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# Cultural validation of the competence in evidence-based practice questionnaire (EBP-COQ) for nursing students

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## Abstract:

**BACKGROUND:** Evidence-based performance competence has a significant impact on the performance of care measures. The higher the qualifications of nurses, the more effective and desirable their performance. Evidence-based practice demonstrates the competencies and abilities of nurses. There is a need for valid and reliable tools for evaluating and promoting evidence-based competence in nursing students, and there are few tools in reviewing studies, but they have not considered the cultural dimension. The purpose of this study is to validate cultural competence in evidence-based practice for nursing students.

**MATERIALS AND METHODS:** A methodological and validation study was conducted in the School of Nursing and Midwifery of Kermanshah and Ilam University of Medical Sciences in 2018. The Evidence-Based Performance Competency Questionnaire (EBP-COQ) is one of the most valid tools used in various studies by Ruzafa-Martinez *et al.* Initially, the original version of the competence in evidence-based practice questionnaire was translated into Persian after securing a permission from the designer of the tool. Totally 300 nursing students were selected through simple sampling method and entered into the study. The validity of the tool was evaluated using face validity and performing factor analysis. The reliability of the questionnaire was evaluated using Cronbach's alpha and internal consistency. Statistical works were carried out in SPSS and AMOS.

**RESULTS:** To determine the content validity of the tool, comparative fit index of the statements was obtained equal to 0.88. Factor analysis of the items yielded acceptable and statistically significant results ( $P < 0.001$ ). The reliability of the tool was determined using internal consistency method (Cronbach's alpha) for the whole tool, which was equal to 0.7. The reliability of the questionnaire was investigated at two stages, and pretest/posttest correlation coefficients were obtained ( $P < 0.05$ ).

**CONCLUSION:** The questionnaire had an acceptable validity and reliability. It can be used to evaluate evidence-based practice. Among advantages of the tool is that it is easy to administer in health-care fields.

## Keywords:

Competence, evidence-based practice, questionnaire, undergraduate nursing, validation

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## Introduction

Today, nurses are in constant endeavor to provide better and better cares. The recent innovations in health care have made making the best choice into

a challenge. Evidence-based practice is one of the methods that demonstrate the practice and capability of individuals in using data and research results. It plays a key and critical role in providing health and therapeutic cares. The higher the nurses' competence in evidence-based

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practice, the better and more effective is their practice.<sup>[1]</sup>

Evidence-based practice is a pivotal part of clinical nursing competence. To provide satisfactory cares, nurses need to be able to determine, interpret, and use the available evidences of clinical status of the patient. This needs nurses equipped with updated knowledge and skills. In addition to less diversity in clinical practice and higher nursing care skill, evidence-based approach creates the authority needed to change the realities of therapeutic cares.<sup>[2,3]</sup> Therefore, different fields such as medicine and paramedicine have started to use evidence-based practice.<sup>[4]</sup> In the case that evidence-based nursing becomes part of the mainstream, better outcomes for the patients, fewer errors, and a more stable and consistent approach to nursing care are expected.<sup>[5,6]</sup> Champion and Leach and Hicks *et al.* showed that not only employing evidence-based practice to assess the clinical skills of nurses at the intensive care unit created motivation, interest, and change in personal beliefs of nurses about researches, but also it improved the knowledge and clinical skills of the nurses in providing cares.<sup>[7,8]</sup>

Therefore, ensuring clinical competence in nurses as the biggest group of health-care providers is highly important. Utilization of evidence-based practice in nursing undergraduate program, however, is mostly neglected. For this, the lack of cognitive skills, failure to recognize such skills, no support by the instructors to use evidence-based approach, limited time of undergraduate programs, and inability to use search techniques are to blame. The point is, however, that evidence-based approach needs to be developed during undergraduate program as many nurses enter professional fields after graduation.<sup>[9,10]</sup>

Assessing evidence-based competence in nursing students needs a valid and reliable tool, and literature review revealed that there were a very few culture-independent tools available.

The present study is focused on a 25-item evidence-based practice questionnaire (EBP-COQ) that is used by Ruzafa-Martinez *et al.* in Spain on nursing undergraduate students.<sup>[11]</sup>

Ruzafa-Martinez's questionnaire is newer than Apton and Apton's questionnaire, and it challenges the condition of evidence-based practice based on the day methods. In addition, the former uses five-alternative questions while the latter uses seven-alternative questions; the fewer the number of alternative, the higher the correlation. As a result, Cronbach's alpha value and reliability of Ruzafa-Martinez's questionnaire are higher. Moreover, with a fewer alternative, the

responder finds the questionnaire easier to understand. This questionnaire is one of the most reliable tools, and it has been used in several studies. Since no similar sample was found in our country and the questionnaire was not subjected to cultural psychometrics, researchers are conducting the present study with the aim of cultural validation of competency tools in performance based on evidence of nursing students. The present study is an attempt to culturally validate EBP-COQ for Iranian nursing students.<sup>[12,13]</sup> This study focused on cultural validation of the competence in evidence-based practice questionnaire (EBP-COQ) for nursing students.

## Materials and Methods

### Study design and sampling

The study was carried out as a methodological work to culturally validate EBP-COQ. The participants ( $n = 300$ ) were nursing students at Kermanshah University of Medical Sciences in 2018 who were selected through convenient sampling. The participants had at least passed two semesters including research method course and expressed their interest to participate in the study.

### Data collection tool and technique

The number of samples for confirmatory factor analysis based on the proposal of different studies from 3 to 20 samples per items has been suggested,<sup>[14,15]</sup> and in this study, researchers considered 300 samples, which according to the total number of items of the questionnaire (25 questions) is approximately 12 people per items.

### Inclusion criteria

Undergraduate nursing students in the 20<sup>th</sup> semester onward, nursing students who have passed the research methodology unit, and students willing to participate in the research (voluntarily participate in the research) were included in the study.

### Ethical considerations in research

The study was approved by the Ethics Committee of Kermanshah University and ethical principles were adhered to throughout the study. After the researchers explained the purpose and procedures of the study to the participants, they consented to participate in the study.

The EBP-COQ was introduced by Ruzafa-Martinez *et al.*<sup>[11]</sup> with 25 questions. The questions are designed based on Likert's five-point scale (completely agree = 5, agree = 4, no idea = 3, disagree = 2, and completely disagree = 1). There are three subscales in the questionnaire including attitudes (questions 1–13), skills (14–19), and knowledge (20–25). Minimum and maximum scores are 25 and 125, respectively, and the higher the score, the higher the evidence-based practice.

### Face validity

Face validity specifies the questionnaire appears to be appropriate to the study purpose and fit to the content area. It is the easiest validation process to carry out. It evaluates the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language used.<sup>[16]</sup> Face validity thus is a form of usability rather than reliability. An evaluation form was developed to determine the face validity of the questionnaire in terms of the clarity of the wording, the likelihood the target audience would be able to answer questions, and the layout and style. Moreover, the questionnaire was given to ten specialists in the fields of education and nursing, and ten nursing students were assessed in terms of clarity and simplicity. They were randomly selected to complete the face validity form on a five-point Likert scale; (completely agree = 5, agree = 4, no idea = 3, disagree = 2, and completely disagree = 1).

To create a valid and reliable tool, the following steps were carried out. For investigating face validity, shape, logic, attractiveness, logical sequence of items, and clarity and brevity of the items were evaluated according to the participants. In order to evaluate content validity, two criteria were used including content validity ratio (CVR) and content validity index (CVI). The first investigates the necessity of an item according to the participants, while the second determines the vagueness, relevance, and compatibility of items with the studied subject. For the first criterion, experts were asked to score each item from 1 to 3 using a three-level scale (necessary, useful but unnecessary, and unnecessary). These scores were used to calculate CVR.<sup>[17]</sup>

The study was carried at four stages. Stage 1 included translation of the tool based on WHO pattern, i.e., forward translation, examination by expert, backward translation, pretest and cognitive interview, and preparing the final copy.<sup>[18]</sup> At Stage 2, face validity of the questionnaire was examined by ten nursing and tool design experts and ten students. Construct validity of the tool was checked at Stage 3 by administering the tool to 300 students, and goodness of fit of the tool was examined using confirmatory factor analysis and the factors of the tool. Confirmatory factor analysis was performed in AMOS, and to examine goodness of fit, Chi-square test was used (insignificant result confirms goodness of fit of the tool); root-mean-square error approximation ( $<0.06$ ), standardized root mean squared residual ( $\leq 0.08$ ), goodness-of-fit index ( $\geq 0.95$ ), and comparative fit index (CFI) ( $\geq 0.95$ ) were used.<sup>[19]</sup> To examine the reliability of the tool, Cronbach's alpha was used (SPSS 24) the Statistics Software SPSS (Version-23 Inc., Chicago, IL, USA). To this end, the tool was administered to thirty students at two stages and pretest/posttest correlation was calculated. Eventually,

Cronbach's alpha and equivalence test indicated that the tool was acceptable with the obtained coefficient higher than 0.7.

### Ethical consideration

The study was approved by the Ethics Committee of Kermanshah University, and ethical principles were adhered to throughout the study. After the researchers explained the purpose and procedures of the study to the participants, they consented to participate in the study.

## Results

The participants consisted of 58.3% of women and 41.7% of men with a mean age of  $22.19 \pm 2.45$  years. In addition, 41 students were at their 2<sup>nd</sup> year, 62.7% lived in dormitory, and 26% had a history of research work [Table 1].

To determine construct validity and factor structure of the tool using exploratory factor analysis method, the results were examined using Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity [Table 2].

The results of confirmatory factor analysis showed that the mean score of the questionnaire was between 2.17 and 3.37 and t-value ranged from 1.84 to 9.74 [Table 3]. Questions 10, 22, and 24 were not significant and removed to improve the goodness of fit of the data [Figure 1]. Analyses also indicated that goodness-of-fit indices of EBP-COQ were higher than 0.9, which supports the goodness of fit of the model. The threshold for all the indices was 0.8, and all indices supported the goodness of fit of the tool [Table 3].

**Table 1: Relative and definite frequency distribution of demographical variables**

Variable	n (%)
Gender	
Male	125 (41.7)
Female	175 (58.3)
Years of study	
2 <sup>nd</sup>	123 (41)
3 <sup>rd</sup>	12 (40)
4 <sup>th</sup>	57 (19)
Semester	
3 <sup>rd</sup>	65 (21.7)
4 <sup>th</sup>	53 (17.7)
5 <sup>th</sup>	72 (24)
6 <sup>th</sup>	57 (19)
7 <sup>th</sup>	26 (8.7)
8 <sup>th</sup>	27 (9)
Domicile	
Dormitory	188 (62.7)
Private housing	112 (37.3)
History of research work	
Positive	78 (26)
Negative	222 (74)

To examine the internal reliability of EBP-SOQ, Cronbach's alpha was obtained for the tool equal to 0.7. Moreover, 10% of the sample group ( $n = 30$ ) filled the questionnaire with a 2-week interval. The Spearman's correlation test supported the reliability of the tool ( $r = 0.89$ ). The Spearman's coefficient was used to examine the internal reliability of the statements [Table 4].

Pearson correlation coefficient was used to investigate the relationship between evidence-based practice variables. The results of correlation matrix showed that the relationship between evidence-based practice and attitude was significant ( $r = 0.694, P < 0.001$ ). In addition, skill has the most relationship with knowledge ( $r = 0.553, P < 0.001$ ) and evidence-based practice has the least possible relationship with attitude ( $r = 0.356, P < 0.001$ ) [Table 5].

### Discussion

The CFI obtained for the tool was 0.88, which indicates acceptable goodness of fit and content validity of the tool. Mostafaie *et al.* obtained the minimum CVI of MOHA

**Table 2: The results of Kaiser-Meyer-Olkin and Bartlett's test of sphericity to determine validity of Evidence-Based Performance Competency Questionnaire**

Bartlett's test of sphericity	KMO test	P	df
$\chi^2$ : 1598.90	0.736	<0.001	231

KMO=Kaiser-Meyer-Olkin

necessary explanations are given questionnaire equal to 0.68 so that the tool had a high level of reliability and validity.<sup>[20]</sup> The reliability and validity of the tool under study here were higher than those in Mostafaie *et al.* which shows the superiority of our tool in terms of content validity.<sup>[20]</sup> Moreover, Ghasemi *et al.* obtained CVI of nurses' competence tool equal to 94% and supported the validity of the Farsi version of the tool.<sup>[21]</sup> One reason for the lower CVI obtained in this study can

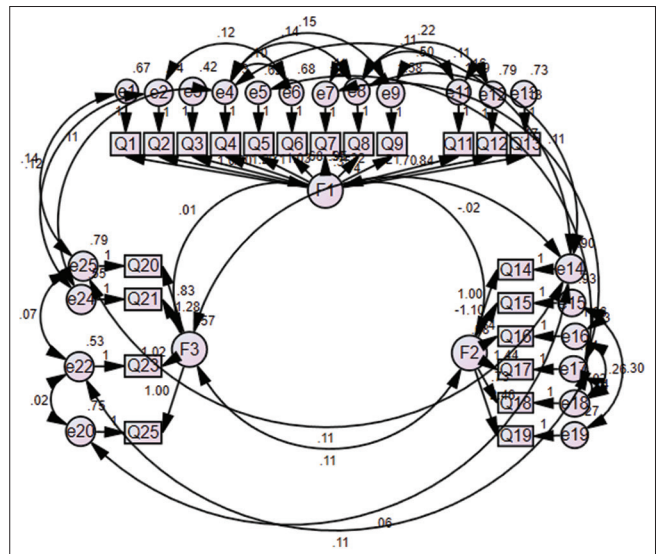


Figure 1: Three-factor model of EBP-COQ and the elements

**Table 3: Confirmatory factor analysis of Evidence-Based Performance Competency Questionnaire**

Number	Statements	P
1	Evidence-based practice is helpful in making decisions at performing of clinical skills	<0.05
2	I am confident that I'm able to critically assess the quality of a scientific article	<0.05
3	Evidence-based practice will help me to realize the role of a nurse better	<0.05
4	The time to read scientific articles and their evaluation should be included in the provisions of the nursing rule	<0.05
5	Extensive usage of evidence-based practice will allow nurses to have more autonomy in their careers	<0.05
6	When I'm working as a nurse, I will be very glad to use evidence-based practice in a clinical setting	<0.05
7	The usage of evidence-based practice improves the health-care outcomes of patients	<0.05
8	I would like to participate in the implementation of evidence-based practice in the future	<0.05
9	I'm not in favor of scientific article's reading	<0.05
10	I will be pleased if the evidence-based practice be merely theoretical and not be used practically	<0.05
11	If I have the opportunity, I will attend in an evidence-based practice	<0.05
12	I would like to have better access to published nursing evidences	<0.05
13	I feel that I'm able to create a clinical question for starting the best scientific evidence	<0.05
14	I feel I'm not able to search scientific evidence in the health science databases	<0.05
15	I feel I'm able to search scientific information about the considered topic in most information and library resources	<0.05
16	I feel I'm able to evaluate the quality of a scientific article critically	<0.05
17	I feel I'm not able to analyze the achieved results of a scientific and authentic study	<0.05
18	I feel I'm able to analyze the practical uses of a scientific study	<0.05
19	I'm able to design the organized clinical questions in PICO format	<0.05
20	I have access to scientific sources providing regular and revised information (Joanna Briggs Institute and so on) in addition to what is reported in evidence	<0.05
21	I know the level of different evidence from designing of studies and research	<0.05
22	I am aware of main measures of a research work like relative risk and odd ratio that determine the level of effectiveness in studies	<0.05

PICO=Patient intervention comparison outcome

be the difference in the subjects and that the focus area of the present study is different

Lweise and Kouhpayezadeh reported that CVI and CVR of EOB-COQ were equal to 0.78 and 0.7, respectively.<sup>[22]</sup> Our results showed a higher content validity for the tool, which might be due to the different study populations.

Taking into account the higher correlation coefficients of the questions in the tool, as indicated by KMO and Bartlett’s test of sphericity, factor analysis was carried out and the obtained values were significant ( $P < 0.001$ ). Martinez *et al.* examined an evidence-based practice questionnaire for Spanish nurses using factor analysis and consistency of the statement and supported a good correlation of the tool.<sup>[23]</sup> Moreover, Melnyk *et al.* tested the validity and reliability of two new tools for evidence-based practice and supported the consistency of the two tools.<sup>[24]</sup> Consistent with the mentioned studies, the construct validity of the tool here was supported. Panczyk *et al.* and Melnyk *et al.* showed good construct validity in their studies so that reliability of the tools examined in the mentioned studies was confirmed.<sup>[24,25]</sup>

Reliability of the tool was examined through internal consistency (Cronbach’s alpha), which was obtained equal to 0.7 for the whole tool, i.e., good internal consistency. The reliability of the tool obtained here was less than that reported by Zeleníková *et al.* which might be due to fewer statements of the tool they studied.<sup>[26]</sup> Moreover, the internal consistency reported by other studies was higher than that of the present study.

**Table 4: Goodness-of-fit indices of Evidence-Based Performance Competency Questionnaire**

Goodness of fit of the model	Value	Standard	Interpretation
$\chi^2$ , df	1.97	<5	Confirmed
Df	180	-	Confirmed
CFI	0.88	-	Confirmed
NFI	0.8	>0.8	Confirmed
GFI	0.9	>0.8	Confirmed
TLI	0.85	>0.8	Confirmed
RMSEA	0.057	<0.08	Confirmed
$F^2$	0.79	Close to 1	Confirmed

CFI=Comparative fit index, NFI=Normed fit index, GFI=Goodness-of-fit index, TLI=Tucker-Lewis index, RMSEA=Root-mean-square error of approximation

**Table 5: Correlation coefficients matrix of evidence-based performance-sexual outlook questionnaire**

Element	Attitude		Skill		Knowledge		Total	
	r	P	r	P	r	P	r	P
Attitude	1		-0.181*	0.002	0.014	0.810	0.649*	0.001
Skill	-0.181*	0.002	1		0.199*	0.001	0.356*	0.001
Knowledge	0.014	0.801	0.199*	0.001	1		0.553*	0.001
Total	0.694*	0.001	0.356*	0.001	0.553*	0.001	1	

\*Significance <0.05

The reliability of the tool based on retest method yielded the correlation coefficient before and after the test ( $P < 0.05$ ). Finally, equivalence was obtained using Cronbach’s alpha equal to 0.7. Based on the results, the Farsi version of EOB-COQ had an acceptable level of internal consistency. Lweise and Kouhpayezadeh reported Cronbach’s alpha for subscales skill and attitude equal to 0.934 and 0.396, respectively, and Cronbach’s alpha for the whole tool was equal to 0.784.<sup>[22]</sup> Cronbach’s alpha and internal consistency of the tool were acceptable, though they were less than those reported by Lweise and Kouhpayezadeh. To explain the differences, number of statements, type of statements, time of the test, and study population are notable.<sup>[22]</sup> In general, Cronbach’s alpha alone cannot be indicative of consistency of the tool or superiority of tool in terms of internal consistency. This tool (questionnaire) has the reliability and validity of the Farsi version of EOB-COQ were supported. Among advantages of the tool are easy process of administration, reasonable cost, and availability, which make it suitable for the community of nurses and physicians and the whole community of health service providers as well. Future research can include comparing the validity and reliability of this tool with the larger study population, using this questionnaire to investigate the effect of evidence-based performance on improving nursing practice and investigating the application of evidence-based performance among students with interventional research approach.

**Limitation and suggestion**

The study has several limitations. The study assumed that the answers of the participants were valid, because of the impossibility of direct observation of the nurses toward EBP. Therefore, these findings cannot be generalized to other settings. The study outcome recommends to investigate this research direction for prospective future studies.

- Comparison of validity and reliability of this tool with the population
- Using this questionnaire to investigate the effect of evidence-based performance on improving nursing students’ performance
- Comparison of this tool with other conventional izzers in Iran to assess the validity and reliability of evidence-based performance in nurses.

## Conclusion

The gap between nursing education and nursing practice is undeniable. This gap starts to emerge at nursing schools where the students experience classroom and clinical environment. Therefore, nursing schools need to add evidence-based concepts into the curriculum and prepare the students for evidence-based care. Through this, students will be able to provide evidence-based cares and do a critical analysis of nursing practice throughout their professional lives, which are inevitable given the scientific advances. Since evidence-based practice can be used to improve practice and quality of nursing standards throughout nursing processes, it is essential to promote it among nurses. To this end, organizational factors, preparation of the ground for acceptance of evidence-based practice at clinical setting, focus on informing nurses about evidence-based practice, and preparation of the ground for evidence-based practice need to be taken into account.

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## Conflicts of interest

There are no conflicts of interest.

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