

Research Article

Effect of Evidence Based Nursing Practice Module on Faculty Staff's Skills in Obstetrical and Gynecological Units

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ABSTRACT

Background: Evidence-Based Practice is the integration of the best research evidence with clinical expertise and patient values in health decision making. Hence, Evidence based nursing practice ensures the use of current best available evidence to aid in decision making about the care of the patients to provide better outcomes.

Objectives: to evaluate the effect of evidence based nursing practice module on faculty staff's skills in obstetrical and gynecological units.

Methods: A pre-post quasi-experimental study was carried out on forty one faculty nursing staff at the Obstetrical and Gynecological nursing departments in Benha, Tanta and Zagazig Faculties of Nursing were included in the study. A pre-designed structured questionnaire was used to assess the participant skills: knowledge, practice, and attitude regarding evidence based nursing practice (EBNP) as well as the patient problem, intervention, comparison and outcome (PICO) model and perceived barriers hindering application of the EBNP.

Results: The faculty nursing staff had deficient skills (knowledge & practice) and attitude regarding EBNP before implementation of the teaching module which led to significant improvement in their skills with improvement in their attitudes and their perception of barriers after applying the intervention, where the mean practice score increased from a pretest level of 4.1 to a post test level of 5.1, $p < 0.001$.

Conclusion: Application of the EBNP teaching module in other nursing departments for further confirmation of the results is recommended. In addition, evaluate the impact of EBNP application on the patient outcome.

Keywords: Evidence-Based Nursing Practice, Obstetrics & Gynecology, PICO Model

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INTRODUCTION

The information system is the key of evidence based health practice; there is growing awareness of the role of information technology in Evidence-Based Practice (EBP). It is a problem-solving approach to the delivery of clinical care that incorporates the best evidence from well-designed studies along with a clinician's expertise, and patient preferences. Moreover, it is the conscientious and

judicious use of the current best evidence to guide healthcare decisions.^(1,2) In a report of the Institute of Medicine, five core competencies have been identified that all clinicians should possess to improve the quality of healthcare in the 21st century. The competency of applying EBNP was one of these competencies, which also included patient-centered care, work in interdisciplinary team, quality improvement, and use of informatics.^(3,4) Evidence-Based Nursing practice

(EBNP) is the process by which nurses make clinical decisions using the best available research evidence, their clinical expertise, and patient preferences. It de-emphasizes ritual, isolated and unsystematic clinical experiences, ungrounded opinions, and tradition as a basis for practice. It stresses on the use of research findings and other operational and evaluation data, the consensus of recognized experts, and affirmed experience to substantiate clinical practice.^(5,6)

The implementation of EBNP is a meaningful goal of healthcare professionals practicing in a wide range of disciplines and settings. However, according to the American Nurses Association such practice should occur within the context of available resources.⁽⁷⁾ Hence, implementing EBNP is especially important in different areas to ensure the best outcomes for populations in areas with limited health-care choices and resources.^(7,8)

Creating an EBNP in nursing culture is the most fundamental way for nurses to recognize the importance of EBNP and subsequently, adopt to solving clinical problems.

A strategy for incorporating EBNP into the clinical ladder system has been proposed. It involves the EBNP concept in newcomer in-service training, adopting EBNP competence as a criterion in the clinical ladder system, with various evidence-based, ladder-related reports required for providing support to nurses and promotion through centralized and decentralized education as well as individual consultation.⁽⁹⁻¹¹⁾

The challenge of finding practical strategies for implementation of and/ or teaching EBNP is still facing nurse educators. Relevant barriers have been identified in the literature. These include barriers related to leadership in organizations and students' confidence and skills regarding research. The need for improved searching skills using computers, and the need for continuing education for nurses in evaluating research with an emphasis on the application of the findings to practice.^(12,13)

The aim of the present study was to evaluate effect of evidence based nursing practice module on faculty staff's skills in obstetrical and gynecological units.

METHODS

Research Hypothesis:

Faculty nursing staff' skills (knowledge& practice) and attitude regarding EBNP will show significant

improvement after implementation of the teaching module and their perceived barriers hindering application of EBNP will be reduced.

Design and settings: A pre-post quasi-experimental intervention study design was used which was conducted at the obstetrical and gynecological nursing department at Benha, Tanta, and Zagazig Faculties of Nursing.

Sampling: A purposive sample of 41 faculty nursing staff (among the three previously mentioned faculties) working in obstetrical and gynecological nursing department as well as studying research and evidence based nursing practice through their master and /or doctorate courses. A total number of 29 demonstrators with bachelor degree, their age ranged more or less than 25 years old, and about 12 assistants lecturers with master degree, their age ranged from 25-30 years old while their years of experiences were more or less 5 years. This sample size was calculated to detect an expected pre-post difference in the mean scores of reported EBNP before and after the intervention of 0.5 and 1.5 standard deviation. Using the equation for the difference between two means at 95% level of confidence and 80% study power, the calculated sample size was 37. It was increased to 41 to compensate for a dropout rate of about 10%.

Data collection tool:

A pre designed instructional questionnaire schedule to assess reported skills (knowledge, practice) and attitude regarding evidence based nursing practice (EBNP), as well as the (PICO) model (patient problem, intervention, comparison and outcome) and also the perceived barriers hindering application of EBNP.

The researchers designed the instructional questionnaire schedule intended to assess participants' reported EBNP skills, as well as their related attitudes and perceived barriers. Basic personal data such as age, qualification, and previous training were recorded. The tool had four parts based on Funk et al. (1991)⁽⁶⁾, Nguyen (2008), and Panagiari (2008)^(17,19). The first part consisted of 14 items on a 7-point Likert scale (from poor to excellent)(poor, fair, average, above average, good, very good, excellent). The researchers rated the participant in certain skills such as the research and information technology (IT) skills, awareness of major information types and sources, and how to retrieve evidence.....etc.

The second part The frequency of the participants' practice was rated regarding the elements of EBNP such as formulating a clearly answerable question, tracking down relevant evidence, critical appraisal, and integrating evidence with own expertise. The rating was also on a 7-point Likert scale ranging from "never" to "all the time." (Never, rarely, a little of the time, sometimes, often, always almost, all the time).

The third part was for participants' attitude. It involved four pairs of statement, each pair representing the two extremes of a certain attitude. An example of a pair of statements is: "My workload is too great for me to keep up to date with all the new evidence" and "New evidence is so important that I make the time in my work schedule." The respondent has to check how close the participant is to one of these two extremes on a scale from 1 to 8 (strongly agree, agree, agree somewhat, neutral, undecided, disagree somewhat, disagree, strongly disagree).

The fourth part consisted of the EBNP barriers scale used for assessing the barriers that hinder the application of EBNP (Funk et al., 1991). The 28-item scale covers four dimensions related to the characteristics of the adopter of research or the participant with items such lack of awareness of research, feeling the benefits of changing will be minimal; the communication of research with items such as statistical analyses are not understandable, the relevant literature is not compiled in one place; the innovation characteristics with items as the conclusions drawn from research are not justified, and the literature reports conflicting results; the organization characteristics with items as the facilities are inadequate for implementation, and administration will not allow implementation.

The reliability of the four scales was assessed through measuring their internal consistency. All these scales showed a high degree of reliability with Chronbach's alpha coefficients 0.94 for knowledge, 0.89 for skills, 0.79 for attitude, and 0.87 to 0.89 for the domains of barriers.

The scoring of each section was done through summation of the points checked on its respective scales and dividing it by the number of items giving an average score. The mean scores of the first and second part ranged from 1 to 7 with a higher score meaning better knowledge and more reported skills of EBN. For the attitude scale, the

mean score ranged from 1 to 8, with a higher score reflecting a more positive attitude. The barriers scale's scores ranged from 1 to 5, with a higher score indicating more perception of the hindering effect of the barrier.

Ethical considerations: Each participant was informed about the purpose of the study, and informed approval before starting the data collection was taken. The participant was informed that participation is voluntary and free to withdraw from the study at any time. Their individual email and phone number was taken confidentiality was ensured throughout the study, and the participants were assured that all data would be used only for research purpose.

Pilot study: A pilot study was carried out on four participants to test the clarity and applicability of the study tools, and for estimation of the time needed to fill out the questionnaire. Required modifications were done in the form of re-phrasing of some items.

Procedures: The study was achieved through phases which include

First phase: This phase encompassed recruitment of the faculty nursing staff and obtaining the participant's approval. Then, a pretest was administered using the data collection form. The purpose was to obtain baseline data regarding participants' knowledge and skills, attitudes, and perceived barriers. The collected data served to guide the researchers in developing the teaching module. The time for completion of the form was around 20-25 minutes.

Second phase: Based on the results obtained from the pretest assessment, and with the help of pertinent literature, the researchers constructed the teaching module to satisfy the identified participants' needs. The main objective of the teaching module was to foster participants' skills regarding EBNP as well as improve their knowledge, practice, attitude, and modulate their perception of the hindering barriers. The module consisted of ten sessions (5 for theory and 5 for practical application). The duration of the sessions ranged from 30 to 60 minutes. Instructional media and a module booklet which contain the following: (EBP definition & importance, Five EBP steps, Identify search strategies for finding relevant evidence, Determine the steps to find relevant literature results to the patient's problem, etc...) were prepared by the researchers to be distributed

to all participants at first, An electronic file explaining EBNP was provided to participants through their individual email in advance to review and bring to class for discussion *as follows*:

(A Step By Step Approach EBNP): *Step 1:* Work out what is that you want to know. *Step 2:* Identify the key concepts you are searching for. By breaking the question down into its key components you will easily be able to identify the keywords to use when searching the databases. Then, download PICO form (the patient problem, intervention, comparison and outcome).

Step 3: Search for the evidence. Find the Best Evidence, best practice - An introduction to the evidence base by using the literature & National Network of Library of Database guide - A selection of databases to help to find the best evidence to answer your question. Download Locating Best Evidence 2012. Searching PubMed and the Library for EBP. *Step 4:* Appraise the evidence.

Not all evidence can be trusted and knowing how to critically appraise it is vitally important. Readings for 'How to appraise' How to read a paper: Assessing the methodological quality of published papers that summaries other papers (systematic reviews and meta-analyses), Papers that report How to Use an Article About Therapy or Prevention Based on the Users' Guides to Evidence-based practice, Papers that report diagnostic or screening tests. How to Use an Article About a Diagnostic Test Based on the Users' Guides to EBP. *Step 5:* Putting evidence into practice. The final step, and possibly hardest, is how to use the evidence to provide better outcomes for the patients.

(PICO FORM): Asking the right question is an important skill to learn, yet it is fundamental to the evidence-based decision-making process. This process almost always begins with a patient question or problem. A "well-built" question should include four parts, referred to PICO that identify the patient problem or population (P), intervention (I), comparison (C) and outcome(s) (O).

-The first step in developing a well-built question is to identify the patient problem or population. Describe either the patient's chief complaint or generalize the patient's condition to a larger population.

When identifying the P in PICO it is helpful to ask:

How could you describe a group with a similar problem?

How you would describe the patient to a colleague?

What are the important characteristics of this patient to search for evidence?

- Primary problem
- Patient's main concern or chief complaint
- Disease or health status
- Age, race, sex, previous ailments and current medications

The P phrase could be more detailed if the added information influences the results you expect to find.

-Identifying the *Intervention* is the second step in the PICO process. It is important to identify *what you plan to do for that patient*. This may include the use of a specific diagnostic test, treatment, adjunctive therapy, medication or the recommendation to the patient to use a product or procedure. The intervention is the main consideration for that patient or client.

-The *Comparison* is the third phase of the well-built question, which is *the main alternative you are considering*. It should be specific and limited to one alternative choice in order to facilitate an effective computerized search.

The Comparison is the only optional component in the PICO question. One may only look at the Intervention without exploring alternatives, and in some cases, there may not be an alternative. The *Outcome* is the final aspect of the PICO question. It specifies the result(s) of what you plan to accomplish, improve or affect and should be measurable. Outcomes may consist of: relieving or eliminating specific symptoms - improving or maintaining function.

Specific outcomes will yield better search results and allow you to find the studies that focus on the outcomes you are searching for. When defining the outcome, *more effective* is not acceptable unless it describes *how* the intervention is more effective.

In addition to identify the PICO components, it is important to clarify the types & categories of questions you are asking and the related research method. (Once you have identified a patient problem and defined your question using PICO,

you are ready to find the most current valid evidence).

The PICO Worksheet and Search Strategy provides the framework for developing this step of the process by guiding one to write each component of the PICO question and is also a guide in developing a search strategy, which aids in the retrieval of relevant clinical evidence.

The researchers developed participants' research-critiquing skills in the classroom through discussions and "hands-on" exercises as research proposals in different obstetrics areas (ante natal - natal - post natal).

An assigned power-point presentation on critiquing skills was used to display the strengths and weaknesses to consider for each part of a research study.

Third phase: The researchers divided the participants into small groups of about 3-5 participants. A schedule for the teaching sessions was set in the study settings to suit the work schedule of the participants and their physical and mental readiness; this was mostly three days per week. The teaching and training involved ten sessions for each small group. At the beginning of the first session, the researchers provided an orientation to the aim and objectives of the teaching module. Feedback was given in the beginning of each session about the preceding one.

Different methods of teaching were used. Participants worked in small groups to rate the strength and quality of the research evidence related to their identified clinical obstetrical problems, with researchers' guidance and through the use of the teaching/learning materials developed by the researchers. The durations of the sessions were flexible to allow for periods of discussion of their achievement of assignments, progress and feedback.

Fourth (Evaluation phase): To assess the effectiveness of the teaching module, a posttest was applied after three months of the implementation of the teaching and training using the same tool of the pretest.

Limitation of the study: Because of the study topic is new, somewhat difficult, it was needed more time and effort for more searching, more accessibility to internet data base all the time, and also needed a wide range of time to cover different aspects of all areas of obstetrics and gynecology to be applied.

Statistical analysis: Data entry and statistical analysis were done using SPSS 16.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for scales. Quantitative continuous data were compared using the non-parametric Mann-Whitney test. Spearman rank correlation analysis was used for assessment of the inter-relationships among scales and quantitative and ranked variables. In order to identify the independent predictors of practice score, multiple linear regression analysis was used, and analysis of variance for the full regression models were done. Statistical significance was considered at p-value <0.05.

RESULTS

A total number of 29 (70.7%) were demonstrators with bachelor degree. Their ages were about 25 years old, and about 12 (29.3%) assistant lecturers with master degree, of ages ranged from 25-30 years old, with at least 2-5 years of experience. The reported staff's skills regarding EBNP showed pre-program low scores ranging from 3.8 for the ability to apply information to individual cases, to 5.0 for the skill of sharing of ideas and information with colleagues from a maximum score of 7.

After implementation of the program, the scores of all skills were higher compared to the pretest, reaching statistically significant differences in the skills of determining material usefulness, applying information to individual cases, disseminating new ideas about care to colleagues, and reviewing own practice. The total score increased from 4.3 to 4.9 although the difference did not reach statistical significance ($p=0.13$), (Table 1).

As regards participants' self-reported EBN practice, the same table shows low pretest scores ranging from 3.3 for the practice of critical appraisal to 4.5 for the practice of formulating question. The posttest results were higher in almost all practices, with statistically significant differences in three out of the six practices assessed. In total, the mean practice score increased from a pretest level of 4.1 to a posttest level of 5.1, $p<0.00$, (Table 1).

Table 1: Pre-post changes in faculty staff ' skills scores of reported knowledge and reported practice regarding EBNP

	Time (scores max=7)				Mann Whitney Test	p-value
	Pre		Post			
	Mean±SD	Median	Mean±SD	Median		
knowledge related to the following :						
▪ Research skills	4.0±2.1	4.00	4.7±1.6	5.00	2.15	0.14
▪ Information technology skills	4.0±2.1	4.00	4.6±1.6	5.00	0.99	0.32
▪ Monitoring and reviewing of Research practice	4.1±1.8	4.00	4.5±1.4	5.00	0.66	0.42
▪ Converting information needs into a research question	3.9±1.9	4.00	4.4±1.5	4.00	0.88	0.35
▪ Awareness of major information types and sources	4.4±1.9	5.00	5.0±1.4	5.00	0.95	0.33
▪ Ability to identify gaps in Professional practice	4.9±2.0	5.00	4.9±1.5	5.00	0.17	0.68
▪ Knowledge of how to retrieve evidence	4.6±1.8	5.00	4.8±1.4	5.00	0.15	0.70
▪ Ability to analyze critically evidence against set standards	4.3±2.0	5.00	4.6±1.5	4.00	0.21	0.64
▪ Ability to determine how valid the research methods	4.0±1.8	4.00	4.5±1.5	4.00	1.66	0.20
▪ Ability to determine how useful methods	4.0±1.7	4.00	4.9±1.5	5.00	5.85	0.02*
▪ Ability to apply information to individual cases	3.8±1.7	4.00	3.9±1.4	5.00	8.32	0.004*
▪ Sharing of ideas and information with colleagues	5.0±1.7	5.00	5.3±1.5	6.00	0.55	0.46
▪ Dissemination of new ideas about care to colleagues	4.6±2.1	5.00	5.6±1.4	6.00	4.51	0.03*
▪ Ability to review own practice	4.7±2.0	5.00	5.8±1.4	6.00	7.06	0.008*
Total knowledge	4.3±1.5	4.50	4.9±1.0	4.90	2.35	0.13
Practice related to the following :						
▪ Formulated a clearly answerable question as the beginning of the process towards filling the gap	4.5±1.9	4.00	4.1±1.7	5.00	2.72	0.10
▪ Tracked down the relevant evidence once have formulated the question	4.3±1.7	4.00	5.2±1.1	5.00	6.23	0.01*
▪ Critically appraised, against set criteria, any literature have discovered	3.3±1.7	4.00	4.8±1.0	5.00	18.73	<0.001*
▪ Integrated the evidence have found with own expertise	4.2±1.8	4.00	4.9±1.0	5.00	2.19	0.14
▪ Evaluated the outcomes of own practice	4.0±1.9	4.00	4.9±1.3	5.00	3.41	0.06
▪ Shared this information with colleagues	4.3±1.9	5.00	5.9±1.2	6.00	19.66	<0.001*
Total practice	4.1±1.5	4.30	5.1±0.8	5.20	12.36	<0.001*

(*) Statistically significant at $p < 0.05$

Table 2 shows low scores of attitudes towards EBN, especially as regards making the time for new evidence is in work schedule (4.1±2.7) out of a maximum of 8. After implementation of the program, the scores of all attitudes were higher compared with the pretest, reaching statistically significant differences

in the attitudes related to making the time for new evidence is in work schedule ($p=0.04$) and the practice being changed because of evidence found ($p=0.01$). The total attitude score increased from 5.1 to 6.1, and the difference was statistically significant ($p=0.01$).

Table 2: Pre-post changes in faculty staff ' scores of attitude towards EBNP

	Time (scores max=8)				Mann Whitney p-value Test	
	Pre		Post			
	Mean±SD	Median	Mean±SD	Median		
▪ Attitude related to the following :						
▪ New evidence is so important that I make the time in my work schedule	4.1±2.7	4.00	5.4±3.1	7.00	4.15	0.04*
▪ I welcome questions on my practice	5.5±2.8	7.00	6.4±2.6	8.00	2.36	0.12
▪ Evidence based practice is necessary to professional practice	5.7±2.7	7.00	6.2±2.9	8.00	2.20	0.14
▪ My practice has changed because of evidence I have found	5.1±2.7	6.00	6.3±2.9	8.00	6.18	0.01*
Total attitude	5.1±1.9	5.00	6.1±2.4	7.50	6.56	0.01*

(*) Statistically significant at $p < 0.05$

Concerning the barriers of application EBNP (Table 3) revealed that the highest pre-program score was (4.0±1.0) for the organization characteristics, whereas the lowest was (3.6±0.9) for the innovation characteristics. For the individual items, the highest pre-program scores

were those of the "Hospital nursing staff are not cooperate with implementation and the administration is not allow implementation, 4.1 each. The table demonstrates statistically significant decreases in the scores of all types of barriers and their individual items after

implementation of the program. It is noticed that the score of the organization characteristics, which was highest at the pretest became the lowest at the

posttest (2.4 ± 0.7). In total, the mean barrier score decreased from a pretest level of 3.7 to a posttest level of 2.7, $p < 0.001$.

Table 3: Pre-post changes in faculty staff ' scores regarding barriers of EBNP application

	Time (scores max=5)				Mann Whitney Test	p-value
	Pre		Post			
	Mean±SD	Median	Mean±SD	Median		
Adopter characteristics (The participant)						
Is unaware of the research	3.9±1.3	4.00	3.3±1.2	4.00	5.32	0.02*
Feels the benefits of changing will be minimal	3.7±1.2	4.00	3.1±1.2	4.00	4.12	0.04*
Is isolated from knowledgeable colleagues with whom to discuss the research	3.7±1.2	4.00	2.8±1.2	3.00	9.60	0.001*
Sees little benefit for self	3.8±1.3	4.00	2.8±1.2	3.00	12.16	<0.001*
Does not see the value of research for practice	3.9±1.2	4.00	3.0±1.1	3.00	12.52	<0.001*
There is not a documented need to change practice	3.8±1.3	4.00	2.6±1.3	2.00	15.23	<0.001*
Is unwilling to change/try new ideas	3.5±1.3	3.00	2.4±1.2	2.00	12.66	<0.001*
Does not feel capable of evaluating the quality of research	3.6±1.2	4.00	2.8±1.2	3.00	7.83	0.005*
adopter characteristics	3.7±0.8	3.60	2.9±0.7	3.00	17.35	<0.001*
Communication characteristics:						
Research reports\articles are not readily available	3.8±1.3	4.00	2.7±1.2	2.00	13.09	<0.001*
Implications for practice are not made clear	4.0±1.0	4.00	2.9±1.1	3.00	15.39	<0.001*
Statistical analyses are not understandable	3.6±1.2	4.0	2.8±1.1	2.00	8.99	0.003*
The research is not relevant to the nursing practice	3.7±1.3	4.00	2.7±1.2	3.00	12.43	<0.001*
The relevant literature is not compiled in one place	4.0±1.3	5.00	1.9±1.2	1.00	34.37	<0.001*
The research is not reported clearly.	3.2±1.4	3.00	2.5±1.3	2.00	4.54	0.03*
communication characteristics	3.7±0.8	3.70	2.6±0.7	2.70	28.52	<0.001*
Innovation characteristics:						
The research has not been replicated	3.3±1.4	3.00	2.6±1.1	2.00	5.47	0.02*
The participant is uncertain about the results of research	3.4±1.3	3.00	2.8±1.1	3.00	5.69	0.02*
The research has methodological inadequacies	4.0±1.0	4.00	3.1±1.1	3.00	11.67	0.001*
Research reports are not published fast enough	4.0±1.3	5.00	2.8±1.2	2.00	18.30	<0.001*
The conclusions drawn from research are not justified	3.6±1.3	3.00	2.8±1.3	2.00	7.40	0.007*
The literature reports conflicting results	3.5±1.3	3.00	2.7±1.3	2.00	8.43	0.004*
Innovation characteristics	3.6±0.9	3.70	2.8±0.8	2.80	17.10	<0.001*
Organization characteristics:						
The facilities are inadequate for implementation	3.7±1.4	4.00	2.6±1.2	2.00	12.77	<0.001*
The participant does not have time to read research	3.9±1.3	4.00	2.7±1.1	2.00	17.09	<0.001*
The participant does not feel enough authority to change patient care procedures	3.9±1.4	5.00	2.6±1.2	2.00	19.80	<0.001*
The participant feels results are not applicable to setting	4.0±1.3	4.00	2.8±1.3	2.00	16.46	<0.001*
Physicians will not cooperate with implementation	4.1±1.2	5.00	2.5±1.2	2.00	26.74	<0.001*
Administration will not allow implementation	4.1±1.1	5.00	3.0±1.1	3.00	16.71	<0.001*
Other staff are not supportive of implementation	4.0±1.2	4.00	2.5±1.3	2.00	22.16	<0.001*
There is insufficient time to implement new ideas	3.9±1.3	4.00	1.3±0.8	1.00	48.78	<0.001*
Organization characteristics	4.0±1.0	4.30	2.4±0.7	2.30	39.42	<0.001*
Total barriers	3.7±0.7	3.90	2.7±0.6	2.70	34.14	<0.001*

(*) Statistically significant at $p < 0.05$

Table 4 indicates statistically significant weak negative correlations between participants' age and their attitude score as well as the barriers related to communication and innovation characteristics and total barriers. Their experience bears positive moderate correlations with their scores of skills and practice. Meanwhile, a higher qualification is positively correlated to the scores of skills, practice,

attitude, and all except the adopter characteristics barriers. In multivariate analysis, Table 5 revealed that the attendance of the program and a higher qualification are the statistically significant independent predictors of the participants' score of EBNP. The model explains 38% of the change in this score. Participants' social characteristics had no influence on their practice score.

Table 4: Correlation between faculty nursing staff 'skills' scores and their personal characteristics

	Spearman rank correlation coefficient		
	Age	Experience	Qualification
knowledge	-.05	.39**	.22*
Practice	-.09	.44**	.23*
Attitude	-.24*	.15	.22*
Adopter characteristics	-.19	.10	.19
Communication characteristics	-.24*	.08	.24*
Innovation characteristics	-.23*	.10	.26*
Organization characteristics	-.21	.07	.22*
Total barriers	-.24*	.12	.26*

(*) Statistically significant at $p < 0.05$ (**) statistically significant at $p < 0.01$ **Table 5:** Best fitting multiple linear regression model for EBNP score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	-2.26	1.02		2.21	0.03	-4.30	-0.22
Intervention(reference: pre)	1.02	0.23	0.39	4.49	<0.001	0.57	1.48
Qualification(reference: master)	1.43	0.26	0.49	5.58	<0.001	0.92	1.95

R-square = 0.38

Model ANOVA: $F=25.70$, $p < 0.001$

Variables entered and excluded: age, experience, job, department, previous training

NB: B means beta coefficients

(Statistical test used to show effect of all integrated factors on practice score)

DISCUSSION

Although EBNP is critical in quality care, the participants in the present study demonstrated low levels of related skills and practices, with high perception of barriers. Implementing a custom-tailored training module that met their needs proved successful in fostering their practices, improving their attitudes, and modulating their perception of EBNP barriers, thus leading to verification of the research hypothesis.

The multivariate analysis confirmed the effectiveness of training module on participants' skills regarding EBNP. This is certainly attributed to the program content and process. The content was based on actual identified needs and commensurate with the level of understanding the participants. As for the process, it followed the principles of adult learning with active participation and self-directed learning. Added to this is the practical hands-on training, using real situations to apply EBNP. The findings are in congruence with the results of the systematic review of Melnyk et al.⁽¹⁴⁾ and Morris et al.⁽¹⁵⁾

which revealed that such programs are beneficial process as they involve multi-dimensional teaching strategies⁽¹⁵⁾. On the same line, Melnyk et al.⁽¹⁶⁾ showed that practical collaborative learning using journal articles was successful in improving nursing students' research abilities. Additionally, the use of computer-based media as in the present study was shown to be superior to other teaching methods in EBN.⁽¹⁷⁾

According to the present study results, a higher qualification is positively correlated to the skills and practice as well as the attitudes towards EBN. This is quite perceivable since the principles and application of research are seldom addressed in nursing education programs at bachelor degree participants. Thus, master degree participants are more knowledgeable of research and Evidence-Based Practice given their training, although it is still insufficient. Furthermore, the higher qualification proved to be an independent predictor of participants' practice scores. This means that the higher the participant qualification has the more benefit she got from the attendance of the training program. The finding is quite

plausible given the better background in research principles and terminology. Moreover, their curricular activities involve carrying out small research projects; this provides them some skills in research, which are basic in applying EBN. A similar positive effect of a higher nursing qualification on implementation of EBNP has been demonstrated in a large study in Finland.⁽¹⁸⁾

According to the present study findings, participants' self-reported EBN skills demonstrated improvements in all skills. However, the significant improvements were related to determining material usefulness, applying information to individual cases, disseminating new ideas about care to colleagues, and reviewing own practice. These areas may have improved significantly because they reflect actual application compared to other more basic areas as research and IT skills, which was non-significantly improved. In line with this, a German study revealed that although nurses confirm the value of research for their own practice, there is a lack of fundamental requirements to identify and implement relevant research findings as for example the use of recent scientific evidence.⁽¹⁹⁾

The present study has also revealed significant improvements in the scores of total practice but the improvement in the total score of knowledge was not significant. This may again reflect the better effect of the training program on the practical aspects more than the theoretical ones. Moreover, the theoretical information gained in the program may be amenable to more attrition throughout the follow-up period of three months compared with the practical issues that may continue to improve along the follow-up by continuing application. Similar findings were reported by Reed et al⁽²⁰⁾ and Sears⁽²¹⁾ in a program teaching medical students in Malaysia.

The participants' attitudes towards EBNP in the current study were higher than half (median 5 out of a maximum of 8) before the program implementation and 7.5 after (approaching the maximum score of 8). This improvement indicates that the participants became more convinced the importance of EBNP in their practice after having acquired the needed skills. This may have also positively influenced their perception of the barriers hindering its application. The findings are in agreement with those of a large survey in Germany⁽²²⁾ that assessed participants' perceptions

of relevant context factors for implementing an EBNP. The results showed a positive attitude towards EBNP, and the majority of participants considered research as relevant to nursing practice. However, implementation remains a challenge since they are not informed about recent research results, and only a minority is prepared to spend own money on congresses or to start academic nursing training in the near future. On the same line, Stichler et al.,⁽²³⁾ reported that nurses in Ireland have a positive attitude towards evidence-based nursing but face many obstacles, which include a lack of time, support, knowledge and confidence.

Studies have also shown that the attitudes towards EBNP were negatively correlated to participant's age. Hence, as the age increases, the attitude becomes more negative. This might be explained by the fact that the attitudes are hard to change, and this becomes even more difficult at older age, as indicated in the literature of Reed et al.⁽²⁰⁾

An interesting finding of the current study is the type of change in participants' perception of the barriers hindering the implementation of EBNP. While the perception of all the types of barriers has improved after the program, it was noticed that the participants considered the organization-related barriers as the most hindering at the pretest; they became the lowest at the posttest. On the contrary, the adopter (participant) related barriers became highest at the posttest. This indicates that the participants became more aware of their own deficiencies hindering the implementation of EBN, and that their negative perception (organizational factors) is wrong. This finding is in congruence with Timmins et al⁽²⁴⁾ and Tyer-Viola et al⁽²⁵⁾ who mentioned regarding nurses' readiness to EBP, which individual factors are known to influence engagement in research utilization and EBP, and that cognitive maturity is one factor that may enhance interest in and willingness to engage in clinical inquiry, research utilization, and EBP. Thus, participants may use good formal logic, but they also believe in authority, or revealed truth, as the criterion for knowledge and sometimes fail to perceive the need to evaluate evidence. Meanwhile, the success of the intervention in improving barriers to EBN is in agreement with the results reported by White-Williams et al⁽²⁶⁾ in a US military setting .

CONCLUSION AND RECOMMENDATIONS

The results of the study lead to the conclusion that participants in the study settings had deficient skills regarding of EBNP, although they were currently completing their researches and evidence based nursing practice through their master and/or doctorate courses. The implementation of a teaching module led to significant improvements in their knowledge, practice, attitudes, and their perception of barriers. Hence research hypothesis was achieved through conduction of the study.

RECOMMENDATIONS

- It is recommended to apply the module for further confirmation of the results and for its improvement, along with the use of a randomized trial design to provide stronger evidence at many other nursing fields.
- Faculty management should overcome faculty nursing staff barriers by creates a conducive environment through arranging EBNP training, supplying enough time to learn and implement new techniques, and provide socializing opportunities to promote peer-to peer information and knowledge sharing. Hence the teaching EBNP module should be included in the curriculum.
- Hospital administration policies should be flexible in allowing application and implementation of evidence in nursing practice.
- Regular in-service educational programs must be developed to increase the awareness and abilities for hospital nursing staff regarding the benefits and the integration of evidence in nursing practice.
- Nurse educators must work together with managers at hospitals to address organizational barriers and proactively support Evidence-Based Nursing Practice.
- Simple Arabic evidence based guidelines should be distributed to all hospital nursing staff in maternity and gynecologic units to improve their knowledge, performance and attitude.

Significance of the study:

Although EBNP is gaining increasing importance in the era of accreditation, its implementation in our settings is still lagging behind other areas of innovation. There is scanty information regarding nursing skills (knowledge, practice) and attitude as well as the barriers they perceive in its implementation. Hence, this study

was an attempt to empower faculty nursing staff members to identify their competencies in application of EBNP in their practice.

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