

Integrating Evidence Based Nursing into the Critical Care Nursing Course: Challenges from Students' Perspectives

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Abstract: In critical care settings, there is a considerable need for highly experienced and knowledgeable nurses making efficient clinical decisions. Utilization of evidence based nursing (EBN) guides clinical decisions and practices. Therefore, it is important for critical care nurses to receive the necessary education to practice EBN. This begins with the ability to ask a clinical question and search for evidence answering it properly, which were the focus of teaching in this study. Therefore, this study aims to identify challenges to integrating EBN into the critical care nursing (CCN) course from students' perspectives. Undergraduate students who were enrolled into the CCN course on January 2010, Faculty of Nursing, University of Alexandria, were included in the study. Different teaching/learning strategies fostering adult learning were utilized to teach EBN related activities. A questionnaire was developed to identify challenges to integrating EBN into the course. Study findings indicated that about two thirds of total students have a moderate level of negative attitude to integrating EBN in the critical care practice. Most of students have moderate challenges to integrating activities of EBN into the CCN course. Two thirds of the students indicated that challenges related to course coordination are moderate. In relation to practicing EBN related activities, formulating a focused clinical question was moderately or highly challenging to the students. Searching for research evidence was moderately challenging to more than half of students. Time constraint while searching the internet was the highest top reported challenge. In conclusion, integrating EBN into the CCN course was challenging to students in different levels. Most of challenges were related to a lack in background research knowledge and skills and time constraints. So, the current study recommended that students have to receive their research course as one of the fundamental courses. In addition, more time management is required, in which an arrangement between different courses schedules and adequate time to practice free learning activities should be provided.

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1. Introduction:

One of the characteristics of the CCN practice is the application of the relevant theories, research, and latest evidence-based guidelines ⁽¹⁾. When nurses are unaware of evidence based practices (EBPs), they tend to use their current knowledge, which is limited and outdated ⁽²⁾. Nurses who work in critical care often encounter life-sustaining treatment decisions. These decisions may be related to offering or withholding a specific care, performing a practice in a particular way, and/or dealing with patients' clinical and ethical dilemmas. Making these decisions creates anxiety, uncertainty, and requires risk taking on the part of the critical care nurses ^(3,4). Basing nursing decisions and practice strategies on the best available evidence improves patients' outcomes and ensures that provided nursing care is both cost-efficient and effective ⁽⁵⁾.

EBN is described as using the best available evidence from research, along with patient preferences and clinical experience, when making

nursing decisions ⁽⁶⁾. It encompasses significant skills that are not traditionally part of nursing undergraduate training, including; precisely creating a searchable question arising from clinical knowledge gaps; conducting an efficient search and evaluation of available literature answering this question, extracting the clinical message, and applying it to fill the clinical gap ^(6,7). In Egypt, studies show that there are a number of barriers to the application of EBN ^(8,9). One of the major barriers is nurses' lack of EBN related knowledge and skills. Therefore, EBN requires sound, operational and professional educational preparation. Teaching EBN to undergraduate students effectively fosters the attitude, knowledge, skills, and behaviours necessary for EBN ^(8,9).

Furthermore, teaching EBN is a challenge for the teacher as it requires innovative teaching/learning approaches ⁽¹⁰⁾. The first recommended approach is providing mixed sessions including both didactic and interactive elements.

Didactic sessions comprise lectures, and may include question and answer periods. While, the interactive sessions involve some form of interaction amongst the participants, which may take the format of small-group work, or the opportunity to practice skills⁽¹¹⁻¹³⁾. The second approach includes basing educational activities on the internet. This is beneficial as it provides important forum for teaching EBN and allows more effective interactive learning. In addition, it overcomes the challenge of being limited by time or location. The third approach includes relating learning activities to the clinical practice, allowing identification of real gaps between current and desired levels of competencies, and identifies clinically effective solutions fulfilling these gaps⁽¹³⁻¹⁶⁾.

Finally, the fourth approach focuses on taking the learners' needs into consideration as they are adult learners contributing into their learning experience. On the other hand, teachers are only facilitators to the process of learning. They are committed to the development of the learners' skills of inquiry, helping students learn to make reasoned decisions, and providing them with adequate feedback. After all, cooperative learning is the most recommended approach for teaching EBN by actively involving students in learning process. This approach enables students to learn from peers, creates positive relationships among students and promotes students' healthy psychological adjustment to the learning activities. Cooperative learning offers a way to structure learning situations so that students work together to achieve shared goals. Students cooperate to foster learning, rather than approaching learning in isolation^(13,17,18).

In this research, the focus is upon teaching activities related to the first two primary skills of EBN. First is when nursing students convert their needs for information into answerable clinical questions, which is widely believed to be the key to efficiently finding high-quality evidence⁽¹⁹⁾. Next is when the students access electronic databases to find evidence answering these clinical questions, which is essential to lifelong learning, taking the student from novice to expert⁽¹⁸⁾. Previous studies indicated that learning these primary key skills of EBN has a number of challenges as perceived by students^(10,20). Moreover, it has been found that many students may encounter clinical questions but are rarely answering them due to these challenges. A large number of studies investigated challenges to integrating EBN into practice^(8,9,21). Yet, fewer studies investigated challenges to teaching EBN. They indicated that challenges to teaching EBN may include; lack of time, motivation and interest, and difficulty in accessing literature^(10,20,22).

Identifying challenges for integrating EBN into critical care nursing courses can assist in developing strategies to overcome challenges facing students. Therefore, this study was conducted to identify challenges to integrating EBN into the CCN course from students' perspectives.

2. Materials and Method:

Research design: descriptive study.

Aim:

To identify challenges to integrating EBN into the CCN course from students' perspectives.

Research question:

What are challenges of integrating EBN into the CCN course from students' perspectives?

Materials:

Setting: Emergency and Critical Care Nursing Department, Faculty of Nursing, University of Alexandria.

Subjects:

All undergraduate students who were enrolled into the CCN (1) course on January 2010 were subjected to the same educational intervention in order to learn EBN (89 students), however, 46 students of them accepted to participate in the research and answer the questionnaire.

Tool: Challenges to integrating EBN into the CCN course questionnaire:

was developed after reviewing the related literature^(8-10, 21, 23) to identify challenges to integrating EBN into the CCN course. It includes 3 parts. Part "1" involves challenges related to students' attitude towards integrating EBN into the critical care practice, in which negative students' attitude is considered a challenge (7 statements). Part "2" involves challenges to teaching EBN. It is classified into two sections; challenges related to students' attitude towards integrating EBN activities into the CCN course (12 statements) and challenges related to coordination of the CCN course (9 statements). Part "3" includes challenges to practicing EBN activities. It is divided into 2 sections; challenges to formulating a clinical question, and challenges to searching for research evidence (5, and 8 statements; respectively).

Each statement was rated on a five Likert scale from strongly agree to strongly disagree. A number of statements are phrased positively (16 statements) to prevent students' tendency to respond similarly to all items by choosing "agree" or "strongly agree" for all statements. The characteristics of the studied sample; such as

residence, working or not and having available computers are included in this tool.

Methods:

An approval to conduct the study was obtained from the responsible authorities at the Faculty of Nursing, Alexandria University. Study questionnaire was developed after reviewing the related literatures. The reliability of the questionnaire was tested; the Cronbach reliability coefficient was 0.698. A pilot study was conducted on 5 students who received the same course, one semester before, to test the feasibility and applicability of the study questionnaire.

Educational intervention:

EBN related activities were integrated into the CCN (1) course in order to assist students in learning skills enabling them to link theory and clinical practice. The course consisted of 15 lectures; each one was for 2 hours. These lectures covers the main concepts of caring critically ill patient which are derived from the scope of critical care nursing; critically ill patient, critical care nurse, and critical care environment. Examples of topics under these main concepts are Nutrition of critically ill, pain and sleep in intensive care unit...etc. Ten sessions were specified to teaching/learning EBN, one session at the end of each of ten consecutive lectures. Each one extended for thirty minutes. The first session started at lecture three. The following are activities conducted in each of the ten sessions.

Session (1) was an introduction to EBN. It involved an orientation on the importance of EBN and its process. After this session, an evidence based health care practice (EBHP) group was created on facebook to provide materials and websites for EBHP and for the purpose of discussing issues related to EBHP in general. This group was not restricted to the students; it attracted other health care members to participate in it. Session (2) involved the topic of formulating a focused answerable clinical question. In this session, a presentation about formulating a clinical question, using the PICO format, was displayed to the students. PICO represents an acronym for Patient/Problem, Intervention, Comparison and Outcome ⁽²⁴⁾. At the end of this session, students were asked to be assigned into small groups including three students with a voluntary selection. Each group was asked to make a critique to the existing critical care practices to choose a topic of personal interest and deliver a question frequently encountered in clinical practice. This can stimulate self-directed learning ⁽²⁵⁾. Then, each group was asked to email the selected question to the teacher. Each group worked independently.

Session (3) was a discussion on clinical questions formulated by students. Each question was discussed on the light of a number of queries such as; how common is it relevant to the critical care practice? What are its benefits or harms of care? This discussion provided students with a feedback from their teacher and colleagues. Then, students were asked to restate their questions again based on this discussion and to resent it by email to the teacher. Consequently any feedback could be sent from the teacher to each group, if needed, would be invisible to the other groups.

Sessions (4, 5, and 6) were on searching electronic database skills to find research evidence. Students were learned to use PICO format in the searching process, as, it contains the essential elements and keywords of the research question ⁽²⁴⁾. Combining Boolean operators which are the connector terms; such as AND, OR, and NOT with the PICO format to structure an effective search keywords were also explained ⁽²⁴⁾. The main electronic database used to search was the PubMed which is linked to the world's largest medical library. PubMed (www.pubmed.com) was used because it allows easy and free search. It allows assistance in finding search terms using the MeSH (Medical Subject Heading Database). In addition, it includes a PubMed's Clinical Queries section, makes it easier to find articles that report applied clinical research and systematic reviews ⁽²⁶⁾. Students were given handouts (print screen pictures) simulating the process of searching the PubMed database to find research evidence.

Sessions (7 and 8) gave the students an idea about research process, and types of evidence resources. A discussion was done about how to ensure that the retrieved evidence is related to the question which stimulates critical thinking as one of the course ILOs. Sessions (9 and 10) were discussion on students' searches, results found, and challenges faced; answering students' queries. Finally, students were asked to send their search results and researches found answering their clinical questions through the email to the teacher to be evaluated. Students were evaluated based on the following criteria; the relevance of the formulated clinical question to the critical care practice, how it is important and frequently faced, the ability to reach evidence answering the question, and submitting assignment on time.

The process of critical appraisal to the obtained research evidence was not focused in this course because students did not receive any research courses before this course; research course is delivered in advanced semesters. In addition, students

are not in a position to integrate critical appraisal of the literature with patient care.

Data collection:

At the end of the course, researchers briefed the students on the study aim, and its anonymized and voluntary nature. Then, the questionnaire was distributed to students. Completion of the questionnaire was taken as consent. Students were asked to provide their rating of each statement included in the study questionnaire on a five Likert scale from strongly Agree to Strongly Disagree. The number of students who returned the questionnaire after completion was 46 students.

Data analysis:

The collected data were coded, analysed using Statistical Package for Social Sciences (SPSS) version 15 software, and tabulated. Data were expressed as percentages, frequencies, means, and standard deviations. Changing the scales was done as follows for each of the 5 challenge types; the score for the challenge was calculated as the sum of the scores of all the items within the challenge using the

strongly disagree=1 up to the strongly agree=5. The obtained score obtained was converted to a percentage based on the maximum possible score for the challenge. The obtained percentage was then categorized as follows; Low= <33.3%, Moderate= from 33.3% to 66.6%, and High= 66.7% or more. Fisher's exact test was used to test the significance of the relationship between challenges to integrating EBN into the CCN course and students' characteristics. The level of significance was set at 0.05.

3. Results

Table (1) shows the characteristics of the studied sample. It was found that half of the studied sample (50%) are males. More than half of the study sample (60.9%) are living in Alexandria. Slightly less than half of them (43.5%) are working besides studying, 76.5 of them (who are working) are working 21 hours or more per week. Most of the studied sample (97.9%) have moderate and /or excellent English proficiency. In addition, about two thirds of them (73.9%) have computers available.

Table (1): Characteristics of the studied sample

Characteristics	Count (46)	%	
Sex	Male	23	50.0
	Female	23	50.0
Residence	Alexandria	28	60.9
	Outside Alexandria	18	39.1
Working	Working	20	43.5
	Not Working	26	56.5
Working Hours per week (Hours/week)	<14	2	11.8
	14-20	2	11.8
	21+	13	76.5
English Proficiency	Do not know	0	0.0
	Weak	1	2.2
	Moderate	28	60.9
	Excellent	17	37
Having available computer	Yes	34	73.9
	No	12	26.1

Table (2) presents distribution of challenges to integrating EBN into the CCN course according to their levels. About two thirds of total students (65.2%) have a moderate level of negative attitude to integrating EBN in the critical care practice. Regarding challenges to teaching EBN, most of students (87%) reports that there are moderate challenges to integrating activities of EBN into the CCN course. Also, about one third of the students (30.4%) report that challenges related to course coordination are high. In relation to practicing EBN related activities, equal percentages (50%) of high and moderate level to formulate a focused clinical question. While, 41.3% of students are highly challenging to search for research evidence.

Table (3) shows the highest top ten challenges to integrating EBN activities into the CCN course. It is found that, the time constraint while searching the internet is the highest reported challenge faced by students (mean=3.850±0.988). Four challenges related to applicability of EBN principles in nursing are reported among the highest top ten challenges (mean =3.740±1.021, 3.590±1.127, 3.590±1.185, and 3.460±1.312, respectively). In addition, four challenges are related to formulating a focused clinical question and course co-ordination, two statements for each challenge (mean=3.650±1.127, 3.370±1.142, 3.540±1.168, and 3.430±1.142, correspondingly).

Table (2): Distribution of challenges to integrating EBN into the CCN course according to their levels

Type of Challenge	Challenge Level						Total
	Low		Moderate		High		
	Frequency	%	Frequency	%	Frequency	%	
Students' attitude towards EBN	1	2.2	30	65.2	15	32.6	46
Teaching EBN							
• The attitude towards integrating activities of EBN into the course	6	13.0	40	87.0	0	0	100
• Course coordination	0	0	32	69.6	14	30.4	46
Practicing EBN activities							
• Formulating Clinical Question	0	0	23	50	23	50	100
• Searching Evidence	0	0	27	58.7	19	41.3	46

EBN: Evidence Based Nursing, CCN: Critical Care Nursing

4. Discussion

Implementing EBN into critical care practice promotes quality care and provides a framework for nurses to take decisions related to every day practices^(5,27). Thus, it is necessary to prepare undergraduate student nurses with competencies and key concepts of EBN. However, teaching traditional undergraduate nursing students to appreciate, understand, and apply the basic skills of EBN raises numerous challenges⁽¹⁰⁾. Therefore this study aims to identify challenges of integrating EBN into the CCN course from students' perspectives. Accordingly strategies that account for identified challenges can be set to overcome.

The current study indicates that about two thirds of total students expressed a moderate level of negative attitude towards integrating EBN into the critical care practice. Moreover, the rest of students showed a highly negative attitude. This might be due to their lack of research abilities as they did not attend any previous research courses or training, which in turn might have made them feel anxious about the unknown. *Estabrooks et al.* (2003)⁽²⁸⁾ indicated that attitude towards research evidence is a key factor influencing research evidence utilization as it plays a crucial role in governing one's motivation to learn, practise and maintain a skill. Therefore, in the current study, the negative attitude towards integrating EBN into the critical care practice reflects a major challenge facing students.

In accordance with the current study, *El-Badawy and Kassem* (2008)⁽⁹⁾ reported that the first suggested strategy to facilitate research utilization was improving research knowledge through training and education, in which, educational levels and participation in their research was found to be related to positive attitude toward research. Furthermore, *Lai, Teng, and Lee* (2001)⁽²¹⁾ reported in their study that the majority of nurses agreed or strongly agreed to all the negatively phrased statements on the value of EBP and related that to their level of education and experience in which nurse managers showed more positive attitude than registered nurses. Moreover,

Koessl (2009)⁽²⁹⁾ added that nurses with a master's degree education that would have included in research courses are more likely to view research as positive. On the other hand, *Knops et al. study* (2009)⁽³⁰⁾ showed that nurses had a moderately positive attitude toward the application of principles of EBN into practice. This finding may be attributed to the difference in the educational backgrounds of the studied sample, in which the current study sample were undergraduate students while the later study sample were graduates who have completed research courses and have more practical experience.

In addition, the findings of the current study attributed the students' negative attitude to EBN to the limited resources in the critical care settings where they received their clinical training and had the time to perceive that the availability of the necessary resources is limited. This may be evidenced by the finding that one of the highly ranked top 10 challenges identified by students; ranked as second was "Resources are not sufficient for the application of research". This is supported by the results of *Ezz, Zahran, and El-Soussi*' (2010)⁽⁸⁾ study indicating that there is a lack in resources in critical care settings, as perceived by nurses.

Regarding challenges to teaching EBN, most of students perceived that there are moderate levels of challenges related to the attitude towards integrating EBN activities into the CCN course. This may be attributed to their negative attitude towards integrating EBN into the critical care practice which is related to their lack of research knowledge and skills. This may be proved by the fact that the highest ranked challenge to integrating EBN activities into the CCN course was "Activities required are at a level higher than undergraduate students' level". So they do not feel comfortable with these activities. These results are in line with *Tamim et al.* (2009) findings⁽³¹⁾. They indicated that integrating EBP into the curriculum was faced by a number of challenges some of them are related to the insufficient previous educational preparation.

Another factor, which might make students perceive integrating activities of EBN into the CCN course as challenging, is their resistance to change. Several reasons may cause resistance; fear of the unknown, and disjunction between learning and teaching styles. Fear of the unknown may be from the unfamiliar tasks related to EBN. Disjunction between learning and teaching styles may arise when some students' preferred a specific approach of learning. For example, some students do not like interaction during lecturing because this makes it difficult to take notes⁽³²⁾. In the current study, this appears obviously when one of the students stood up suddenly during the lecture and said "I do not like to learn EBN related skills in this manner, I do not like these discussions because when I return home I cannot find a content to study to pass the exam".

Regarding course coordination, there are three main issues evaluated under this topic involving; time schedule, communication, and cooperation. Results showed that the CCN course coordination was either moderately or highly challenging to students. These challenges may be attributed to lack of synchronization between the time schedules of different lectures, in which some lectures might coincide with the time of CCN lectures, resulting in inability of a number of students to attend the CCN lecture. This also led to a difficulty delivering EBN related knowledge and skills to students, a lack of communication among students and between students and their teacher. To overcome similar challenges, online teaching is recommended which expand the educational process beyond the traditional on-campus experience⁽³³⁾. Although the current study involved a number of electronic communication tools; including the E-mail and the EBHC forum, these appeared to be insufficient to replace attending EBN sessions.

Other time related constraints are that group work and self directed learning activities which required plenty of time for colleagues meetings and EBN activities. This is evidenced by the presence of a number of time related challenges among the highest top ten challenges to integrating EBN activities into the CCN course; "Searching through the internet needs a lot of time, ranked as the 1st highest challenge" and "Time was not enough to meet my colleagues to carry out the required activities, ranked as the 9th highest challenge", "I did not attend most of the lectures related to time scheduling, ranked as the 6th highest challenge". Even cooperation related challenges were mainly due to time constraints. This might be evidenced by the 9th highest challenge in ranking "Time was insufficient to meet my colleagues to carry out the required activities". These findings concerning time constraints are in line with *Potomkova et al. (2010)*⁽³⁴⁾ who reported that the

most frequently stated obstacle against integrating EBP into a medical curricula were extra time requirements. Another factor that may act as a time constraint is that some students were working besides studying.

One of the obvious challenges related to students' cooperation is "Cooperation with my colleagues was insufficient to carry out what is required". Although students were divided into small groups to facilitate more cooperation, this reported statement conveys the message that cooperation was inadequate in relation to the tasks required to be achieved. This might be because of time constraint and absence of well equipped study rooms for students' meetings. This justification is supported by what a literature reports that one of the drawbacks to cooperative learning occurs when the group need to meet outside of class to achieve its tasks, where timing and other commitments may be an issue⁽¹⁸⁾. The teacher might also play a role in the occurrence of this cooperation related challenge. *Johnson and colleagues (1991)*⁽³⁵⁾ indicated that one of the teacher's roles for implementing cooperative learning is monitoring and evaluating students' achievements and helping discuss how well they cooperated with each other. In the current study, supervision and monitoring were not adequate due to the time constraint, and the load of the CCN course content and the integrated EBN sessions.

In relation to practicing EBN related activities, formulating a focused clinical question was challenging to the students in a moderate or high level. Students, as beginners in the critical care practice, frequently ask background questions or questions referring to general aspects of a phenomenon⁽³⁶⁾, for example; what are the criteria for weaning from a mechanical ventilator?. On the other hand, during the CCN course, students were asked to formulate a foreground focused clinical question and specify its four PICO components; consequently this might constitute a challenge to the students. Furthermore, reformulation of the clinical question after receiving the feedback from the teacher or after trying it while searching through the internet for an answer might create a challenge.

Another reason that might make formulating a clinical question challenging is the nature of the critical care practice, in which students may be encountered by many clinical queries and need to take a lot of critical decisions⁽³⁾. This might be evidenced as the challenge "I found many of the clinical questions that need to be answered" was ranked as the 3rd highest challenge. In accordance with these results, *Huang, Lin, and Demner-Fushman (2006)*⁽¹⁹⁾ indicated that there are a number of challenges in structuring clinical questions using the

PICO format such as; inability to reconstruct the original question, and inability to encode fine-grained relationship between frame elements.

As regards searching for research evidence, students found the process moderately or highly challenging. This might be due to the fact that searching databases is difficult and sophisticated. This is supported by the literature emphasizing that searching for research evidence is difficult for the students and recommended the presence of a facilitator who has the required search skills to overcome barriers related to searching evidence is recommend⁽¹⁸⁾.

The time constraint factor also might be another cause for searching related challenges, in which, the highly ranked challenge within those related to searching evidence was "Searching through the internet needs a lot of time". This is in accordance with⁽³⁸⁾ who indicated that searching for research evidence answering the clinical question is time consuming. In addition, slowness while trying to reach the research evidence due to internet, computer, or software related problems can also prolong time required, which was reported by other researches.

Furthermore, challenges related to the searching for evidence may be as a result of students' inability to find different research evidence resources, such as; systematic reviews, meta-analysis, clinical guidelines, and individual articles. This explanation may be evidenced by the reported challenge "I was unable to identify internet research evidence resources" as one of the top 10 challenges. This might be because students learned to search evidence through PubMed database only. Although PubMed database contains a large number of full text articles, many of them are not available free, additionally to inadequate indexing of the database. For example, a MeSH term for the topic of interest might not exist or a relevant article might not be indexed under the intuitive MeSH term⁽³⁹⁾.

Searching evidence related challenges might be also attributed to the search question itself, if it is not formulated well. This is in accordance to *Ely and colleagues (2002)*⁽³⁹⁾ who reported that the success of the search may be much more dependent on asking a good focused clinical question than on the searching process itself. Contrary to the current study, one of the major challenges reported by another research is the lack of the computer skills⁽⁴⁰⁾. In the current study, this was not reported as high or even moderate challenge because most students have an acceptable level of computer skills as they are required to obtain the ICDL certificate as a basic requirement for the bachelor degree. Another difference between the current research and other researches is that others reported lack of computers

^(39,40). This was not an obvious challenge in the current study because most of the students have available computers; even those who do not have computers, they can utilize computers available at the faculty computer lab. Moreover, cooperation between the group members might overcome the challenge of unavailable computer devices for some students.

In relation to the top ten highest ranked challenges to integrating EBN into the CCN course, among these challenges two were not discussed in this section. First challenge is "I found many of the clinical questions that need to be answered" which might be because of the fact that students are beginners in their clinical experience in the critical care consequently having a lot of clinical queries, in addition to the nature of the critical care practice^(3,39). Second challenge is "The results of practical research cannot be applied in reality" which might be because of the lack of resources in critical care settings, students observed during their training. This is in line with what was reported in a study (2011)⁽⁸⁾ conducted at the same critical care settings, where students received their training in.

Limitations: For this study, lack of students' research related knowledge and skills did not allow integrating the step of research appraisal into the course. Another difficulty facing the teacher of this course was inability to evaluate students' interactions within the small group because of the time constraint.

5. Conclusion and recommendations:

In conclusion, integrating EBN into the CCN course had a number of challenges. Most of these challenges were related to the lack of research related knowledge and skills, time constraints, and resistance and difficulty of introducing relatively new EBN related skills to novice students. So, the current study suggested several recommendations. First is giving students their research course as one of the fundamental courses. Second is tailoring the EBN competences over the four years, in a sequence to help students build up their expertise in EBN. Third is efficient time management among different courses schedules, and providing adequate time to practice self-directed learning activities. For the library, it is important to provide adequate training to the librarians on the skills of searching for research evidence, preparing them to play the role of facilitators to this task, not only for the undergraduate students but also for the post graduates students and the faculty members. Moreover, it will be helpful if the library is supplied with well equipped study rooms. In relation to further suggested studies, it is recommended to conduct a similar study on interns and post graduate students. Investigating the effect of

integrating EBN on students' achievement is also recommended.

6. Implications of the research:

Identifying challenges facing integrating EBN into the CCN course will help identifying strategies overcoming these challenges and improving students' learning to EBN practices. When they graduated they will be able to find answers to their clinical queries. Consequently, quality of care and critically ill patient' outcomes will be improved

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Appendix:

Challenges related to students' attitude towards integrating evidence based nursing into the critical care practice:

Item	Mean	Std. Deviation
1. There is no need to change the practice in critical care units	1.960	0.942
2. Change is very difficult in critical care units	3.590	1.127
3. The results of practical research cannot be applied in reality	3.460	1.312
4. Administration will not allow research application into practice	2.980	0.977
5. Resources are not sufficient for the application of research in practice	3.740	1.021
6. Physicians do not cooperate in research application	3.040	1.010
7. Nurses are not motivated to carry out scientific research	3.590	1.185

Challenges to teaching evidence based nursing

Challenges related to the attitude towards integrating evidence based nursing activities into the critical care nursing course	Mean	Std. Deviation
1. Integrating activities of evidence based practice into the course is not of great value	2.110	0.737
2. Integrating those activities into the course makes it not interesting	2.220	0.892
3. Studying evidence based practice does not put us in line with modern principles of nursing practice	1.870	0.619
4. Practicing the activities of evidence based practice does not improve students' scientific level	2.220	0.814
5. Activities required are at a level higher than undergraduate students' level	3.040	1.173
6. Activities required are not considered as a type of self-directed learning	2.240	0.822
7. Participating in these activities is not interesting	2.130	0.833
8. Participating in these activities does not improve nursing decision making skills	2.040	0.893
9. Application of what we learn is difficult when facing a clinical question in the future	1.980	0.683
10. There is a lack of confidence regarding what we learn, and consequently unable to apply it again	1.930	0.879
11. Integration of evidence based practice activities into the course is not important	2.430	1.068
12. It is not recommended to adopt similar courses integrating these activities into them	2.170	0.973
Challenges related to coordination of the critical care nursing course:	Mean	Std. Deviation
1. Time of holding the lecture is not suitable	2.800	1.293
2. I did not attend most of the lectures	3.540	1.168
3. Schedule time of the lecture is inconsistent with the other lectures	2.960	1.282
4. Time was not enough to meet my colleagues to carry out the required activities	3.430	1.241
5. Cooperation with my colleagues was insufficient to carry out what is required	3.220	1.228
6. The activities required did not encourage me to work with my colleagues as a team to achieve them	2.780	1.209
7. Each individual at the team did not carry out activities assigned to him/her	2.870	1.185
8. The results of scientific research were not discussed with my colleagues	2.540	1.130
9. I can not open the e-mail frequently	3.090	1.380

Challenges to practicing evidence based nursing activities in the critical care nursing course:

Challenges related to the formulating a clinical question:	Mean	Std. Deviation
10. I did not know where to start, when formulating the clinical question	3.300	1.171
11. I found it difficult to find a clinical question	3.220	1.134
12. I found it difficult to formulate a clinical question	3.370	1.142
13. I found many of the clinical questions that need to be answered	3.650	1.016
14. Although I found many of the clinical questions, I was confused, whichever is chosen	3.240	1.139
Challenges related to searching for research evidence	Mean	Std. Deviation
1. I was unable to identify internet research evidence resources	3.480	1.169
2. I found many research articles, answering my clinical question	2.780	1.009
3. I do not have necessary skills required for searching researches across the internet	3.280	1.205
4. Searching through the internet needs a lot of time	3.850	0.988
5. Dealing with websites specific to research articles are difficult to deal with	3.300	1.314
6. I have basic skills needed for computer use	2.480	1.295
7. Slow internet connection makes it difficult to obtain the required research	3.300	1.171
8. The cost of Internet and computer use is one of the obstacles to perform the required activities	2.700	1.364

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