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**ORIGINAL PAPER**

# PERCEPTION OF THE EFFECTIVENESS OF EVIDENCE-BASED PRACTICE COURSES BY CZECH NURSING AND MIDWIFERY STUDENTS

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## Abstract

*Aim:* The aim of the study was to determine Czech nursing and midwifery students' perception of the effectiveness of evidence-based practice (EBP) courses. Another objective was to verify the psychometric properties of a Czech version of the *Perception of Effectiveness of EBP Courses* questionnaire. *Design:* A descriptive cross-sectional study. *Methods:* The Czech version of the 13-item instrument was used. Data were collected from April 2013 to July 2013. The sample consisted of 119 students of nursing and midwifery. The reliability of the scale was measured by Cronbach's alpha. The construct validity of the instrument was tested using factor analysis. *Results:* The participants strongly believed in the value of EBP for patient care, but were less confident regarding their own knowledge and skills needed for EBP. The average item mean of the instrument was 5.25 (on a scale from 1 – strongly disagree to 7 – strongly agree; higher scores meant higher effectiveness). Cronbach's alpha coefficient (0.915) confirmed a good internal consistency of the scale. The results of factor analysis identified three factors (subscales) of the instrument: satisfaction and behavioral changes; teaching; and EBP mastery. *Conclusion:* The *Perception of Effectiveness of EBP Courses* questionnaire showed satisfactory psychometric properties and may be used to assess Czech students' perception of the effectiveness of EBP courses.

**Key words:** evidence-based practice, nursing, effectiveness, evaluation, EBP skills.

## Introduction

In recent years, increasingly more attention has been paid to the provision of patient-centered care based on the best available evidence to improve clinical practice (Brancato, 2006). Evidence-based practice (EBP) is now seen as an essential part of healthcare services at all levels and expected of health professionals (Thorsteinsson, Sveinsdóttir, 2014, p. 572). Nurses in clinical practice report that their educational preparation for accessing and using EBP is insufficient (Oh et al., 2010, p. 387). Research has shown that despite the fact that nurses are convinced about the importance of EBP, its implementation into practice tends to be problematic (Boström et al., 2013; Stokke et al., 2014; Thorsteinsson, 2013). This is one of the reasons why educational institutions are increasingly interested in incorporating EBP issues into the nursing and midwifery curricula.

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According to Ciliska (2005), graduates of bachelor's degree programs in nursing are mainly expected to be active and good consumers of research information, that is, they will be able to find and assess the evidence and use it in practice.

Preparation for the provision of EBP starts as early as during their undergraduate training when students become acquainted with the fundamentals of EBP.

Evidence-based practice is the process by which nurses make clinical decisions using the best available evidence, their clinical expertise and patient preferences, in the context of available resources (DiCenso et al., 2005). When compared with the traditional approach to nursing care, EBP leads to improved quality of care, better patient outcomes, cost cutting and increased satisfaction of nurses (Melnyk et al., 2010). A body of knowledge about the factors that influence the use of research evidence in practice has mostly accumulated in countries that lead in EBP (e.g. USA, UK or Canada). Little is known about nurses' readiness for EBP in other countries (Thorsteinsson, 2013, p. 116). In the Czech socio-cultural context, EBP is a relatively new phenomenon that first appeared only in the mid-

 

2000s in association with the transition of nursing to tertiary education (Jarošová, Zeleníková, 2014, p. 7). At the present time, EBP courses are not a common part of curricula at all Czech tertiary institutions providing education in nursing and midwifery. EBP may be taught as either an individual course or a component of other courses. The Department of Nursing and Midwifery at the Faculty of Medicine of the University of Ostrava was one of the first Czech centers to incorporate a course called Evidence-Based Practice not only into master's degree and postgraduate programs but also, as an optional course, into bachelor's degree programs in general nursing and midwifery. As early as in 2007, the first course was held for the bachelor's degree programs. The course is partly taught in the form of project-based learning. This approach was chosen to promote students' engagement, critical thinking and autonomous and creative activities (Zeleníková, Jarošová, 2012). Therefore, we were curious about how students perceive the effectiveness of the courses and the impact the course Evidence-Based Practice has on their EBP skills. The instrument to assess this is the *Perception of Effectiveness of EBP Courses*, a questionnaire in English originally developed for students in the USA (Zeleníková et al., 2014). The theoretical background for developing the questionnaire was Donald Kirkpatrick's four-level evaluation model first published in 1959 (Kirkpatrick, 1998). The four levels of the model are reaction (satisfaction), learning, behavior change and results (benefits) (Stokking, 1996). The questionnaire *Perception of Effectiveness of EBP Courses* consists of 13 items reflecting the four levels. Each item is rated on a seven-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree).

## Aim

The aim of the study was to determine the students' perception of the effectiveness of EBP courses. Another objective was to verify the psychometric properties of a Czech version of the *Perception of Effectiveness of EBP Courses* questionnaire.

## Methods

### *Design*

A descriptive cross-sectional study design was used to examine the psychometric properties of the questionnaire evaluating the effectiveness of EBP courses.

### *Sample*

The sample consisted of 119 bachelor's and master's degree program students who completed the Evidence-Based Practice course at the Department of Nursing and Midwifery, Faculty of Medicine, University of Ostrava, Czech Republic.

The inclusion criteria were being a nursing or midwifery student who completed the Evidence-Based Practice course at the Faculty of Medicine, University of Ostrava, and consent to participation in the research. Initially, 191 students were approached. A total of 124 questionnaires were returned (64.9% response rate). Five questionnaires were excluded as more than 5% of data were missing. For the final analysis, 119 completed questionnaires were used.

### *Data collection*

The data were collected from April 2013 to July 2013. The questionnaire *Perception of Effectiveness of EBP Courses* was translated into Czech by two independent experts in the field of EBP. In addition, fourteen questions were generated to measure the perception of nursing and midwifery students' EBP skills on a scale from 1 (not at all competent) to 7 (extremely competent), demographic items and items measuring students' self-evaluation of EBP, computer competencies and English language competencies. The list of EBP competencies was derived from a study by Melnyk et al. (2008a, p. 12). Some EBP skills were paraphrased and some new ones (those with an immediate impact on patient care) were added to ensure better understanding. To test the comprehensibility of the questionnaire, a pilot survey was conducted on 10 students. Upon completion of a hard copy of the questionnaire, the subjects were asked about the comprehensibility of the items. Based on the pilot survey results, some of the items were adjusted.

A web-based survey was used for data collection. The students agreeable to participate were sent an email with information about the research and a hyperlink to a study-specific secured SurveyMonkey® website with the online questionnaire to be filled in. Each student was contacted only once. The questionnaire took approximately 3–5 minutes to complete. The participants could withdraw from the survey at any time. They did not have to answer each question. By using SurveyMonkey®, the responses were anonymous and secure.

### *Data analysis*

Descriptive statistics were used to describe the sample characteristics. The mean and standard deviation were calculated for each item of the questionnaire. Spearman's rank correlation coefficient was used to assess the relationship between the total score for the instrument and the

score for each item. The reliability of the scale was measured by Cronbach's alpha. Inter-item correlations were calculated and an item-total correlation test was performed. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were performed, followed by factor analysis with varimax rotation. Statistical analysis was conducted using the Statistical Package for the Social Sciences 16.0 for Windows (SPSS, Chicago, IL).

## Results

The entire sample comprised 115 females and 4 males. Nearly half of the participants (46.2%) were aged 20 to 29 years. The largest subgroups were part-time students in both bachelor's (42.9%) and master's (27.7%) degree programs. The most frequent position was a hospital nurse (44.5%). Full-time students not working as nurses or midwives accounted for 27.7% of the sample. Most participants described themselves as novices (70.6%) or advanced beginners (22.7%) in relation to EBP. The mean for self-evaluation of computer skills on a scale from 1 (not at all competent) to 7 (extremely competent) was 4.34 (± 1.22), with the majority of the students rating their skills as 4 (25.2%), 5 (31.1%) or 3 (21.0%). Using the same scale, the mean English language competency rating was 2.68 (± 1.33); most students self-rated their language skills as 2 (34.5%), 3 (24.4%) or 1 (17.6%). The sample characteristics are presented in Table 1.

Perception of the effectiveness of EBP was measured with a 13-item instrument. The respondents were asked to rate on a scale from 1 (strongly disagree) to 7 (strongly agree) how they perceived the effectiveness of EBP courses. The average item mean for the entire sample was 5.25 (minimum 4.02; maximum 6.49). Higher scores meant higher perception of the course effectiveness. The highest rated items were *EBP instructors were enthusiastic about teaching EBP* (6.49), *EBP instructors had a thorough knowledge of EBP* (6.49), *EBP instructors provided feedback during EBP classes* (6.29), *The teaching methods used in EBP courses were useful and effective* (6.11), and *Implementation of EBP can improve clinical care* (5.69). The usefulness of EBP courses and importance to continue with EBP studies were also rated positively. The lowest rated items were *Students view EBP courses favorably in comparison to other courses* (4.19), *I have adequate EBP skills* (4.12), and *I can serve as an EBP mentor to other health care professionals* (4.02) (Table 2).

**Table 1** Sample characteristics (n = 119)

| Characteristic | | n | % |
|---|---|---|---|
| Gender | Female | 115 | 96.6 |
| | Male | 4 | 3.4 |
| Age | 21–30 years | 55 | 46.2 |
| | 31–39 years | 24 | 20.2 |
| | 40–49 years | 35 | 29.4 |
| | 50 and above | 5 | 4.2 |
| Form of study | Full-time bachelor's | 18 | 15.1 |
| | Part-time bachelor's | 51 | 42.9 |
| | Full-time master's | 17 | 14.3 |
| | Part-time master's | 33 | 27.7 |
| Current clinical position | Hospital nurse | 53 | 44.5 |
| | Nurse | 15 | 12.6 |
| | Midwife | 8 | 6.7 |
| | Manager | 10 | 8.4 |
| | Full-time student | 33 | 27.7 |
| Year of study | 1st | 32 | 26.9 |
| | 2nd | 60 | 50.4 |
| | 3rd | 27 | 22.7 |
| Resources for understanding EBP | EBP courses | 99 | 83.2 |
| | Others | 20 | 16.8 |
| Self-description in relation to EBP | Novice | 84 | 70.6 |
| Mean 1.39 (SD 0.73) | Advanced beginner | 27 | 22.7 |
| | Competent | 5 | 4.2 |
| | Proficient | 2 | 1.7 |
| | Expert | 1 | 0.8 |
| Computer skills self-evaluation | Mean* 4.34 (SD 1.22) | | |
| English language skills self-evaluation | Mean* 2.68 (SD 1.33) | | |

*1 – not at all competent, 7 – extremely competent; SD – standard deviation

**Table 2** Perception of effectiveness of evidence-based courses (n = 119)

| Item | Mean* (±SD) |
|---|---|
| EBP instructors were enthusiastic about teaching EBP | 6.49 (±1.17) |
| EBP instructors had a thorough knowledge of EBP | 6.49 (±1.32) |
| EBP instructors provided feedback during EBP classes | 6.29 (±1.44) |
| The teaching methods used in EBP courses were useful and effective | 6.11 (±1.26) |
| Implementation of EBP can improve clinical care | 5.69 (±1.57) |
| EBP courses are very useful for students | 5.52 (±1.37) |
| I think it is important to continue with my EBP studies | 5.26 (±1.59) |
| I can use my EBP knowledge and skills in my practice | 5.14 (±1.83) |
| After completing EBP courses I had opportunities elsewhere in the curriculum to strengthen and apply my EBP skills | 4.70 (±1.85) |
| I have sufficient knowledge of EBP | 4.23 (±1.32) |
| Students view EBP courses favorably in comparison to other courses | 4.19 (±1.59) |
| I have adequate EBP skills | 4.12 (±1.45) |
| I can serve as an EBP mentor to other health care professionals | 4.02 (±1.74) |

*1 – strongly disagree, 7 – strongly agree; SD – standard deviation

### *Psychometric properties of the* Perception of Effectiveness of EBP Courses *questionnaire*

*Validity*

The construct validity of the instrument was tested using factor analysis. Data were subjected to principal component analysis with varimax and Kaiser normalization in order to determine the factor structure of the questionnaire. For factor analysis, a ratio of 5:1 (subject-to-variables) was used. The sample size was nine times greater than the number of items. A Kaiser-Meyer-Olkin score of 0.886 was achieved ($p < 0.001$), suggesting that factor analysis was appropriate for this data set. Principal component factor analysis yielded three factors, each with an eigenvalue > 1 (6.59; 2.46; 1.01). The first factor explained 50.68% of variance, the second factor explained 18.95% of variance and the third factor explained 7.78% of variance. The first factor labeled *Satisfaction and behavioral changes* contains six items, the second factor labeled *Teaching* contains four items and the third factor labeled *EBP mastery* contains three items of the scale (Table 3).

*Reliability*

The internal consistency of the scale, based on standardized Cronbach's alpha, was 0.915, which signifies a strong internal consistency (Table 4). The inter-item correlations of the thirteen items ranged from 0.018 to 0.902, with a majority being around 0.50. The lowest correlation (0.018) was found between the items *EBP instructors had a thorough knowledge of EBP* and *I have sufficient knowledge of EBP*. The strongest correlation (0.902) was found between the items *I have sufficient knowledge of EBP* and *I have adequate EBP skills*. The item-total correlation test showed a range from 0.902 to 0.914 for Cronbach's alpha if an item was deleted, showing that every item contributed to the overall reliability.

**Table 3** Factor analysis

| Item | Standardized factor loadings |
|---|---|
| **Factor 1 Satisfaction and behavioral changes (6 items)** | |
| EBP courses are very useful for students | 0.77 |
| Students view EBP courses favorably in comparison to other courses EBP | 0.54 |
| After completing EBP courses I had opportunities elsewhere in the curriculum to strengthen and apply my EBP skills | 0.52 |
| I think it is important to continue with my EBP studies | 0.84 |
| I can use my EBP knowledge and skills in my practice | 0.82 |
| Implementation of EBP can improve clinical care | 0.72 |
| **Factor 2 Teaching (4 items)** | |
| EBP instructors were enthusiastic about teaching EBP | 0.91 |
| EBP instructors had a thorough knowledge of EBP | 0.89 |
| The teaching methods used in EBP courses were useful and effective | 0.83 |
| EBP instructors provided feedback during EBP classes | 0.91 |
| **Factor 3 EBP mastery (3 items)** | |
| I can serve as an EBP mentor to other health care professionals | 0.71 |
| I have sufficient knowledge of EBP | 0.92 |
| I have adequate EBP skills | 0.92 |

**Table 4** Cronbach's alpha

| Scale | Cronbach's α | Cronbach's α based on standardized items | Number of items |
|---|---|---|---|
| Perception of effectiveness of EBP courses | 0.915 | 0.917 | 13 |
| Self-evaluation of EBP skills | 0.942 | 0.942 | 14 |

A 14-item questionnaire was used for self-evaluation of EBP skills. The average item mean on the scale from 1 (not at all competent) to 7 (extremely competent) was 3.87 (min. 2.96; max. 4.89).

The highest rated items were *Asking questions regarding patients' care* (4.9), *Formulating searchable, answerable clinical questions in PICO format* (4.25), and *Searching efficiently for evidence that answers the clinical questions* (4.15). The lowest rated items, where students felt least competent after completed EBP courses, were *Assessing the clinical environment for readiness for EBP as well as barriers to and facilitators of EBP* (3.57), *Challenging current institutional or unit-based practices* (3.57), and *Mentoring/teaching the EBP process to others* (2.96). (Table 5)

## Discussion

The aim of the study was to determine the students' perception of the effectiveness of EBP courses. The highest rated items were those related to teaching and beliefs that implementation of EBP can improve clinical care. The usefulness of EBP courses as well as importance to continue with EBP studies were evaluated as positive. In a study by Zeleníková et al. (2014) using the same questionnaire in a sample comprising 129 students of the University of Pittsburgh, the highest rated items were *Implementation of EBP can improve clinical care* and those related to teaching. The effectiveness of teaching methods was rated worse than in the Czech sample.

The lowest rated items in the Czech sample were those related to EBP knowledge and EBP skills, popularity of EBP course and EBP mentoring. The lowest rated items in the study with US students were *I can serve as an EBP mentor to other health care professionals* and *Students view EBP courses favorably in comparison to other courses EBP*.

The item *After completing EBP courses I had opportunities elsewhere in the curriculum to strengthen and apply my EBP skills* was rated as neutral. A 2004 systematic review (Coomarasamy, Khan, 2004) confirmed that standalone EBP courses improved students' knowledge but clinically integrated teaching also improved their skills, attitudes and behavior. Therefore, EBP should not be studied as an individual course only but it should also be incorporated into other, mainly clinical, courses throughout the curriculum. The Czech students positively evaluated the courses and believed that implementation could improve clinical practice but were less confident in their EBP knowledge and skills. The majority of the students described themselves as novices or advanced beginners in relation to EBP. It may be assumed that they encountered EBP issues for the first time.

**Table 5** Self-evaluation of EBP skills (n = 119)

| Item | Mean* (± SD) |
|---|---|
| Asking questions regarding patients' care | 4.90 (± 1.38) |
| Formulating searchable, answerable clinical questions in PICO format | 4.25 (± 1.43) |
| Searching efficiently for evidence that answers the clinical questions | 4.15 (± 1.35) |
| Selecting the best evidence from what is found in the search | 4.09 (± 1.31) |
| Communicating best evidence to the patient | 4.06 (± 1.57) |
| Critically appraising the relevant body of evidence to address clinical questions | 3.96 (± 1.38) |
| Considering patient preferences when implementing EBP | 3.91 (± 1.58) |
| Synthesizing evidence to make decisions about patient care | 3.87 (± 1.39) |
| Communicating best evidence to individuals, groups, colleagues, the media, and policymakers | 3.75 (± 1.57) |
| Applying synthesized evidence to initiate change | 3.58 (± 1.52) |
| Analyzing outcomes of evidence-based interventions, practice changes, and clinical guidelines | 3.58 (± 1.42) |
| Assessing the clinical environment for readiness for EBP as well as barriers to and facilitators of EBP | 3.57 (± 1.49) |
| Challenging current institutional or unit-based practices | 3.56 (± 1.42) |
| Mentoring/teaching the EBP process to others | 2.96 (± 1.63) |

*1 – not at all competent, 7 – extremely competent; SD – standard deviation

Similarly, their self-evaluation of English language competencies was relatively low. A lack of knowledge of English seems to be a significant obstacle. Language barriers were confirmed by other research studies as well (Thorsteinsson, Sveinsdóttir, 2013, p. 578). After completion of the course, the students were most confident about asking questions regarding patients' care, formulating clinical questions in PICO format, and searching efficiently for evidence that answers the clinical questions. These issues are the focus of the Evidence-Based Practice course. Lower scores were noted for linking clinical experience with theory, for instance, assessing the clinical environment for readiness, critically appraising current practice or EBP mentoring. This was similar to results observed in the US students (Zeleníková et al., 2014). In a sample of 160 nurses, Melnyk et al. (2004) found that although the participants' beliefs about the benefit of EBP were high, their knowledge of EBP was relatively low. Significant relationships were found between the extent to which the nurses' practice is evidence-based and the nurses' knowledge of EBP, nurses' beliefs about the benefits of EBP, having an EBP mentor, and using the Cochrane Database of Systematic Reviews and the National Guideline Clearinghouse (Melnyk et al., 2004).

Nurses implementing EBP need productive reasoning skills to assess applicability of evidence to make informed clinical decisions about patient care (Estrada, 2009, p. 205). There is obviously a need to develop strategies to support newly graduated registered nurses in order to enhance their skills and practice of EBP. Such strategies should focus on both individual and organizational factors associated with these nurses' practice of EBP (Boström et al., 2013).

The other aim was to verify the psychometric properties of the Czech version of the *Perception of Effectiveness of EBP Courses* questionnaire. The Czech version of the instrument showed a good internal consistency (0.92). Similarly, the original version showed a good internal consistency measured by Cronbach's alpha (0.93).

The three-factor model of the Czech version of the scale is conceptually consistent with the original version (Zeleníková et al., 2014), in which the three-factor model is also presented. Only one item (*I can serve as an EBP mentor to other health care professionals*) in the Czech version was not associated (based on the variable loading) with the same factor (Factor 1 – satisfaction and behavioral changes) as in the original study; it was associated with Factor 3 – EBP mastery. *EBP mastery* includes EBP knowledge and EBP skills. EBP mentoring, which requires EBP knowledge and skills together with other interpersonal skills, can be also understood as a part of EBP mastery.

Although the instrument was guided by a model which advocates evaluation interventions at four levels, reaction or satisfaction, learning, behavioral changes and results (benefits), factor analyses of the Czech and US studies revealed three underlying concepts, or subscales of the instrument. According to Stokking (1996) evaluation of the last two levels is very difficult due to the fact that training is not the only relevant factor. The transfer of learning can be influenced by several factors including individual and contextual ones. From a student's perspective, it is difficult to evaluate all four levels. Evaluation of Level 1 – reaction (satisfaction) means how participants react to training. It can be understood as how well students like the learning process. Reaction (satisfaction) was measured by two items, *EBP courses are very useful for students* and *Students view EBP courses favorably in comparison to other courses EBP*. Evaluation of Level 2 – learning focused on perception of the effectiveness of teaching methods used in the course, providing feedback during the classes, instructors' knowledge and enthusiasm. Level 3 – behavioral changes is characterized by the following items: *I think it is important to continue with my EBP studies, After completing EBP courses I had opportunities elsewhere in the curriculum to strengthen and apply my EBP skills* and *Implementation of EBP can improve clinical care*. Level 4 – results is aimed at self-evaluation of EBP knowledge and skills.

The original items associated with two levels of evaluation – reaction (satisfaction) and behavioral changes – were identified by factor analysis as one overarching factor. Two other levels – learning and results were identified by factor analysis as two independent factors labeled as teaching and EBP mastery. The tested questionnaire showed good psychometric properties.

*Limitation*

Despite an acceptable response rate, a bias may have influenced the results in that the students who did not respond may have had beliefs, skills, and access to resources that differed from the participating students' ones.

## Conclusion

The results of the study confirmed that Czech students perceived EBP courses as effective. The participants believed in the value of EBP for patient

care, but were less confident regarding their own knowledge and skills needed for EBP.

In the area of EBP, the participants were in the role of novices. For improvement of EBP knowledge and skills, courses are just the initial impulse. EBP knowledge and skills have to be developed by further training not only during the rest of one's studies but especially in clinical practice. The tested questionnaire showed good psychometric properties and can be used in the Czech context for evaluation of EBP courses by students.

## Ethical aspects and conflict of interest

Completing the questionnaire was taken as indicating consent to participation in the study. The participants could withdraw from the survey at any time.

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## Author contribution

Conception and design (RZ), data collection (RZ, DJ) data analysis and interpretation (RZ), manuscript draft (RZ), critical revision of the manuscript (RZ, DJ), final approval of the manuscript (RZ, DJ).

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