Original Article

A Multicountry Study on Nursing Students' Self-Perceived Competence and Barriers to Evidence-Based Practice

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ABSTRACT

Key words

attitudes, competence, cultural implications, evidence-based practice, knowledge, skills, multicountry research, nursing student

Background: Nursing education and training are essential in the attainment of evidence-based practice (EBP) competence in nursing students. Although there is a growing literature on EBP among nursing students, most of these studies are confined to a single cultural group. Thus, cross-cultural studies may provide shared global perspectives and theoretical understandings for the advancement of knowledge in this critical area.

Aims: This study compared self-perceived EBP competence among nursing students in four selected countries (India, Saudi Arabia, Nigeria, and Oman) as well as perceived barriers to EBP adoption.

Methods: A descriptive, cross-sectional, and comparative survey of 1,383 nursing students from India, Saudi Arabia, Nigeria, and Oman participated in the study. The Evidence-Based Practice Questionnaire (EBP-COQ) and the BARRIERS scale were used to collect data during the months of January 2016 to August 2017.

Results: Cross-country comparisons revealed significant differences in EBP competence ($F = 24.437$, $p < .001$), knowledge ($F = 3.621$, $p = .013$), skills ($F = 9.527$, $p < .001$), and attitudes ($F = 74.412$, $p < .001$) among nursing students. Three variables including nursing students' gender ($\beta = .301$, $p < .001$), type of institution, ($\beta = -0.339$, $p = .001$), and type of nursing student ($\beta = .321$, $p < .001$) were associated with EBP competence. Barriers to EBP adoption included having no authority to change patient care policies ($M = 1.65$, $SD = 1.05$), slow publication of evidence ($M = 1.59$, $SD = 1.01$), and paucity of time in the clinical area to implement the evidence ($M = 1.59$, $SD = 1.05$).

Linking Evidence to Action: Both academe and hospital administration can play a pivotal role in the successful acquisition of EBP competence in nursing students.

INTRODUCTION

In today's healthcare environment, practicing nurses are in high demand to utilize current evidence in making clinical decisions relative to patient care (Melnyk, Gallagher-Ford, Long, & Fineout Overholt, 2014). This can be best achieved through thoughtful incorporation of the current research in the care of the patient along with nurses' expertise, patient preferences or values, and local context.

Evidence-based practice (EBP) is defined as a problem-solving approach in making clinical decisions within the healthcare organization and is attributed to improved clinical outcomes (e.g., decreased rates of hospital infections, falls, and pressure ulcers), functional outcomes (e.g.,

increased performance of daily activities), quality of life outcomes (e.g., enhanced physical and mental health), and economic outcomes (e.g., reduced healthcare costs; Dang & Dearholt, 2017; Melnyk et al., 2014). Additionally, EBP enhances patients' access to healthcare information regarding the best treatment and provides opportunities for highly personalized, quality, and safe nursing care (Melnyk & Gallagher-Ford, 2015; Melnyk et al., 2014).

LITERATURE REVIEW

Laibhen-Parkes (2014) defined EBP competence as "the ability to ask clinically relevant questions for the purposes

of acquiring, appraising, applying, and assessing multiple sources of knowledge within the context of caring for a particular patient, group, or community" (p. 180). EBP competence is a concept that incorporates a variety of important domains, including EBP knowledge, skills, and attitudes (Ilic, 2009; Laibhen-Parkes, 2014; Tilson et al., 2011). EBP knowledge refers to the learner's understanding of the concepts and basic principles of EBP, formulating structured and answerable clinical questions, and describing the levels of evidence. EBP skills pertain to the learner's ability to search for the best available evidence to answer the clinical question, appraising levels of evidence, application of the results of appraisal into clinical practice, and evaluating its impact within the context in which it was implemented (Ilic, 2009). Along with EBP knowledge and skills, attitude toward EBP or the values ascribed by the learner to the relevance and usefulness of EBP to inform clinical decision-making is also considered an important EBP domain (Ilic, 2009; Laibhen-Parkes, 2014; Tilson et al., 2011).

A large body of evidence has shown that equipping future nurses with the necessary knowledge and skills on EBP and assisting them to gain a more positive attitude toward EBP is vital in promoting evidence-based nursing practice in the future (Ashktorab, Pashaeypoor, Rassouli, & Alavi-Majd, 2015; Park, Ahn, & Park, 2015; Ramis, Chang, & Nissen, 2018; Ryan, 2016). Conversely, the lack of EBP knowledge, skills, and attitude would undermine future nurses' capability to utilize evidence in the future (Ashktorab et al., 2015; Brown, Wickline, Ecoff, & Glaser, 2009; Ryan, 2016).

Nursing education and training are both essential in the acquisition and achievement of EBP competence in nursing students. Nurse faculty are strategically positioned to model and advance EBP among nursing students by facilitating an evidence-based nursing approach to guarantee that the future nursing workforce are competent and highly prepared for the challenges of the increasingly complex and EBP-driven healthcare environment (Sin & Bliquez, 2017). Nursing faculty can assist nursing students to increase their knowledge in EBP concepts and skills in searching and selecting the best evidence, appraising the evidence, and then translating it into practice (Hickman, Kelly, & Phillips, 2014; Saunders & Vehviläinen-Julkunen, 2016).

Available evidence has shown inconclusive and varying results pertaining to self-perceived EBP competence among nursing students. A limited number of studies have reported that nursing students are generally prepared and competent to apply EBP in the clinical area (Florin, Ehrenberg, Wallin, & Gustavsson, 2012; Ryan, 2016), whereas other authors reported that nursing students' confidence, knowledge, and beliefs in the importance of EBP to guide clinical decisions have largely been negative (André, Aune, & Brænd, 2016; Llasus, Angosta, & Clark, 2014).

Despite greater emphasis on EBP in nursing education, many studies have reported several barriers to implementing EBP in clinical practice among nursing students. A review of the literature finds most barriers related to the organization or setting, such as the lack of support and opportunities, resources, time, and authority to change practice (Brown, Kim, Stichler, & Fields, 2010; Rojjanasrirat & Rice, 2017; Ryan, 2016). In a qualitative inquiry by Brooke, Hvalič-Touzery, and Skela-Savič (2015), nursing students perceived EBP and research findings as equally important in their current nursing practice; however, understanding EBP and research concepts remained both a barrier and a great challenge. Identification of these barriers may assist and guide nursing faculty in selecting appropriate measures that would best enhance EBP competence in nursing students.

Research has demonstrated that nursing education and training have a positive influence on successful achievement of EBP competence in nursing students (André et al., 2016; Brown et al., 2009; Leach, Hofmeyer, & Bobridge, 2016; Llasus et al., 2014); however, an extensive review of related literature failed to identify any studies comparing knowledge, attitudes, and skills regarding EBP as well as perceived barriers to EBP adoption among nursing students from a multicountry perspective. Findings from a multicountry research study are vital as it may provide common and shared global perspectives and theoretical understandings for the advancement of knowledge in this critical area. Therefore, this study compared EBP competence and perceived barriers to EBP adoption among nursing students from four countries: Oman, India, Nigeria, and Saudi Arabia. Furthermore, factors associated with self-perceived EBP knowledge, attitudes, and skills in nursing students were additionally examined. The knowledge gained from this study is important for identifying, planning, and implementing empirically tested interventions or approaches to improve and enhance EBP competence and care offered to patients.

METHODS
Research Design
This study adopted a comparative, cross-sectional research design.

Samples and Settings
During the months of May 2016 to August 2017, 1,527 nursing students were invited to participate in the study and 1,383 responded, a 90.6% response rate. Nursing schools in the sampled countries were known to have implemented and integrated EBP in their nursing curricula. In this study, the inclusion criteria included the following: (a) regular and bridging nursing students, (b) in their 2nd to 4th year level of education, and (c) having consented to participate in the study. Due to the lack of exposure to clinical training and having no exposure or awareness of nursing research, the 1st year nursing students were excluded.

Instruments

Self-report questionnaires consisted of three parts: (a) Demographic information, (b) Evidence-Based Practice Questionnaire (EBP-COQ), and (c) BARRIERS scale.

To measure EBP competencies in nursing students, the EBP-COQ developed by Ruzafa-Martinez, Lopez-Iborra, Moreno-Casbas, and Madrigal-Torres (2013) was used. The tool is a 25-item scale that was classified into three distinct subscales: (a) attitudes toward EBP, (b) EBP skills, and (c) EBP knowledge. Nursing students were asked to indicate how much they agree or disagree on each item using a five-point Likert scale (0 = *neutral*, 1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*). The scale showed a moderate to high internal consistency with a Cronbach's α of .88 as previously reported (Ruzafa-Martinez et al., 2013). In this study, the test–retest reliability of the EBP-COQ was 0.94. The test–retest reliability values for EBP-COQ subscales were 0.95 for attitudes, 0.93 for skills, and 0.96 for knowledge.

The BARRIERS scale, which was originally developed by Funk, Champagne, Wiese, and Tornquist (1991) to examine barriers to research utilization among practicing nurses, was used to examine barriers to EBP adoption in nursing students. This scale has been widely used in many studies to examine barriers to EBP adoption in both practicing nurses and nursing students (Brown et al., 2009, 2010). It is a 29-item scale organized into four factors: attributes of the adopter (in this study, this pertains to the students), attributes of the innovation (in this study, this pertains to evidence), and attributes of the evidence communication (in this study, this pertains to modes to convey the evidence). Nursing students were asked to rate each item of the scale using a four-point Likert scale (1 = *no extent*, 2 = *to a little extent*, 3 = *to a moderate extent*, and 4 = *to a great extent*). The test–retest reliability of the scale in the current study was higher (α = .94) than in previous studies (α = .80; Funk et al., 1991). The test–retest reliability values for the BARRIERS subscales were 0.95 for attitudes of the adopter, 0.96 for attitudes of the organization or setting, 0.93 for attributes of the research, and 0.93 for the attributes of the research communication.

The original author granted permission to use and make minimal item amendments for use with the nursing student population. The original English version of the tool was utilized for respondents from India, Nigeria, and Oman. For the country of Saudi Arabia, the tool was translated into Arabic by each respective research partner. To ensure the content validity of the translated versions, the tool was subjected to panel discussions of experts within the respective country.

Data Collection

Communication letters with detailed information about the study were forwarded to the nursing students in the selected nursing schools. Once identified as a potential study participant based on the eligibility criteria, a written consent for participation in the study was obtained. The questionnaires were administered to the participants during their free time at the end of their semester. Number-coded forms were kept securely and separately from the number-coded file to maintain confidentiality. Hard copy files were kept in a secured cabinet to ensure any disclosure.

Ethical Considerations

IRB approval was obtained by each research partner from his or her respective institutional review committees in the four countries. In addition, several mechanisms were followed to ensure the confidentiality and anonymity of each participant: (a) Nursing students were informed of the nature of the research along with their rights as a participant, (b) the benefits that could be derived from participation in the study were likewise explained to the nursing students, (c) possible risks from participating in the research were disclosed, and (d) nursing students' anonymity was assured. Informed consent forms were signed after which the researchers personally dispersed the questionnaires at the respective sites and collected them upon completion.

Data Analysis

Both descriptive and inferential statistical tools were used to analyze the data collected. No missing values for the EBP-COQ were noted, whereas five cases had missing values for the BARRIERS scale. As the cases were missing <5% of responses, data were imputed using an imputation strategy (substitution). To quantify the answers to the research questions, the following descriptive statistical tools were used: frequencies, means, percentages, and standard deviations. Inferential statistical tools such as Pearson's correlation coefficient, chi-square, independent t test, and analysis of covariance (ANCOVA) were used to compare selected variables. Multiple linear regression analysis was conducted after the normality of the data of the EBP-COQ was evaluated using the Shapiro–Wilk test. Post hoc pairwise comparisons were performed on parameters significantly different on ANCOVA testing. The Bonferroni test was used to correct for the familywise errors in the pairwise comparisons. The alpha level, representing the probability of a Type I statistical conclusion error, was set at .05 for all procedures.

RESULTS
Nursing Students' Characteristics

One thousand three hundred and eighty-three students from Oman (N = 320, n = 247, response rate = 77.2%), India (N = 357, n = 334, response rate = 93.6%), Nigeria (N = 440, n = 407, response rate = 92.5%), and Saudi Arabia (N = 410, n = 395, response rate = 96.3%) participated in the study during the months of May 2016 to August 2017. Table 1 shows the complete characteristics of the students.

Table 1. Demographic Characteristics (N = 1,383)

Variables	Oman	India	Saudi Arabia	Nigeria	Total	F/chi-square	df
n	247	334	395	407	1,383		
Response rate	77.2%	93.6%	96.3%	92.5%	90.6%		
Age (mean, SD)	23.46 (17.81)	20.29 (4.88)	22.81 (5.27)	28.24 (6.86)	23.91 (6.03)	154.57*	(3, 1,380)
Gender							
Male	44 (17.81%)	34 (10.18%)	262 (66.33%)	42 (10.32%)	382 (27.62%)	518.83*	(3)
Female	203 (82.19%)	300 (89.92%)	133 (33.67%)	365 (89.68%)	1,001 (72.38%)		
Type of institution							
Private	71 (28.74%)	287 (85.93%)	30 (7.59%)	0 (0%)	388 (28.05%)	790.90*	(3)
Public	176 (71.26%)	47 (14.07%)	365 (92.41%)	407 (100%)	994 (71.87%)		
Academic level							
Level 2	12 (4.86%)	14 (4.19%)	15 (3.80%)	0 (0%)	41 (2.96%)	54.83*	(6)
Level 3	92 (37.25%)	169 (50.60%)	217 (54.94%)	158 (38.82%)	636 (45.99%)		
Level 4	143 (57.89%)	151 (45.21%)	163 (41.27%)	249 (61.18%)	706 (51.05%)		
Type of student							
Regular (BSN)	202 (81.78%)	332 (99.40%)	324 (82.03%)	253 (62.16%)	1,111 (80.33%)	162.96*	(3)
Bridging (RN to BSN)	45 (18.22%)	2 (0.60%)	71 (17.97%)	154 (37.84%)	272 (19.67%)		

*p < .001.

Association Between Self-Perceived EBP-COQ and Nursing Students' Characteristics

Bivariate analysis showed statistically significant differences in the self-perceived EBP-COQ mean scores according to the country of origin (F = 64,604, p = .05), gender (t = −9.361, p < .001), type of institution (t = 9.718, p < .001), and type of student (t = 8.897, p < .001). Furthermore, there were no statistically significant differences in the self-perceived EBP-COQ mean scores according to age and academic year level (Table 2).

Factors Associated With Self-Perceived EBP Competence in Nursing Students

Among the different factors that were associated with self-perceived EBP competence, the adjusted coefficient of the multiple determination (adjusted R^2) of the statistical model indicated that 9.5% of the self-perceived EBP-COQ were explained by gender (β = .301, p < .001), type of institution (β = −.339, p < .001), and type of student (β = .321, p < .001; Table 3).

Between Countries Comparison in Nursing Students' Self-Perceived EBP Competence EBP-COQ (Attitude Domain)

Cross-country comparisons were performed to examine the differences in the overall self-perceived EBP-COQ mean and EBP-COQ subscales across four countries (Table 4). Since important differences were identified between the four countries, the ANCOVA test was carried out and some demographic variables such as the age, gender, type of institution, type of students, and academic year level as covariates were controlled. The Bonferroni adjustment was used for post hoc analysis and pairwise multiple comparisons. The result showed that there were statistically significant differences in the self-perceived EBP-COQ (Attitude subscale) means between the four countries (F = 74.412, p < .000). Pairwise comparisons using Bonferroni adjustment showed that Saudi Arabia had a lower mean compared with Oman (p = .000), India (p = .000), and Nigeria (p = .000). Further, Nigeria had a higher mean compared with Saudi Arabia (p = .000), India (p = .017) and Oman (p < .000).

EBP-COQ (Skill Domain)

Using the ANCOVA test, the results showed statistically significant differences in the self-perceived EBP-COQ (Skill Subscale) means between the four countries (F = 9.527, p < .000). In addition, pairwise comparisons using the Bonferroni adjustment showed that Nigeria had a higher mean compared with Oman (p = .016) and Saudi Arabia (p < .000; Table 4).

EBP-COQ (Knowledge Domain)

When the self-perceived EBP-COQ (Knowledge Domain) means for each country were compared using the ANCOVA

Table 2. Correlation Between EBP-COQ and Respondents' Characteristics

Variables	EBP-COQ		Test statistics, *p* value	Cohen's *d*
	Mean	**SD**		
			***r* value**	
Age			0.002†	0.221
			***t* test**	
Gender				
Male	1.979	0.724	−9.361**	0.577
Female	2.395	0.717		
Type of institution				
Private	2.173	0.808	9.718**	0.533
Public	2.580	0.678		
Student type				
Regular (BSN)	2.102	0.764	8.897**	0.426
Bridging (RN to BSN)	2.401	0.634		
			***F* test (*df*)**	
Academic level				
2	2.084	0.652	2.916† (2, 1,381)	0.031
3	2.262	0.645		
4	2.327	0.820		
Country				
Oman	2.331	0.711	64.604* (3, 1,380)	0.401
India	2.569	0.789		
Saudi	1.899	0.749		
Nigeria	2.417	0.741		

*$p < .05$, **$p < .001$; †not significant.

test, the results showed statistically significant differences in the self-perceived EBP-COQ means between the four countries (F = 3.621, *p* = .013). Using the Bonferroni adjustment, pairwise comparisons showed that Nigeria had a higher mean compared with Saudi Arabia (*p* = .007; Table 4).

EBP-COQ (Overall Competence)
Analysis of covariance (ANCOVA) results showed that there were statistically significant differences in the self-perceived total EBP-COQ means between the four countries (F = 24.437, *p* < .000). In addition, pairwise comparisons using the Bonferroni adjustment showed that Saudi Arabia had a significantly lower mean compared with Oman, India, and Nigeria (all *p* < .000; Table 4).

Top Ranked Barriers Scale Items per Country
Table 5 reflects the top 10 ranked items in the BARRIERS SCALE according to each country. Overall, the majority of the top ten 10 items ranked by the nursing students were from the "setting/organization" subscale (6 out of 10).

Relationships Between the Overall EBP-COQ Mean and Subscale Means and BARRIERS Scales
The correlations between the self-perceived EBP-COQ subscale and the BARRIERS Scale were examined using Pearson's correlation coefficients (Table 6). The "knowledge" domain strongly correlated with "skills" and "attitude" domains. Furthermore, strong but negative correlations were found between the BARRIERS scales and the three domains of the self-perceived EBP-COQ (all *p* < .000).

DISCUSSION
In this study, the mean score for the self-perceived EBP-COQ across the four countries ranged from 1.89 (Saudi Arabia) to 2.331 (India) with an overall mean of 2.290

Table 3. Factors Associated with EBP Competence in Nursing Students (Multivariate Analysis)

Predictor variables	β	SE	95% CI
Gender			
Male (reference category)	0		
Female	.301*	0.046	0.210 to 0.391
Type of institution			
Public (reference category)	0		
Private	−.339*	0.044	−0.252 to −0.426
Students type			
Regular (BSN) (reference category)	0		
Bridging (RN to BSN)	.321*	0.031	0.278 to 0.398
Academic level			
Fourth year (reference category)	0		
Third year	−.061[†]	0.039	−0.138 to 0.016
Fourth year	−.200[†]	0.113	−0.422 to 0.023

Notes. Adjusted R^2 = 9.5%; F = 30.251 ($p < .001$).
*$p < .001$; [†]not significant.

($SD = 0.74$), which is above the midpoint with small variability, suggesting moderate to high EBP competence in nursing students. Comparing this finding with another study utilizing a similar scale (Ruzafa-Martínez, López-Iborra, Barranco, & Ramos-Morcillo, 2016) revealed that the self-perceived EBP-COQ mean in the current study is significantly higher. Particularly, nursing students in Oman, India, and Nigeria had a significantly higher self-perceived EBP-COQ mean compared with nursing students in Saudi Arabia. Two possible explanations are offered here. First, this may be due to that fact that EBP incorporation in the nursing curriculum in Saudi Arabia is relatively new and has occurred only during the past 5 years. Conversely, in Oman, Nigeria, and India, EBP and research have been in place and taught throughout their curricula for more than 10 years. Second, this finding may also be explained by the challenges in English comprehension among Saudi Arabia nursing students, as most research findings and evidence are published in English (Al Abik, 2014; Al Nasser, 2015; Suliman & Tadros, 2011). Although English has been used as a medium of instruction in most nursing schools in the country for several years, comprehension remains a challenge (Al Abik, 2014; Al Nasser, 2015). Available studies suggested that more than 50% of nursing students reported a lack of English language skills as an important challenge they face during nursing education (Al Bloushi, 2017; Al Mutair & Redwan, 2016). However, it is important to note that without additional information as to how issues relating to the English language influence EBP competence among Saudi students, this justification remains speculative; thus, further studies are needed to explore the role of an individual language in explaining EBP competence among nursing students. Nevertheless, this finding has important implications both on the national and international level. With the increasing number of Saudi nursing students being admitted to a nursing program because of Saudization (localization) and with the increasing number of nursing students whose primary language is not English being admitted in international universities, additional measures and support are needed to enhance and improve

Table 4. Between-Country Comparisons in Students EBP Competence

EBP-COQ	Oman		India		Saudi		Nigeria		F	df
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI		
Attitude toward EBP	2.677	2.58–2.76	2.684	2.57–2.79	2.034	1.94–2.11	2.920	2.83–3.00	74.412***	(3, 1,344)
Skills in EBP	2.126	2.02–2.22	2.192	2.06–2.13	1.966	1.86–2.06	2.343	2.24–2.44	9.527***	(3, 1,344)
Knowledge in EBP	2.169	2.05–2.28	2.165	2.02–2.30	2.003	1.89–2.11	2.254	2.14–2.35	3.621**	(3, 1,344)
Overall EBP competence	2.341	2.23–2.41	2.347	2.24–2.45	2.001	1.91–2.08	2.51	2.42–2.58	24.437***	(3, 1,344)

Notes. EBP competence as dependent variable; country as independent variable; age, gender, type of institution, type of students, and academic year level as covariates.
*$p < .05$.; **$p < .01$.; ***$p < .001$.

Table 5. Top-Ranked BARRIERS Scale Items Per Country

Barriers items	Total mean (rank)	Oman mean (rank)	India mean (rank)	Saudi Arabia mean (rank)	Nigeria mean (rank)	Subscale
The nursing student does not feel she/he has enough authority to change patient care procedures	1.659 (1)	1.68 (1)	1.18 (6)	1.98 (3)	1.72 (1)	Organization/setting
Research reports/articles are not published fast enough	1.5986 (2)	1.48 (12)	1.2 (5)	1.98 (2)	1.61 (3)	Innovation/research
There is insufficient time on the nursing education/training to implement new ideas	1.5959 (3)	1.53 (3)	1.27 (2)	1.9 (23)	1.59 (7)	Organization/setting
The amount of research information is overwhelming	1.5737 (4)	1.5 (6)	1.28 (1)	1.91 (19)	1.52 (12)	Innovation/research
Physicians will not cooperate with implementation	1.5734 (5)	1.5 (7)	1.25 (3)	1.96 (6)	1.5 (14)	Organization/setting
The nursing student feels results are not generalizable to own setting	1.5621 (6)	1.59 (2)	1.1 (12)	1.93 (12)	1.55 (8)	Organization/setting
The facilities are inadequate for implementation	1.5602 (7)	1.5 (8)	1.09 (14)	1.95 (7)	1.6 (4)	Organization/setting
The relevant literature is not compiled in one place	1.538 (8)	1.52 (4)	1.07 (15)	1.86 (29)	1.6 (5)	Communication/presentation
Hospital is not supportive of implementation	1.5319 (9)	1.38 (19)	1.17 (7)	1.97 (4)	1.48 (15)	Organization/setting
Research reports/articles are not readily available	1.531 (10)	1.5 (9)	0.88	2.093 (1)	1.533 (10)	Communication/presentation

English comprehension among these groups of nursing students.

In addition, several between-country differences were noted in the means of the self-perceived EBP-COQ domains (knowledge, skills, and attitudes). By examining these countries individually, it is possible that these variances, while considered miniscule, might be related to an individual country's nursing educational system, the type of nursing curriculum, the extent of EBP integration in the nursing curricula, faculty teaching approaches in teaching EBP, duration of clinical training, and perhaps the healthcare systems itself (Ciliska, 2005). Certainly, these findings warrant further examination to determine the extent to which these factors affect EBP competence in nursing students. As acquiring EBP competence is considered essential in the delivery of quality health care to nursing students, nursing education plays a tremendous role to ensure that prelicensure nursing students

achieve this competency upon graduation. This can be best achieved by introducing EBP concepts and application early in the nursing curriculum beginning from their first year until they graduate from the nursing program (Blackman & Giles, 2017; Melnyk, Fineout-Overholt, Stetler, & Allan, 2005).

Regression analysis showed higher self-perceived EBP-COQ mean scores in female students, nursing students enrolled in government schools, and bridging nursing students (RN to BSN). It could be possible that through their clinical experiences, these nursing students had been exposed to clinical EBP experiences in the workplace or perhaps in their previous education. These research findings offer support to previous studies (Blackman & Giles, 2017; Brown et al., 2009) in which clinical preparedness and previous clinical experiences predicted confidence with and utilization of EBP. As opined by Phillips and Cullen (2014), nursing students who are given opportunities to apply EBP

Table 6. Relationships Between the Overall EBP-COQ Means and Subscales Means and BARRIERS Scales

EBP components	BARRIER scale	EBP attitude	EBP skills	EBP knowledge
BARRIER scale	1	−0.281**	−0.143**	−0.155**
EBP attitude		1	0.621**	0.541**
EBP skills			1	0.653**
EBP knowledge				1

*p < .05.; **p < .01.; ***p < .001.

concepts in clinical areas are better prepared to participate in clinical decision-making using research-based evidence.

Interestingly, female nursing students had higher self-perceived EBP-COQ mean scores as compared to their male counterparts. According to Ploeg, Davies, Edwards, Gifford, and Miller (2007), systems changes, such as the implementation and integration of EBP into organizational culture, require willingness, dedication, and a higher level of organizational commitment among the different stakeholders (e.g., staff nurses, doctors, and hospital administrators). These attributes are known to be dominant among female nurses (Meadus & Twomey, 2007), and this might explain higher EBP comprehension and favorable attitudes toward EBP implementation among female nursing students. However, caution should be exercised when interpreting this finding due to the number of samples per gender. Nevertheless, the finding warrants further exploration to examine how gender influences EBP competence. A higher self-perceived EBP-COQ mean score in nursing students enrolled in government-owned nursing schools may be due to higher support from the government through funding and allocation of resources and equipment necessary for teaching and implementing EBP.

The organizations and clinical settings play a crucially important role in successful integration and implementation of EBP. In this study, the organization was identified as the top ranked barrier to EBP adoption among nursing students, as the majority of the top 10 items ranked by the nursing students were from the "setting/organization" subscale (6 out of 10). This finding is consistent across all four countries, although the rank order of the items within the different subscales varied. For instance, "the nursing student does not feel she/he has enough authority to change patient care procedures," an item in the "organization" subscale that ranked number one in the overall BARRIERS scale, also ranked number one in the Oman and Nigerian samples but ranked third and sixth in the Indian and Saudi Arabia samples, respectively. This finding may be attributed to nursing students' self-perceptions of being the lowest member in the hospital's organizational hierarchy and being typecast as a beginner in terms of evidence-based competence to contribute significantly to any EBP initiatives (Ryan, 2016). Consequently, many nursing students felt insecure and reluctant to participate actively in any research and EBP-related activities in the clinical area (Forsman, Wallin, Gustavsson, & Rudman, 2012; Ibrahim, 2011).

Organization-related barriers have also been reported in studies involving practicing nurses (Brown et al., 2009; Solomons & Spross, 2011; Williams, Perillo, & Brown, 2015). In an integrative review by Solomons and Spross (2011), identified common barriers related to the organization, such as paucity of time and resources and inadequate autonomy to change practice. Issues related to administrational support, infrastructure, and hospital resources and facilities were also identified as potential barriers to EBP adoption (Linton & Prasun, 2013; Williams et al., 2015). This finding, therefore, highlights the role of nurse leaders and hospital administrators in assisting and supporting prelicensure nursing students to implement research findings in clinical areas. Nurse leaders and staff nurses can also advance EBP in nursing students by promoting EBP culture within their units or wards or organizations through modeling and role modeling and providing relevant resources to nursing students. In agreement with previous authors (Brown et al., 2010; Linton & Prasun, 2013), collaboration between nursing faculty and nurse managers is essential to address organization-related barriers and for successful translation of evidence into clinical practice. Additionally, nursing faculty should incorporate EBP into clinical learning performance expectations to strengthen further the nursing student's commitment to the value of EBP. Educational agencies, accrediting bodies, nursing associations, and healthcare institutions can fast track the EBP movement within the country and at the international level by advocating integration and adoption of EBP.

Several authors are in agreement that educating and teaching nursing students with the fundamental knowledge and skills related to EBP are an effective approach to boost their EBP self-efficacy or confidence and ultimately their intention to use and adopt evidence in their clinical nursing practice (Hickman et al., 2014; Leach et al., 2016; Saunders & Vehviläinen-Julkunen, 2016). Blackman and Giles (2017) showed that adequate EBP knowledge is a prerequisite for a successful application of EBP in clinical areas. In this study, the "knowledge" domain strongly correlated with "skills" and "attitude" domains, suggesting the need for educating nursing students with EBP concepts to enhance skills and attitudes toward EBP. Several studies suggested integration

of EBP in all nursing courses to complement the clinical experience of nursing students (Bloom, Olinzock, Radjenovic, & Trice, 2013; Sukkarieh-Haraty & Hoffart, 2017). However, such approaches may not be effective in some institutions with limited resources and clinical placements (Ruzafa-Martínez et al., 2016).

The negative relationship between the BARRIERS scales and three domains of self-perceived EBP-COQ (knowledge, skills, and attitudes) suggested that the more they perceived higher EBP barriers, the lower they perceived their own EBP knowledge, skills, and attitudes. This finding offers support to Brown et al. (2009) and has implications for nursing education. Identification of these barriers may assist and guide nursing faculty in selecting appropriate measures that would best enhance EBP competence in nursing students. It may also guide transformation for nursing education curricular of faculties in the different countries studied. Grol and Wensing (2004) suggested that when adopting changes in practice, potential barriers at different levels must be addressed, including the characteristics of the professionals. In this instance, barriers include characteristics of nursing students as well as the organizational context.

Limitations of the Study

Although this study is one of the earliest to examine EBP competence among nursing students in a multicultural context, it has a few limitations that warrant attention when interpreting and generalizing findings. The use of self-report scales to assess EBP competence and barriers to EBP adoption in nursing students may limit responses of the participants. As a cross-sectional study design was used, determining causality is not possible. Further, as a dynamic construct, EBP competence of nursing students may be best assessed using a longitudinal design at various points in clinical training. Since students were chosen based on the proximity of the researchers, geographical factors may affect the findings of the study.

CONCLUSIONS

This international study contributes to the growing knowledge on EBP practice in nursing students. It can be inferred from this study that nursing students from four countries demonstrated moderate to high self-perceived EBP competence; however, significant between-country differences were noted in the means of self-perceived EBP-COQ subscales (knowledge, skills, and attitudes). Findings showed higher self-perceived EBP-COQ mean scores in female nursing students, nursing students enrolled in government schools or universities, and bridging (RN to BSN) nursing students who have had previous clinical experiences. Organization-related barriers were identified as the most important barrier to EBP among nursing students, which included a lack of authority to modify or change patient care and a lack of time and resources in the clinical area to implement the evidence. Findings of this international study add new knowledge to the existing literature on EBP and highlight the need for multifaceted and culturally tailored approaches to improve and enhance EBP competence and care offered to patients. **WVN**

🔗 LINKING EVIDENCE TO ACTION

- EBP competence among nursing students can be assured by implementing innovative, multifaceted, and culturally tailored teaching approaches.

- To address organization-related barriers and for successful translation of evidence into clinical practice, collaborations between nursing faculty and nurse managers are imperative.

- The abilities to utilize research findings and evidence must be fostered by integrating research and EBP into nursing students' clinical training and practicums.

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