


# Predictors of Intensive Care Unit Nurses' Practice of Evidence-Based Practice Guidelines

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Ashraf Abuejheisheh, MSN, RN<sup>1</sup>, Omar Tarawneh, RN, MSN<sup>2</sup>,  
Jamal A. S. Qaddumi, PhD<sup>3</sup> , Omar Almahmoud, MSN<sup>4</sup>,  
and Muhammad W. Darawad, PhD, RN<sup>2</sup>

## Abstract

Although many studies discussed evidence-based practice among general nurses, few studies were found by the researchers among intensive care unit nurses. Also, no study has been conducted to investigate the predictors of evidence-based practice among intensive care unit nurses in Jordan. Therefore, this study aims to identify the predictors of evidence-based practice among intensive care unit nurses in Jordan. A descriptive cross-sectional design was used to conveniently recruit 132 participants. Self-reported questionnaires were utilized including the Evidence-Based Practice Questionnaire and Evidence-Based Practice barrier scale. Participants' rate of evidence-based practice was 60% ( $M = 4.2/7$ ), which was significantly correlated with their knowledge ( $r = 0.739, P < .01$ ) and attitudes ( $r = 0.564, P < .01$ ) of evidence-based practice. The results revealed a 2-predictor model that explained 62.2% of the variance in evidence-based practice among intensive care unit nurses. The 2 variables were attitude ( $\beta = 0.245$ ) and knowledge ( $\beta = 0.563$ ). The outcomes of this study added new information regarding the prediction of evidence-based practice among intensive care unit nurses. An educational program for nurses regarding this issue is crucial to improve their practice aiming at enhancing nursing care. Also, nursing schools should update their curricula to explain the importance of evidence-based practice and to enhance students' competencies in research utilization and statistical skills.

## Keywords

evidence-based practice, predictors, ICU nurses, Jordan

### What do we already know about this topic?

Although practice of evidence-based practice (EBP) by health care providers, including nurses, have many benefits for health care system, such as reducing mortality and morbidity as well as decreasing health cost, literature revealed that nurses are less likely to practice EBP in their clinical area.

### How does your research contribute to the field?

Some EBP barriers were found to impede the practice of EBP; finding the barriers and overcoming them could improve quality of care which is based on EBP rather than traditional ways to gain information.

### What are your research's implications toward theory, practice, or policy?

No studies were found to measure EBPs among ICNs in Jordan.

Knowledge of EBP was found to be the strongest predictor for practice of EBP, which means an educational program for nurses regarding this issue is crucial to improve the practice of EBP in clinical field that may enhance nursing care and eventually increase the quality of the provided health care. Also, nursing schools should update their curricula to explain the importance of EBP and to enhance students' competencies in research utilization and statistical skills.

## Introduction

Intensive care unit (ICU) is a specially designed and equipped unit staffed by skilled personnel to provide effective and safe care for critically ill patients with life-threatening problems.<sup>1</sup> It is designed to care for patients who are critically ill, have an unstable hemodynamic parameters, or have been undergoing a major surgical procedure. Intensive care nurses (ICNs) play



a crucial role in delivering care for the complicated critically ill patients to promote their health and prevent complications. The provided care should be EBP to achieve high quality of care provided to the patients and their families in ICUs.<sup>2</sup> Thus, patients are ensured to receive a safe and effective treatment, cost-effective services that reduce unnecessary procedures, and decrease medical errors and unnecessary testing.<sup>3</sup>

In the current era, EBP is considered a critical factor to improve quality of care. It became a major focus for all health care quality stakeholders especially due to increased expectations of higher quality of care including nursing care.<sup>4</sup> If nurses routinely use the best EBP in their clinical field, the quality of health care provided for patients will be improved.<sup>5</sup> For example, patient outcomes were improved by 28% when clinical care was based on evidence rather than conventional practices.<sup>6</sup> So, most health care organizations are currently emphasizing on the importance of EBP to improve and ensure the quality of their patient's care.<sup>7</sup> However, knowing that 30% to 40% of patients do not receive health care that is based on available research findings and that further 20% to 25% of patients receive harmful or unnecessary care<sup>8</sup> add an extra obligation on nurses to base their practices on EBP rather than on their own experiences and schoolbooks information.<sup>9</sup>

Although practice of EBP by health care providers, including nurses, have many benefits for health care system such as reducing mortality and morbidity as well as decreasing health cost, literature revealed that nurses are less likely to practice EBP in their clinical area.<sup>10,11</sup> Shirey<sup>12</sup> showed that nurses are practicing EBP with only 15%. Also, a study to examine the factors affecting practicing EBP revealed that nurses are depending on their experience to solve clinical situation rather than evidence obtained from research.<sup>13</sup> Furthermore, Grol et al<sup>7</sup> reported that nurses and other health care providers are not always using the best EBP in patients' care, which may negatively affect the outcome of patients.

Many factors were found to affect ICU nurses' practice of EBP including nurses' negative attitudes toward EBP, low level of nurses' knowledge regarding EBP, and barriers to use EBP in clinical practice.<sup>14</sup> Majid et al<sup>15</sup> revealed that about 64% of nurses had positive attitudes toward using EBP in their clinical practice. Another study examined nurses' attitude toward EBP that found to be positive with a percentage of 70%.<sup>2</sup> The positive nurses' attitudes toward EBP may be due to increased number of nurses with higher level of

education such as master degree, the long practice experience period, institutional support, and embrace of research.<sup>2,16</sup>

Low level of nurses' knowledge regarding EBP was found to be another predictor for practice of EBP by nurses in the clinical area.<sup>6,10,17</sup> Barriers to practice EBP among ICU nurses were considered as additional predictor that might negatively affect the practice of EBP.<sup>18</sup> These barriers included the following: (1) lack of time to find research report, (2) inadequate time to find institutional policies about research, (3) inability to make critique of research, (4) and lack of time for the new evidence based to be implemented and to make change in practice.<sup>13</sup> Also, a survey by Thorsteinsson<sup>19</sup> to assess the barriers for registered nurses to use EBP showed that the most two ranked barriers were lack of search skills and lack of skills to critique or synthesize the literature. Similarly, lack of time to read research was the most frequently reported barrier to using research, and administrators not allowing practice was the least frequently cited.<sup>20</sup> Another common barrier to using EBP was the lack of authority among nurses to make changes in practice.<sup>21</sup>

Although many studies discussed EBP among general nurses regarding their knowledge, attitudes, and barriers, few studies concerning these issues were found by the researchers among ICU nurses. Also, up to researchers' knowledge, no study has been conducted to investigate the predictors of EBP among ICU nurses in Jordan. Most of the studies mentioned in literature regarding EBP among nurses were found to describe knowledge, attitudes, and barriers such as estimating the level and mean score of these variables. Limited research was available to identify the predictors of EBP among ICU nurses. Therefore, this study aimed to identify the predictors of EBP among ICNs in Jordan.

## Methods

### Design

A descriptive design using cross-sectional survey was used for the purpose of this study.

### Setting

The sample was recruited from 3 hospitals of the 3 health care sectors in Jordan: public, private, and university-affiliated hospitals. Also, eligibility criteria for the hospitals included

<sup>1</sup>Arab American University, Jenin, Palestine

<sup>2</sup>The University of Jordan, Amman, Jordan

<sup>3</sup>An-Najah National University, Nablus, Palestine

<sup>4</sup>Birzeit University, Ramallah, Palestine

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#### Corresponding Author:

Jamal A. S. Qaddumi, Associate Professor, Faculty of Medicine and Health Sciences, An-Najah National University, P.O. Box 7, Nablus, 0097, Palestine.

Email: jamal9877@najah.edu

the following: (1) considered at least as medium size hospital according to the Association for Community Health Improvement<sup>22</sup> report that divided hospitals into 3 main sizes according to their bed capacity: small which is less than 100 beds, medium from 100 to 299 beds, and large size with more than 300 beds and (2) contain at least one ICU with a minimum of 7 beds per unit. Random selection from a list of eligible hospitals was applied.

### *Sampling*

All nurses working in the Jordanian adult ICUs were included in the target population of this study. Accessible populations were the ICU nurses working in private, public, and educational hospitals, and 1 hospital of each selected sector participated in this study. A convenience sampling technique was used to recruit ICU nurses from the selected hospitals. The sample of this study had inclusion and exclusion criteria. Inclusion criteria included the following: (1) work as a registered nurse in the ICUs and (2) had at least 1 year of work experience in ICU to ensure that all nurses have adequate training and knowledge regarding the properties of ICU care and knowledgeable with the concept of EBP. The administrator nurses were excluded, because they are not providing direct care to ICU patients. According to power analysis<sup>23</sup> with alpha significance level of 0.05, power of 0.80, and medium effect size of 0.50 of multiple linear regression test, the minimum sample size was 107. However, a larger number of questionnaires were distributed.

### *Instruments*

The instruments package of this study had 3 main sections. The first one was demographic section, developed by the researchers, which consisted of 7 items including age, gender, years of experience, area of working, level of education, type of hospital, and having previous research training or not. The second section had the Evidence-Based Practice Questionnaire (EBPQ), which was predesigned to describe the nurses' knowledge, attitudes, and practice regarding EBP.<sup>24</sup> The EBP questionnaire has 23 items categorized under 3 subscales, including practice (6 items), attitudes (4 items), and knowledge (13 items). The EBPQ uses a 7-point Likert-type scale, with higher scores indicating more frequent use of EBP, positive attitudes, and a more knowledge of EBP; responses were considered positive if the scores were greater than 4.

The final section was barrier scale which is widely used in literature to assess the barriers to practice EBP by nurses.<sup>25</sup> A high score indicate a greater perception by ICU nurse as a barrier. The internal reliability of the Cronbach alpha for EBPQ was 0.95 (subscales practice, knowledge, and attitudes were 0.90, 0.77, and 0.93, respectively) and

barrier scale was 0.87 for each one. The construct validity was assessed by using an independent measure of EPB with the results yielding a positive relationship between the scales.<sup>24</sup> The 2 tools were in English language in addition to the demographic data sheet.

### *Data Collection*

When the required ethical approvals were gained, the researchers made an appointment with nursing administrators to facilitate communication with head nurses of ICUs and ICNs. All eligible ICNs were invited to participate in the study, and the questionnaires were distributed to them after full explanation about the purpose of the study. In this study, confidentiality of the participation was preserved. There was a cover letter in the beginning of each questionnaire, which included information related to the title of the study, purpose, significance, and a statement informing the ICU nurses that their privacy will be protected. The ICU nurses were requested to complete the questionnaires according to their permitted time. The questionnaire took about 10 to 15 minutes to be filled. During ICU nurses filling the questionnaire, the researchers were available in the units to answer any question from the participants related to the study.

### *Ethical Consideration*

Ethical approval was obtained from the scientific research committee at the School of Nursing, the University of Jordan, and institutional review board of each targeted hospitals before starting data collection. Nurses' participation was voluntary and confidentiality was preserved. Also nurses were assured that their response will be confidential. Consent form and questionnaire were distributed to all ICU nurses who expressed interest in participation in the study. Consent included information about purpose of study, brief description of what the nurse will be asking to do, clarification that no risks or harms in participation, explaining how the participant information will be kept confidential, and how much time they will spend by participating in the study. Furthermore, ICU nurses were told that they could withdraw from the study at any time and there will be no penalty or loss of benefits if they decide to stop.

### *Analysis Plan*

Statistical Package of Social Science (SPSS, Version 22; SPSS Inc., Chicago, Illinois) was used for this purpose. The normality assumption of the data was tested by using frequency distribution, skewness, and kurtosis.<sup>26</sup> The Pearson correlation was used to assess the correlation between mean scores of attitudes, knowledge, barriers, and practice of EBP. Finally, multiple linear regressions were used to identify the most significant predictors of EBP.

**Table 1.** Nurses' Demographic Characteristics (N = 132).

Variable	n (%)	M (SD)
Age (years)		29.9 (6.1)
Experience (years)		6.5 (5.5)
Gender		
Male	56 (42.4)	
Female	76 (57.6)	
Type of hospital		
Governmental	48 (36.4)	
Educational	33 (25)	
Private	51 (38.6)	
Attending EBP courses		
Yes	70 (53)	
No	62 (47)	
Educational level		
Bachelor's degree	112 (84.8)	
Master's degree	20 (15.2)	
Unit of ICU		
Surgical	22 (16.7)	
Medical	11 (8.3)	
Cardiac	3 (2.3)	
Neuro	26 (19.7)	
Mixed	70 (53)	

Note. EBP = evidence-based practice; ICU = intensive care unit.

## Results

### Sample Description

A total of 160 nurses were approached from different hospitals, out of which 132 nurses returned the survey (response rate = 82.5%). The analysis showed that the mean age of nurses was 30 (SD = 6.1) years and nurses' mean years of experience in the ICU was 6.5 (SD = 5.5) years. The majority of sample were females (57.6%, n = 76), had bachelor degree in nursing (84.8%, n = 112), recruited from private hospitals (38.6 %, n = 51), and working in mixed ICU (53%, n = 70). Table 1 presents the detailed demographic characteristics.

### Correlation Between Attitude, Knowledge, and Practice of EBP

The analysis revealed that the ICU nurses' EBP mean score was 4.2 (SD = 1.50), which is considered relatively moderate. The highest mean score for nurses' practice of EBP was 4.6 (SD ± 1.4) in governmental health care sector, while educational hospital had the lowest mean score of 3.9 (SD ± 1.4). The mean scores for ICU nurses' attitude and knowledge of EBP were 4.9 and 4.3, respectively. Concerning the barriers in general, the mean score among ICU nurses was 2.66 (SD ± 0.64), and in the subscales of EBP barriers, setting was the most barrier with a mean score of 3.02 (SD ± 0.61), while the nurse was the least barrier with a mean score

**Table 2.** Mean Score of the EBP and Barrier Variables.

Variable	No. of items	M (SD)	Range
EBP	6	4.29 (1.50)	1-7
EBP attitude	4	4.91 (1.47)	1.75-7
EBP knowledge	13	4.35 (1.31)	1.46-6.54
EBP barriers total	27	2.66 (0.64)	1.67-3-67
barriers: nurse	8	2.39 (0.67)	1-3.75
barrier: setting	7	3.02 (0.61)	1.29-4
barrier: quality	6	2.63 (0.67)	1-3.83
barrier: communication	6	2.64 (0.63)	1.33-3.83

Note. EBP = evidence-based practice.

of 2.39 (SD ± 0.67). The mean scores and standard deviations of the study variables presents in Table 2.

Examining the correlation of EBP with other study variables, some of the demographic variables were correlated with EBP. The Pearson correlation test was computed to determine the relationships between EBP and other study variables of attitude, knowledge, and barriers, and analysis showed significant correlation between practice and the most of study variables. Age, experience, and level of education found to be significantly correlated with EBP. The most significant correlation was between practice and knowledge ( $r = 0.739$ ,  $P < .01$ ), which is considered positively high. Also, there was significant moderate correlation between practice and attitude ( $r = 0.564$ ,  $P < .01$ ). Despite no significant correlation between practice and total barriers, there were significant negative correlations between practice and subscale of the following barriers: nurse barrier ( $r = -0.257$ ,  $P < .01$ ) and setting barrier ( $r = -0.179$ ,  $P < .05$ ), which is considered as low correlation for both nurse and setting barriers. Furthermore, there was a statistically significant correlation between attitude and knowledge ( $r = 0.480$ ,  $P < .01$ ), and there was negative statistical significant correlation between knowledge and nurse barriers ( $r = -0.290$ ,  $P < .01$ ). Table 3 shows the correlation between different variables.

### Factors Predicting Practices of EBP

Multiple linear regression test was used to identify the potential predictors for practice of EBP among ICU nurses. To identify which variables are the potential predictors of EBP, the Student *t*-test and ANOVA were conducted. From the demographic variables that were tested, only level of education was found to be correlated with practice of EBP, which was included as a potential predictor in multiple linear regressions. Concerning the main study variable of attitude, knowledge, nurses' barrier, and setting barrier were entered to the stepwise model. The results revealed a 2-predictor model that explained 62.2% of the variance in EBP among ICU nurses. The 2 variables, attitude and knowledge, were found to be the significant predictors for practice of EBP ( $\beta = 0.245$  and  $0.563$  for attitude and knowledge,

**Table 3.** The Pearson Correlation Matrix of Key Study Variables.

	1	2	3	4	5	6	7	8	9	10
Age	1									
Experience	.941**	1								
EBP knowledge	.063	.093	1							
EBP attitude	.106	.092	.480**	1						
EPB barriers total	-.034	.005	-.172*	-.067	1					
Barrier: nurse	-.012	.051	-.290**	-.123	.756**	1				
Barrier: setting	-.005	.007	.164	.143	.511**	.083	1			
Barrier: quality	.003	.000	-.183*	-.171*	.789**	.440**	.215*	1		
Barrier: communication	-.092	-.063	-.153	-.029	.815**	.523**	.203*	.677**	1	
EBPs	.232**	.229**	.739**	.564**	-.107	-.257**	-.179*	-.115	-.074	1

Note. EBP = evidence-based practice.

\*Correlation is significant at the .05 level (2-tailed). \*\*Correlation is significant at the .01 level (2-tailed).

**Table 4.** Predictors for Practice of EPB.

Variable	B	SE	$\beta$	t	Significance
Age	.062	.040	.252	1.531	.128
Exp	-.027	.045	-.098	-0.591	.556
Education	.437	.236	.105	1.852	.066
EBP attitude	.287	.072	.245	3.967	.000
EBP knowledge	.640	.075	.563	8.545	.000
Nurse barriers	-.121	.131	-.054	-0.927	.356
Setting barriers	.143	.135	.058	1.062	.290

Note.  $R^2 = 0.646$ , adjusted  $R^2 = 0.626$ ,  $F$ -statistic = 32.26,  $df = 7$ .

EBP = evidence-based practice.

respectively). Of these, knowledge was the strongest predictor. However, many independent factors in this study were found to be non-statistically significant predictors for practice of EBP among nurses in ICUs (Table 4).

## Discussion

The main purpose of this study was to study the predictors of EBP among ICNs. Up to researchers' knowledge, limited studies were found to identify the predictors for practice of EBP among ICNs. This shortage of studies might add significance for our study due to its emphasis on factors that predict practice of EBP rather than on description of the practice and other variables such as knowledge, attitude, and barriers. The results revealed that the mean score of nurses' EBP was 4.29 out of 7, which is considered to be the low level of EBP. This result was consistent with Phillips,<sup>2</sup> who reported that the EBP means score among ICNs was 4.3 out of 7. Furthermore, it is relatively congruent with the Brown et al<sup>10</sup> study, which reported that mean score of practice among nurses was 5.21 of 7. Also, Shirey<sup>12</sup> reported that nurses are practicing EBP with only 15%. This low level of practice could be explained by the high total barriers reported in this study with mean score of 2.66 out of 4.

The most barrier to practice EBP was setting barrier with mean score of 3.02 out of 4, which might be explained by lack of resources regarding health care,<sup>27</sup> overload work,<sup>28</sup> and low support from hospital administration to applying EBP.<sup>29</sup> However, the least barrier was nurses' barrier with mean score of 2.39 out of 4, which might be explained by a good intention to adhere with EBP among nurses.<sup>30</sup>

According to the results of this study, attitude and knowledge were the only significant predictors for practice of EBP, and nurses' knowledge regarding EBP was the strongest. This is consistent with Griffiths et al,<sup>31</sup> who reported that knowledge is considered as a key stone to use EBP by nurses in clinical area. Furthermore, knowledge, attitude, and nurses' awareness of researcher were found to be the significant predictors for nurses to practice EBP in their clinical areas.<sup>32</sup> High level of education might enhance ICNs' abilities to practice EBP in their clinical area.<sup>18</sup> Conversely, in the current study, although holding master's degree among nurses appeared to be not significant predictor to practice EBP, it was significantly difference with practice of EBP.

## Limitations

At the time of this study, no studies were found to measure EBPs among ICNs in Jordan. Despite the sample of this study was relatively small and recruited only from the ICUs in the middle region of Jordan, the study sample might be considered representative because there is about 81% of hospitals in Jordan located in the middle region including Amman city and because the sample gave specific exploration for the practice of EBP among ICNs and not for general nurses in other departments. Despite these measurement limitations, this study found strong predictors of self-reported EBPs and serves as a foundation for future research investigating the full range of EBPs among ICNs.

## Conclusions

The purpose of the study was to identify the predictors of ICNs' practice of EBP. The outcomes of this study added new information regarding the prediction of EBPs specifically among ICNs. Knowledge of EBP was found to be the strongest predictor for practice of EBP, which means an educational program for nurses regarding this issue is crucial to improve the practice of EBP in clinical field that may enhance nursing care and eventually increase the quality of the provided health care.<sup>6</sup> Also, nursing schools should update their curricula to explain the importance of EBP and to enhance students' competencies in research utilization and statistical skills. Evidence-based practices help ICNs to provide patient care based on research rather than traditions, myths, or advice of colleagues. Health care institutions should make EBP a corner stone for the provided care in their facilities to increase patient quality of life and to be updated with globalization of research worldwide. Some EBP barriers were found to impede the practice of EBP, and the main barrier in this study was setting barrier; despite the barriers to practice EBP, predictors of EBP can be enhanced by using strategies to improve EBP training to facilitate practices of EBP.<sup>33</sup> Furthermore, overcoming the barriers to practice EBP in ICUs, such as allotting time for nurses to find and practice research, could increase the practice.<sup>13</sup> Finally, future studies concerning this subject with different and new research methods should be encouraged to explore the EBP mainly in terms of practice.

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## ORCID iD

Jamal A. S. Qaddumi  <https://orcid.org/0000-0001-6984-3020>

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