used an educational support as offered by 26 Swedish universities to conceptualize learning strategies. Reference [16] integrated EBP teaching into a single course and compared the outcomes to traditional teaching strategies. The intervention group received a one-day workshop on EBP basics. Reference [37] focused on self-directed learning (SDL) strategy and a workshop. In the first phase, students were encouraged to talk about their understanding of EBP and its significance to nursing science and to develop work plans in accordance with the EBP steps. In the second phase, students completed a workshop on the appraisal of the literature.

EBP, knowledge, and attitudes

EBP was conceptualized in three studies based on Sackett 's et al. [31] definition of EBP [12], [16], [24]. Two studies did not explicitly give a definition of EBP [18], [37]. Reference [18] related knowledge to students' ability to identify problems, synthesize evidence, implement evidence, and disseminate the evidence. Three of the studies defined knowledge as the capability of explaining EBP, formulating EBP questions, searching evidence, appraising evidence, selecting best evidence, integrating evidence into practice and facilitating and participating in evaluation of EBP [12], [24], [37]. Reference [16] described knowledge as the ability to memorize, repatriate, and recite of information. Three of the studies did not provide an explicit definition of attitudes [16], [18], [37]. Reference [37] related attitudes to the confidence level of the nursing students. Reference [12] linked attitudes to nursing students' capability beliefs on the nursing students regarding EBP.

Nursing Students

All studies targeted nursing students who were in a baccalaureate-nursing program, however, they conceptualized nursing students differently. Three studies conducted their studies on senior nursing students [12], [18], [37]. Reference [24] focused on Korean RN-BSN nursing students in their

second semester of first year who had completed research coursework. Another study focused on second year baccalaureate Iranian nursing students [16].

None of the studies used same learning strategies, which may have led to inconsistencies in the outcomes and results. Most of the studies utilized Sackett's et al. [31] definition of EBP, which is one of the most commonly used for EBP definitions. The studies related knowledge to EBP processes. They had a consistent definition of knowledge, as knowledge is gaining required information and skills. Reference [26] linked EBP knowledge to EBP processes. Attitudes remained undefined in most studies, thereby leading to differences in outcome as some of the studies related attitudes to confidence or beliefs. On the other hand, although the studies participants were all baccalaureate-nursing students, there was considerable variation among the participants from one study to the next. Nursing students varied by background and culture, which may have led to inconsistency in the results, as the nursing students may have perceived EBP differently.

3.2.2. Findings

The effect of different learning strategies on nursing students' knowledge toward EBP

Nursing students' knowledge toward EBP is important for increasing EBP utilization in their practicum and for preparing future nurses to utilize EBP in practice. Three of five studies in this review found significant improvements in nursing students' knowledge toward the use EBP after being exposed to different learning strategies [18], [24], [37]. Reference [12] found significant differences in most of EBP knowledge steps except participating in implementation of research-based knowledge in practice and participating in evaluating if practice reflects current research-based knowledge, which showed, no statistically significant differences. Reference [16] reported that there was no significant improvement between the knowledge subject matter scores between intervention and control groups. However, they found that EBP knowledge was improved in the intervention group because the control group did not receive any principles of EBP principles sessions.

The effect of different learning strategies on nursing students' attitudes toward EBP

Two of the five studies included in this review found a significant improvement in nursing students' attitudes toward EBP following EBP learning strategies [16], [37]. One study reported no significant improvement in nursing students' attitudes following EBP learning strategy [18]. Reference [24] study did not explicitly measure nursing students' attitudes of the nursing students although they did measure nursing students' confidence levels, which is an element of attitude. They found that confidence nursing students level was improved ($P < 0.05$) after incorporating EBP into their clinical practicum. Reference [12] found that the capability beliefs of nursing students were significantly improved after receiving educational support from different universities.

3.2.3. Methodological Rigor

Study design

Each of the studies in this review used a quantitative study

design. Three of five included studies used a quasi-experimental pretest-posttest study designs [18], [24], [37]. Reference [16] performed a quasi-experimental study design, but focused only on post-test results. One study used a cross-sectional survey study design [12].

Sample

All the included studies were conducted using baccalaureate-nursing students samples. Four of five studies relied on convenience sampling [18], [16], [24], [37]. One study used a national population of BSN students [12]. Reference [18] used a sample of 208 (89% response rate) senior baccalaureate-nursing students from two universities in Southern California, United States, with participants aged 20-29 years. Reference [24] used a sample of 81 Korean RN-BSN nursing students in their second semester of first year (mean age = 26.6 years), and who had completed a research course. Reference [12] used 1440 (68% response rate) senior nursing students from 26 universities in Sweden (mean age = 30 years). Reference [16] examined a sample of 41 Iranian second year baccalaureate nursing students from a university in Iran. Reference [37] relied in a sample of 75 (88.2% response rate) senior nursing students (age = 20-23 years) in a hospital in China.

Measurements

Reference [18] used two instruments EBP-focused interactive teaching (E-FIT) instruments developed by the investigators, to measure knowledge and used Knowledge, Attitudes, and Behavior questionnaire for EBP (KAB) [17] to measure attitudes and behavior. Reference [24] developed questionnaires to measure and assess EBP efficacy and barriers to research utilization. The investigators developed 21 questions with seven subscales. The seven subscales incorporated questions on EBP how to formulate questions, evidence searching, evidence appraising, evidence selection, and evidence integrating evidence into practice. Reference [12] used a questionnaire from Longitudinal Analyses of Nurses Education/Entry in working life (LANE) [30] which measures nursing experience of educational support by universities and students' capability beliefs about their EBP skills. Reference [16] developed questionnaires to measure and assess nursing students knowledge and attitudes toward EBP. Reference [37] used KAB questionnaire (Johnston et al., 2003) to measure the nursing students' knowledge, attitudes, and behavior toward EBP.

3.2.4. Internal and External Validity

Most of the studies examined in this review selected their participants using convenient sampling, which might affect the studies internal validity of the studies. Most of the studies also used quasi-experimental designs to establish causality. By using a quasi-experimental design, the majority of the studies increased their internal validity. Moreover, the studies were performed over a short period of time to prevent changes to learning process or participants' integrity overtime, thereby also increasing the validity of the studies. On the other hand, although the instruments that were used in each study were valid and reliable, the participants may also have answered the

surveys questions in such a manner as to please the researchers and to show that they were capable of performing certain practices to secure their future jobs for themselves, thereby impacting the validity of the studies. The results of these studies cannot readily be generalized to other populations because the studies were conducted in five different countries, with culturally diverse student population, different learning strategies, different regulations, and different nursing perceptions which indicated the external validity might be threaten.

3.2.5. Strengths and Weaknesses of the Body of Research

All the studies used appropriate methods data analysis to obtain their findings, with significant and non-significant results reported. All the studies also used appropriate a study designs that were appropriate, with reliable and valid instruments. In addition, two of the studies had sufficient sample sizes [12], [16] The response rate of all studies was adequate. Four of the studies lacked of randomized sampling [16], [18], [24], [37] and one study used a national sample [12]. With the exception of [18], studies did not articulate a theoretical framework. Based on JHNEBP grading scale, three of the studies were graded as good quality [18], [24], [37] and two studies were graded as being of low quality [12], [1]. Another limitation was that the majority of the studies did not discussed the generalizability of their results, with [24] being the exception (see Table 1).

4. Review Limitations

To the author's knowledge, this systematic review is the first attempt to explore and summarize existing literature, with respect to the effect of various learning strategies on nursing students' knowledge and attitudes toward the use of EBP. This review explored different learning strategies, with no two studies relying upon the same strategy. Therefore, the findings of this review have limited scope for generalization. Additionally, the studies settings varied in term of countries, leading to culture differences that might have impacted the results. This review was restricted to quantitative studies published between 2005 and 2015. It would have been better to include qualitative and quantitative studies because of the limitation of published quantitative studies to measure nursing students' knowledge and attitudes. Another limitation of this review was that only three databases were searched and only studies published in English were used, leading to the possibility of missing relevant studies. In addition, this systematic review was completed by only the one author.

5. Discussion

Overall, the findings suggest that there is a gap in the existing knowledge regarding the efficacy of different learning strategies on nursing students' knowledge and attitudes, with few studies having examined this topic. This systematic review revealed that support for EBP education in

baccalaureate nursing programs remains in its infancy. This finding is supported by [27] who also reported supported that nursing is only now beginning to utilize EBP. The systematic review supports the argument that nursing students' knowledge toward the use of EBP is improved through whatever learning strategies are employed. Nursing students gain basic EBP utilization knowledge in their practicums. Additionally, the findings suggest some improvement is needed in students' attitudes toward the use of EBP; two of the studies did not explicitly measure nursing students' attitudes [12], [24] and one study found there was no relationship between learning strategies and nursing students' attitudes toward EBP [18]. Two studies reported that nursing students' attitudes toward EBP were improved as a result of the strategy used. Therefore, the findings with respect to students EBP attitudes do not lead to any definitive conclusions.

The major finding of this systematic review is that nursing students have positive improvement in their knowledge toward the use of EBP and some improvements in their attitudes, with two studies reporting positive attitudinal outcomes. This result is consistent with other studies. Reference [33], for example, found that attitude was not improved after exposure to an EBP educational program, although EBP knowledge was improved toward EBP. Reference [33] also suggest that attitudinal change is difficult and that more time is needed to make that change. Reference [13], however, found that EBP knowledge was improved. While [5] found that students' knowledge, skills and attitudes were improved.

Although the literature suggests positive knowledge outcomes, there were differences in learning strategies across the studies. None of the included studies sought to determine which was the best strategy and such would require the use a comparative or randomized controlled studies to assess which best strategy to utilize. In addition, there were difference in the students' level of education and background since the studies were conducted in five different countries. Therefore, perceptions of EBP, learning styles and the accessibility of knowledge may differ across the studies. Additionally, different regulatory requirements between the countries might affect nurses' autonomy to carry out clinical changes in response to EBP.

6. Recommendations

Education

Education is important for improving nursing students' EBP capabilities. It is essential that nursing students have adequate EBP competencies to be able to perform effectively and efficiently. Therefore, future nurses can justify their daily decision-makings on current evidence. This review found that the integration of different learning strategies was effective in increasing students' knowledge toward EBP, therefore, making it more likely that the nursing students would utilize EBP in their practicum. This review results can help nursing faculty members to develop educational strategies to engage nursing students more effectively in their clinical practicum. Consequently, nursing

institutions should emphasize EBP in their curricula.

Research

Although this review found some evidences for improving nursing students' knowledge and attitudes toward the use of EBP, few studies have been conducted to assess nursing students' knowledge and attitudes toward the use EBP or the best learning strategies for integrating EBP into nursing education. Therefore, little is known about which learning strategy is best incorporated into nursing education for the advancement of EBP or its effect on nursing students' knowledge and attitudes toward the use of EBP. Future studies are needed to provide more evidence to inform the decision as to which learning strategy is the most effective in terms of increasing nursing students' knowledge and attitudes toward the use of EBP. In addition, further studies are needed to evaluate nursing students readiness and preparedness to utilize EBP in their future practice. Therefore, studies to assess nursing students learning abilities and ability to use technology, such as computers, might be needed.

7. Conclusion

This systematic review has highlighted the importance of incorporating EBP into nursing education. The existing literature was assessed to identify the effect of different learning strategies on nursing students' knowledge and attitudes toward the use of EBP. Although the literature covering this topic is somewhat limited, significant differences were identified, which suggests that some learning strategies may be more effective than other for improving nursing students knowledge. The nursing students' attitudes require further study in order to refine these results. This systematic review has outlined some of the limitations in the studies review and in this systematic review itself. Future studies are needed to explore the effectiveness of learning strategies on nursing students' knowledge and attitudes.

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