

Original Article

Effectiveness of a Brief, Basic Evidence-Based Practice Course for Clinical Nurses

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Keywords
evidence-based practice, nursing, effectiveness, education, intervention

ABSTRACT

Background: Barriers to the implementation of evidence-based practice (EBP) by nursing professionals include a lack of knowledge, inadequate skills in searching for and appraising evidence, and consulting research articles. However, few studies have addressed the effectiveness of educational interventions to improve their competence.

Aims: To evaluate the effectiveness of a brief basic online and face-to-face educational intervention to promote EBP attitudes, knowledge and skills, and practice in clinical care nurses.

Methods: This study was quasi-experimental, pretest-posttest design with a comparison group. The sample included registered nurses enrolled in the free continuing education courses offered in 2013 by the Nursing Council of Jaén (Spain). The study included 109 participants (54 in the intervention group and 55 in the comparison group). The intervention was a brief, basic EBP course with online and face-to-face learning. The comparison group received an educational intervention with different content. The evidence-based practice questionnaire (EBPQ) was used to evaluate EBP attitude, knowledge and skills, and practice before the intervention, and at 21 and 60 days following the intervention. Two-way mixed analysis of variance was conducted.

Results: There was a significant difference between intervention and comparison groups in the knowledge and skills dimension. The difference between groups was not significant in the EBP practice dimension. Both groups had high scores in the attitude dimension that did not change after the intervention.

Linking Evidence to Action: A brief basic educational intervention on EBP with online and face-to-face learning can produce improvements in the knowledge and skills of clinical nurses.

INTRODUCTION

Evidence-based practice (EBP) is an essential element in the delivery of optimal care quality. In EBP, healthcare professionals make clinical decisions based on the best available research results while considering the preferences and clinical circumstances of their patients. EBP implementation has been related to improved health outcomes (Meijers et al., 2006) and reduced health costs (McGinty & Anderson, 2008). It is also reported to increase the satisfaction of nursing professionals (Maljanian, Caramanica, Taylor, MacRae, & Beland, 2002), who must meet increasingly high expectations of care quality on the part of patients and healthcare organizations.

Experts (Frenk et al., 2010) and international organizations have emphasized the need for healthcare professionals to possess adequate knowledge, skills, and attitudes for EBP implementation. The Institute of Medicine of the United States considers EBP to be a central competency for all healthcare professionals and aims for 90% of health decisions to be based on optimal evidence by 2020 (McClellan, McGinnis, Nabel, & Olsen, 2007). The International Council of Nurses (2007) considers EBP a professional responsibility and a central characteristic of the work of nurses.

Incorporation of EBP into the clinical practice of nurses involves a highly complex behavioral change influenced by various factors, and it has proceeded at a slower pace than desirable since its inception 20 years ago (Melnyk, 2006). The adoption and implementation of EBP by nurses has been described as inadequate (Sandström, Borglin, Nilsson, & Willman, 2011). A recent study showed that 34.5% of nursing professionals reported that their colleagues implemented EBP in their care, 46.4% believed that EBP was routinely applied in their institution, 76.2% reported a need for more knowledge and skills in EBP, and 72.9% wanted online training on EBP (Melnyk, Fineout-Overholt, Gallagher-Ford, & Kaplan, 2012).

BACKGROUND

There have been numerous studies on attitudes, knowledge, and skills in relation to EBP, including the practice and utilization of EBP (Melnyk et al., 2012; Pravikoff, Pierce, & Tanner, 2005) and the barriers against and opportunities for

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its implementation, which were generally classified in relation to the professionals themselves, organizations, and institution policies (Sadeghi-Bazargani, Tabrizi, & Azami-Aghdash, 2014). The main barriers to EBP faced by healthcare professionals include lack of time, inadequate authority to implement the changes, inadequate numbers of EBP mentors along with a culture and environment that does not support EBP (Melnyk, 2014), and a lack of knowledge and skills in searching for and appraising research articles (Sadeghi-Bazargani et al., 2014). Related to the knowledge and skills in EBP, disparities also exist among nurses´ perceptions. In our context, higher scores in knowledge and skills were obtained among nurses with shorter professional experience (González-Torrente et al., 2012). With respect to attitudes toward EBP, several studies show moderate to high scores (Koehn & Lehman, 2008), and highlight that nurses with positive attitudes are more likely to use EBP (Estabrooks, Floyd, Scott-Findlay, O'Leary, & Gushta, 2003; Melnyk et al., 2004).

Framework

The Theory of Planned Behavior (TPB; Ajzen, 1991) is considered appropriate to explain the behavioral intentions of healthcare professionals (Eccles et al., 2006; Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008). According to this theory, behavioral intention is explained by attitude, subjective norms, and perceived behavioral control. Attitudes refer to the general evaluation of behavior and are determined by beliefs about it and by perceptions of its consequences. Subjective norms refer to the perceived social approval of the behavior and are determined by expectations of approval or disapproval by key reference groups. Perceived behavioral control refers to the confidence of individuals in their capacity (knowledge and skills) to carry out a specific behavior and is determined by their perception of the opportunities, barriers, and resources involved.

Review of Literature

Various educational programs for clinical nurses have been designed to reduce the barriers and promote their acquisition of EBP knowledge and skills (Schulman, 2008; Soukup & McCleish, 2008). The duration and content of these courses vary, but they all impart basic information on the EBP paradigm and its implementation, and discuss the behavioral changes involved. The teaching methodology also differs among programs and includes face-to-face classes, discussion groups, online learning, and journal clubs, among others.

Despite the major potential benefits of education and skills building in EBP and the large number of instruments for its evaluation (Leung, Trevena, & Waters, 2014), there has been little investigation of its effectiveness (Hart et al., 2008; Kim et al., 2013; Mollon et al., 2012). In contrast, there have been numerous studies and systematic reviews on educational interventions for physicians and medical students (Ilic & Maloney, 2014; Young, Rohwer, Volmink, & Clarke, 2014).

Among published studies on EBP courses for nurses, some did not yield conclusive results (Mollon et al., 2012; Sherriff, Wallis, & Chaboyer, 2007), some did not include a control group (Kim et al., 2013; Varnell, Haas, Duke, & Hudson, 2008), and some used instruments with no established psychometric validity to measure EBP competence (Reviriego et al., 2014). However, other studies have offered more consistent results on factors that facilitate EBP learning, including a higher nurse educational level (Hart et al., 2008), the presence of EBP mentors or leaders with EBP expertise (Wallen et al., 2010), and the promotion of student self-learning (Zadvinskis, 2008).

There have been recent calls for further studies to investigate the effectiveness of educational interventions to improve EBP implementation in relation to their duration, target population, methodology, clinical setting, and other influential factors (Kim et al., 2013; Upton, Upton, & Scurlock-Evans, 2014). With this background, this study was designed to evaluate the effectiveness (change in EBP attitudes, knowledge, skills, and practice) of a brief, basic, online, and face-to-face educational intervention for clinical care nurses.

METHODOLOGY

Design

This study was a two group quasi-experiment with an intervention group and a comparison group using a pre-and posttest design, which lacked random assignment (Melnyk & Cole, 2011).

Sample and Settings

The study included a convenience sample of 109 nursing professionals who attended free continuing education courses offered by the Nursing Council of Jaén (Spain) in 2013. There were 54 participants in the intervention group and 55 in the comparison group. The nurses came principally from teaching hospitals.

Calculation of the sample size was based on the estimations of Bausell and Li (2002) for a two-way mixed analysis of variance (ANOVA) design (between-subject factor: EBP intervention yes or no, within-subject factor: Repeated measures). The calculation supported 106 participants (53 + 53) were required to detect a standardized mean difference of at least .30 between intervention and comparison groups with 80% power and 95% confidence. Calculation of the standardized mean difference considered a minimum difference of 6 points in the EBP Questionnaire (EBPQ) score (De Pedro Gómez et al., 2009) and an estimated standard deviation of 20.8, taken from a previous study of the EBPQ in Spanish nurses (González-Torrente et al., 2012).

Procedure

The nurses in the intervention group attended the EBP course in February of 2013, and the comparison group attended a different course during the same time frame. The attitude, knowledge and skills, and practice in EBP were each evaluated using a questionnaire before the course began (time O1) and after at 21 (time O2) and 60 (time O3) days thereafter.

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All the data were collected the first day of the course in both groups. The questionnaire was completed and delivered anonymously. Participants selected a private code to identify their questionnaires, blinding the researchers to their identity. The questionnaire was self-administered, avoiding researcher bias.

Ethics

The study was approved by the provincial ethics committee. The objective of the study and its anonymity were explained to participants before administration of the questionnaire, and their informed consent was obtained.

Data Analysis

After a descriptive analysis was conducted calculating percentages and means, the effectiveness of the intervention was analyzed by two-way mixed ANOVA, with a within-subject factor (time O1, O2, and O3), and a between-subjects factor (intervention). The researcher conducting the statistical analysis was blinded to the group membership of participants.

Intervention

The intervention group received a brief, basic EBP course. The training activity included two face-to-face sessions of 5 hours each and online learning for 30 hours.

The face-to-face sessions developed attitudes, cognitive aspects, and skills related to EBP issues, including the formulation of a clinical question in PICO (Patient or Population, Intervention, Comparison, Outcome) format, knowledge of primary and secondary sources, information recovery, Boolean operators, main databases, and PubMed searches. This learning was reinforced by the home study. Incorporation of this knowledge was evaluated by the completion of different exercises and by providing an individual report to the student with an assessment of each exercise. Students were asked to set each exercise in the routine clinical care setting. An online specific platform was designed and used to support the online learning (consultations, tutoring, and exercise feedback); it included a compulsory discussion forum and offered documentary and reference resources.

The comparison group received a course whose contents differed from those of the EBP course. The course for the comparison group was about digital resources and information technology for clinical practice. However, to facilitate the comparison between the intervention group and the comparison group, the course given to the comparison group had the same duration and the same methodology (online and face-to-face learning, home study exercises, and strategies to support teaching) as the course given to the intervention group. Table 1 shows the characteristics and contents of both educational interventions.

Instrument

EBP attitudes, knowledge and skills, and practice were evaluated with the validated Spanish adaptation by De Pedro Gómez et al. (2009) of the EBPQ (Upton & Upton, 2006), a self-administered 19-item questionnaire with each item scored on a 7-point Likert scale (1-7), with a higher score indicating a more positive attitude toward EBP or greater implementation, or knowledge and or skills of EBP.

The Spanish version of the EBPQ reproduces the original structure of the tool, showing three dimensions (attitudes: 3 items; knowledge and skills: 10 items; and practice: 6 items) both in the exploratory factor analysis (62.3% of total variance explained) and in the confirmatory factor analysis (acceptable fit indices), with a proper internal reliability of each dimension (above .7; De Pedro Gómez et al., 2009). In our sample, exploratory factor analysis with principal axis factors and Varimax rotation showed the previous three dimensions, which account for 72.5% of the variance. Regarding internal reliability in our sample, Cronbach's alpha values were .71 for attitudes, .95 for knowledge and skills, and .92 for practice.

RESULTS

Sample Description

Table 2 exhibits the descriptive data of the study sample and the comparison between groups. The mean age of the sample was 35.7 years and 77% were females. All participants had a bachelor's degree in nursing, 21.1% also had a master's or another university degree, and 16.5% had completed training in a nursing specialty. The average length of professional experience was 12 years, and 42.2% had received previous training in EBP. No significant differences were observed between the intervention and comparison groups in these study variables, which are listed in Table 2.

Effect of the Intervention

Table 3 reports the mean scores of the three EBPQ dimensions (knowledge and skills, attitude, and practice) in each group at each measurement time point. At baseline (01), no significant difference in any study dimension was found.

The analysis of the effect of the intervention on EBP dimensions met the assumptions of sphericity and homogeneity ($p \geq .05$ for Mauchly's test of sphericity and for Levene's test of homogeneity). Table 4 exhibits the between-subject effects (EBP intervention) and the interaction between intervention and time for each dimension. The results for knowledge and skills significantly differed, both between the groups and in the interaction of intervention with time. Post hoc analysis of these differences with the Bonferroni test revealed a greater effect on the intervention group versus the comparison group both at O2 ($p = .002$) and O3 ($p = .005$). No significant differences were observed in the dimensions of attitude and practice.

DISCUSSION

This study shows the degree to which a basic EBP course with an online and face-to-face learning can increase the competence of nursing professionals. The students were clinical care nurses with a bachelor's degree in nursing. The course had

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Table 1. Characteristics and Contents of the EBP (Intervention Group) and Digital Resources (Comparison Group) Educational Interventions

Educational intervention characteristic	Intervention group	Comparison group
Face-to-face sessions	5 + 5 (10 h)	5 + 5 (10 h)
Online learning	15 + 15 (30 h)	15 + 15 (30 h)
Total duration educational intervention	40 h	40 h
Electronic tutoring	Yes	Yes
Specifically designed online learning platform	Yes	Yes
Documentary and reference resources in the online learning platform	Yes	Yes
Discussion forum	Yes	Yes
Weekly exercises and home study	Yes	Yes
Individual report with an assessment of each exercise	Yes	Yes

Contents	
Intervention group (EBP)	**Comparison group (digital resources)**
Session 1 (face to face):	Session 1 (face to face):
• Introduction to EBP • Formulation of the clinical question (PICO) • Hierarchy evidence search: – Meta search engine: trip database, epistemonikos, evidence portal, evidence search, exploraevidencia – Clinical practice guidelines online databases: NGC, NICE, SIGN, RNAO, Guiasalud – Systematics reviews databases: Cochrane Library, JBI, CRD	• Introduction to the Web 2.0 and e-health • Collaboration tools applied to health – Community of practice – Google docs – Social network – Survey (Survey Monkey, Google forms) – File-hosting service (Dropbox, Google Drive, etc.)
Session 2 (face to face):	Session 2 (face to face):
• Search strategies: – Controlled vocabulary (thesaurus/MeSH) – Keywords – Boolean operators – Limit function – Searching databases: PubMed/Medline, CINAHL, PsycINFO, SciELO	• Communication and dissemination information tools applied to health: – Google groups, Webinars (Wiziq), Twitter, Skype, Blogs • Selection and management information tools applied to health: – Really Simple Syndication (RSS), Feedly, Diigo • Audio-visual management tools applied to health: – YouTube, Flickr, Slideshare, Podcast
Online learning (30 h)	Online learning (30 h)
• Study of the contents with the documentary and reference resources • Resolution of the exercises related to: – Formulate the clinical PICO question – Identify two clinical practice guidelines and two systematic reviews about your PICO question – Describe 10 recommendations about your clinical question and identify the level of evidence and grades of recommendation – Identify the original articles of the recommendations described previously – Find three documents (include in a list) in any database (full text) – Describe the hierarchy search of your clinical question. Detail your search strategies (controlled vocabulary, keywords, limit function, and Boolean operators) – Search four original articles with several limits in PubMed • Discussion forum: – First week: "How do you implement in your service the best practice X?" – Second week: About the implementation in your service the best practice X: "What do you think would be the answer of the colleagues of your service? And, what would be the role of the leaderships?"	• Study of the contents with the documentary and reference resources • Resolution of the exercises related to a clinical case (diabetes or pressure ulcer): – Design of collaborative files (word processor, survey, etc.) – Create an account in the different resources – Identify resources 2.0 about safety patient, association of patients, recommendations of lifestyles – Select two videos from YouTube for education for health – Self-report about resources 2.0 and health • Discussion forum: – First week: "Barriers and Facilitators for the use of resources 2.0 in your workplace" – Second week: "Safe use of the Internet in health care"

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Table 2. Descriptive Data of the Study Sample and Comparison Between Groups

	Total	IG	CG	*p*-value
Age in years (*SD*)	35.7 (12.2)	36.6 (10.1)	34.7 (8.3)	.295
Gender (% females)	77	70.4	83.6	.100
Educational level (% with master's or additional university degree)	21.1	18.5	23.6	.513
Nursing specialty (%)	16.5	18.5	14.5	.576
Previous EBP training (%)	42.2	48.1	36.4	.213
Professional experience in years (*SD*)	12.2 (9.8)	13.43 (10.8)	10.9 (8.6)	.193

Note. IG = intervention group. CG = comparison group. SD = standard deviation.

Table 3. Mean Scores for EBPQ Dimensions in the Intervention and Comparison Groups at the Three Measurement Time Points

		O1		O2		O3	
Outcomes	**Groups**	**Mean**	**95% CI**	**Mean**	**95% CI**	**Mean**	**95% CI**
Knowledge and skills	IG	3.65	3.29, 4.01	4.89	4.65, 5.13	4.92	4.69, 5.15
	CG	3.61	3.28, 3.93	4.07	3.68, 4.47	4.3	4.02, 4.59
	p	$p \geq .05$		$p < .05$		$p < .05$	
Attitude	IG	5.88	5.63, 6.13	6.05	5.87, 6.23	5.85	5.58, 6.11
	CG	5.97	5.73, 6.21	5.85	5.56, 6.13	5.99	5.78, 6.21
	p	$p \geq .05$		$p \geq .05$		$p \geq .05$	
Practice	IG	3.56	3.13, 3.98	4.14	3.70. 4.58	4.72	4.36, 5.08
	CG	3.77	3.37, 4.17	4.31	3.90, 4.72	4.47	4.11, 4.82
	p	$p \geq .05$		$p \geq .05$		$p \geq .05$	

Note. O1 = before the intervention. O2 = *at* 21 days. O3 = *at* 60 days. IG = *intervention* group. CG = *comparison* group. CI = *confidence* interval.

impact on their EBP knowledge and skills but had no impact on the dimensions of attitude and practice. According to the TPB, our educational intervention improves the dimensions of subjective norms and perceived behavioral control of nurses, because increases in the nurses' confidence to perform their clinical practice were observed in the intervention group.

Related to the attitude dimension, also included in the TPB, the participants receiving the EBP course and the comparison group both had a high mean baseline score in attitudes toward EBP, and this score was not affected by the intervention. Few studies have evaluated the effectiveness of educational interventions aimed at nursing professionals. The design and development of this study followed expert recommendations for studies on the effectiveness of EBP training in healthcare professionals, with the utilization of control groups and validated measurement instruments (Melnyk et al., 2004; Upton et al., 2014; Varnell et al., 2008; Young et al., 2014). The nurses in both groups received an educational intervention with different contents but similar formal characteristics (duration, online and face-to-face learning, and teaching support), improving group comparability. We used a validated Spanish adaptation (De Pedro Gómez et al., 2009) of the 19-item version of the EBPQ (Upton & Upton, 2006), which was reported to possess optimal psychometric characteristics in a recent review (Leung et al., 2014). In addition, its availability in different languages (Upton et al., 2014) facilitates the comparison of findings with those in other countries.

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Table 4. Effect of the Intervention on EBP Knowledge and Skills, Attitudes, and Practice (Two-Way Mixed ANOVA)

	Between-subject effects (EBP intervention)		Interaction: intervention × time	
	F (*df*)	*p*	F (*df*)	*p*
Knowledge and skills	6.6 (1)	.01	8.73 (2)	<.001
Attitude	0.01 (1)	.92	2.26 (2)	.11
Practice	0.04 (1)	.85	2.16 (2)	.12

Note. df = degrees of freedom.

EBP knowledge and skills in nurses have been improved by educational interventions with different durations and methodologies, including online self-learning courses (Hart et al., 2008; Reviriego et al., 2014), courses within a tutoring program (Kim et al., 2013), and face-to-face courses with a "workshop" format, although these only improved skills in the search for evidence (Sherriff et al., 2007). In contrast, EBP knowledge and skills were not improved by an exclusively online educational intervention (Mollon et al., 2012), which may be attributable to the lack of student feedback or learning assessment.

The few studies found on changes in the practice of EBP published varied results, with Mollon et al. (2012) finding no significant changes after their online program, whereas Kim et al. (2013) reported an important improvement after a 9-month multicomponent EBP implementation program that included an educational intervention. However, the degree to which this improvement can be attributed to the educational intervention is not known. Substantive improvements in EBP practice were also reported by Varnell et al. (2008) after an educational course and by Wallen et al. (2010) after a multicomponent intervention.

In this study, scores for the attitude of all participants toward EBP were high (range: 5.83 to 5.99), both before and after the intervention, consistent with reports by authors applying the EBPQ in nurses (Kim et al., 2013; Mollon et al., 2012) and other healthcare professionals (range: 5.22 to 5.75; Mollon et al., 2012; Upton & Upton, 2006). The score for EBP attitudes in this study is close to a previous finding in primary care in our region (González-Torrente et al., 2012). These high scores among nurses may explain why the intervention did not appear to affect their attitudes. Alternatively, it is possible that the EBPQ offers inadequate precision in the estimation of attitudes (De Pedro Gómez et al., 2009; Leung et al., 2014; Sesé-Abad et al., 2014) and requires further improvement (Upton et al., 2014). It did not even detect any effect on attitude after the 9-month course studied by Kim et al. (2013); measurement of this dimension is known to be influenced by differences in organizational, geographic, cultural, and professional settings, (Mollon et al., 2012). Special efforts have been made to improve the evaluation of attitudes toward EBP (Melnyk, Fineout-Overholt, & Mays, 2008; Ruzafa-Martínez, López-Iborra, & Madrigal-Torres, 2011), and two quasi-experimental studies were able to discriminate differences in the attitude of nursing professionals after an educational intervention (Varnell et al., 2008; Wallen et al., 2010).

Limitations

The participants of this study were not randomly selected, although a comparison group was included and no differences between groups were found in potential confounders. The voluntary participation of the professionals may also imply a special interest in the topic. In addition, only short-term effects were evaluated (45 days postintervention), although analysis of the longer-term impact of the course would likely be complicated by the influence of other uncontrolled factors on scores in the three EBPQ dimensions. The instrument is based on self-report for knowledge and skills as opposed to observation or objective measurement. However, Taheri, Mirmohamadsadeghi, Adibi, and Ashorion (2008) have shown a positive correlation between the EBP competence assessed by self-reported and objective tools. Finally, comparisons with the results of other studies are limited by the wide differences in design, educational intervention, and evaluation instruments.

LINKING EVIDENCE TO ACTION

- The incorporation of EBP into nursing practice is slow and its implementation by nurses is inadequate. Barriers to EBP implementation include a lack of knowledge and inadequate skills in searching for and critically appraising research articles.
- A brief basic EBP educational intervention with online and face-to-face learning can produce improvements in the knowledge and skills of clinical nurses.
- Advantages of this educational approach include its low use of resources, its adaptability to work timetables, and its favoring of the active role of participants.
- The intervention targets graduate nurses who work directly with patients, and it can be recommended in any clinical setting.

IMPLICATIONS

Our results are highly relevant to the design of continuing education programs for nursing professionals and healthcare organizations, given the limited data available on the

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effectiveness of educational interventions to improve the competence of healthcare professionals in EBP (Nabulsi et al., 2007).

For the Continuing Education of Nursing Professionals

The present findings endorse the value of this educational intervention on EBP, aimed at professionals who are graduates and work directly with patients. The course content focuses on improving knowledge of the EBP paradigm, formulating PICO questions, and searching electronic bibliographic resources, as proposed by Balakas and Fineout-Overholt (2011, p. 339). The objective is to encourage nurses in their self-perception as "evidence-users" rather than "evidence-generators" (Fineout-Overholt & Johnston, 2005). More advanced courses are warranted to expand learning on the critical appraisal of scientific articles (Yousefi-Nooraie, Rashidian, Keating, & Schonstein, 2007).

The relatively short duration of the course along with its online and home learning components allow it to be readily adapted to the timetable of nurses and reduce the training cost burden. Finally, the personalized feedback favors interaction with teachers, facilitates self-learning, and fosters an active role in learning (Zadvinskis, 2008).

For Healthcare Organizations

Healthcare organizations should include educational interventions within a wider conceptual framework, as that provided by the TPB, developing multicomponent strategies for healthcare professionals to implement EBP in their routine clinical practice. According to the TPB, the present educational intervention keeps the same attitudes and effects with the dimensions of subjective norms and perceived behavioral control, although both would require further contributions.

Numerous studies have shown the efficacy of various interventions. Subjective norms of nurses could be improved by the provision of systematic support by professionals with administrative responsibilities (Brown, Wickline, Ecoff, & Glaser, 2009; Newhouse, Dearholt, Poe, Pugh, & White, 2007). Improvements in perceived behavioral control through reducing the barriers to EBP adoption could be achieved through incentives (Flodgren et al., 2011) and the screening of reminders on point-of-care computers (Shojania, Jennings, Mayhew, Ramsay, & Eccles, 2009). In addition, changes in organizational culture (Parmelli et al., 2011), audits, and feedback (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman, 2006) have been found to exert an influence on subjective norms and perceived behavioral control.

CONCLUSIONS

Healthcare centers share the responsibility of training healthcare professionals about EBP. Our findings demonstrate that a brief, basic, online and face-to-face course on EPB is sufficient to produce improvements in the knowledge and skills of clinical nurses. Further research is required to determine the long-term impact of educational interventions, their cost-effectiveness, and to evaluate the effects of evidence-based care on health outcomes. **WVN**

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References

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes, 50*, 179–211.

Balakas, K., & Fineout-Overholt, E. (2011). Teaching evidence-based practice in clinical settings. In B. Melnyk & E. Fineout-Overholt (Eds.), *Evidence-based practice in nursing & healthcare: A guide to best practice* (2nd ed.; pp. 330–343). Philadelphia, PA: Lippincott Williams & Wilkins.

Bausell, R., & Li, Y. (2002). *Power analysis for experimental research: A practical guide for the biological, medical and social sciences*. West Nyack, NY: Cambridge University Press.

Brown, C. E., Wickline, M. A., Ecoff, L., & Glaser, D. (2009). Nursing practice, knowledge, attitudes and perceived barriers to evidence-based practice at an academic medical center. *Journal of Advanced Nursing, 65*(2), 371–381. doi: 10.1111/j.1365-2648.2008.04878.x

De Pedro Gómez, J., Morales-Asencio, J. M., Sesé Abad, A., Bennasar Veny, M., Ruiz Roman, M. J., & Muñoz Ronda, F. (2009). Validación de la versión española del cuestionario sobre la práctica basada en la evidencia en enfermería [Validation of the Spanish version of the evidence based practice questionnaire in nurses]. *Revista Española de Salud Pública, 83*(4), 577–586.

Eccles, M. P., Hrisos, S., Francis, J., Kaner, E. F., Dickinson, H. O., Beyer, F., & Johnston, M. (2006). Do self-reported intentions predict clinicians' behavior: A systematic review. *Implementation Science, 21*, 1–28. doi: 10.1186/1748-5908-1-28

Estabrooks, C. A., Floyd, J. A., Scott-Findlay, S., O'Leary, K. A., & Gushta, M. (2003). Individual determinants of research utilization: A systematic review. *Journal of Advanced Nursing, 43*(5), 506–520.

Fineout-Overholt, E., & Johnston, L. (2005). Teaching EBP: A challenge for educators in the 21st century. *Worldviews on Evidence-Based Nursing, 1*(2), 37–39.

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17416787, 2015, 4, Downloaded from https://sigmapubs.onlinelibrary.wiley.com/doi/10.1111/wvn.12103 by Servicio Murciano De Salud, Wiley Online Library on [22/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Flodgren, G., Eccles, M. P., Shepperd, S., Scott, A., Parmelli, E., & Beyer, F. R. (2011). An overview of reviews evaluating the effectiveness of financial incentives in changing healthcare professional behaviors and patient outcomes. *Cochrane Database of Systematic Reviews (Online)*, 7, CD009255. doi:10.1002/14651858.CD009255

Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., & ... Zurayk, H. (2010). Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *Lancet*, *376*(9756), 1923–1958. doi: 10.1016/S0140-6736(10)61854-5

Godin, G., Bélanger-Gravel, A., Eccles, M., & Grimshaw, J. (2008). Healthcare professionals' intentions and behaviors: A systematic review of studies based on social cognitive theories. *Implementation Science*, *16*, 3–36. doi: 10.1186/1748-5908-3-36

González-Torrente, S., Pericas-Beltrán, J., Bennasar-Veny, M., Adrover-Barceló, R., Morales-Asencio, J. M., & De Pedro-Gómez, J. (2012). Perception of evidence-based practice and the professional environment of primary health care nurses in the Spanish context: A cross-sectional study. *BMC Health Services Research*, *12*, 227–236. doi: 10.1186/1472-6963-12-227

Hart, P., Eaton, L., Buckner, M., Morrow, B. N., Barrett, D., & Fraser, D. (2008). Effectiveness of a computer-based educational program on nurses' knowledge, attitude, and skill level related to evidence-based practice. *Worldviews on Evidence-Based Nursing*, *5*(2), 75–84. doi: 10.1111/j.1741-6787.2008.00123.x

Ilic, D., & Maloney, S. (2014). Methods of teaching medical trainees evidence-based medicine: A systematic review. *Medical Education*, *48*(2), 124–135. doi: 10.1111/medu.12288

International Council of Nurses. (2007). *Position statement: Nursing research*. Geneva, Switzerland: Author. Retrieved from http://www.icn.ch/images/stories/documents/publications/position_statements/B05_Nsg_Research.pdf

Jamtvedt, G., Young, J. M., Kristoffersen, D. T., O'Brien, M. A., & Oxman, A. D. (2006). Audit and feedback: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews (Online)*, 2, CD000259. doi:10.1002/14651858.CD000259.pub2

Koehn, M. L., & Lehman, K. (2008). Nurses' perceptions of evidence-based nursing practice. *Journal of Advanced Nursing*, *62*(2), 209–215. doi: 10.1111/j.1365-2648.2007.04589.x

Kim, S. C., Brown, C. E., Ecoff, L., Davidson, J. E., Gallo, A. M., Klimpel, K., & Wickline, M. A. (2013). Regional evidence-based practice fellowship program: Impact on evidence-based practice implementation and barriers. *Clinical Nursing Research*, *22*(1), 51–69. doi: 10.1177/1054773812446063

Leung, K., Trevena, L., & Waters, D. (2014). Systematic review of instruments for measuring nurses' knowledge, skills and attitudes for evidence-based practice. *Journal of Advanced Nursing*, *70*(10), 2181–2195. doi: 10.1111/jan.12454

Maljanian, R., Caramanica, L., Taylor, S. K., MacRae, J. B., & Beland, D. K. (2002). Evidence-based nursing practice, Part 2: Building skills through research roundtables. *Journal of Nursing Administration*, *32*(2), 85–90.

McClellan, M. B., McGinnis, M., Nabel, E. G., & Olsen, L. M. (2007). *Evidence-based medicine and the changing nature of health care*. Washington, DC: The National Academies Press.

McGinty, J., & Anderson, G. (2008). Predictors of physician compliance with American Heart Association guidelines for acute myocardial infarction. *Critical Care Nursing Quarterly*, *31*(2), 161–172. doi: 10.1097/01.CNQ.0000314476.64377.12

Meijers, J. M., Janssen, M. A., Cummings, G. G., Wallin, L., Estabrooks, C. A., & Ralfens, Y. G. H. (2006). Assessing the relationships between contextual factors and research utilization in nursing: Systematic literature review. *Journal of Advanced Nursing*, *55*, 622–635.

Melnyk, B. M. (2006). Calling all educators to teach and model evidence-based practice in academic settings. *Worldviews on Evidence-Based Nursing*, *3*(3), 93–94. doi: 10.1111/j.1741-6787.2006.00061.x

Melnyk, B. M. (2014). Building cultures and environments that facilitate clinician behavior change to evidence-based practice: What works? *Worldviews on Evidence-Based Nursing*, *11*(2), 79–80.

Melnyk, B. M., & Cole, R. (2011). Generating evidence through quantitative research. In B. M. Melnyk & E. Fineout-Overholt *Evidence-based practice in nursing & healthcare: A guide to best practice* (pp. 397–434). Philadelphia, PA: Lippincott Williams & Wilkins.

Melnyk, B. M., Fineout-Overholt, E., Fischbeck Feinstein, N., Li, H., Small, L., Wilcox, L., & Kraus, R. (2004). Nurses' perceived knowledge, beliefs, skills, and needs regarding evidence-based practice: Implications for accelerating the paradigm shift. *Worldviews on Evidence-Based Nursing*, *1*(3), 185–193. doi: 10.1111/j.1524-475X.2004.04024.x

Melnyk, B. M., Fineout-Overholt, E., & Mays, M. Z. (2008). The evidence-based practice beliefs and implementation scales: Psychometric properties of two new instruments. *Worldviews on Evidence-Based Nursing*, *5*(4), 208–216. doi: 10.1111/j.1741-6787.2008.00126.x

Melnyk, B. M., Fineout-Overholt, E., Gallagher-Ford, L., & Kaplan, L. (2012). The state of evidence-based practice in US nurses: Critical implications for nurse leaders and educators. *The Journal of Nursing Administration*, *42*(9), 410–417. doi: 10.1097/NNA.0b013e3182664e0a

Mollon, D., Fields, W., Gallo, A. M., Wagener, R., Soucy, J., Gustafson, B., & Kim, S. C. (2012). Staff practice, attitudes, and knowledge/skills regarding evidence-based practice before and after an educational intervention. *Journal of Continuing Education in Nursing*, *43*(9), 411–419. doi: 10.3928/00220124-20120716-89

Nabulsi, M., Harris, J., Letelier, L., Ramos, K., Hopayian, K., Parkin, C., & ... Summerskill, W. (2007). Effectiveness of education in evidence-based healthcare: The current state of outcome assessments and a framework for future evaluations. *International Journal of Evidence-Based Healthcare*, *5*(4), 468–476. doi: 10.1111/j.1479-6988.2007.00084.x

Newhouse, R. P., Dearholt, S., Poe, S., Pugh, L. C., & White, K. M. (2007). Organizational change strategies for evidence-based practice. *The Journal of Nursing Administration*, *37*(12), 552–557. doi: 10.1097/01.NNA.0000302384.91366.8f

Parmelli, E., Flodgren, G., Schaafsma, M. E., Baillie, N., Beyer, F. R., & Eccles, M. P. (2011). The effectiveness of strategies to change organizational culture to improve healthcare performance. *Cochrane Database of Systematic Reviews (Online)*, 1, CD008315. doi:10.1002/14651858.CD008315.pub2

Pravikoff, D. S., Pierce, S. T., & Tanner, A. (2005). Evidence-based practice readiness study supported by academy nursing informatics expert panel. *Nursing Outlook*, *53*, 49–50.

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Reviriego, E., Cidoncha, M. A., Asua, J., Gagnon, M. P., Mateos, M., Gárate, L., & ... González, R. M. (2014). Online training course on critical appraisal for nurses: Adaptation and assessment. *BMC Medical Education, 14*(1), 136–145. doi: 10.1186/1472-6920-14-136

Ruzafa-Martínez, M., López-Iborra, L., & Madrigal-Torres, M. (2011). Attitude towards evidence-based nursing questionnaire: Development and psychometric testing in Spanish community nurses. *Journal of Evaluation in Clinical Practice, 17*(4), 664–670. doi: 10.1111/j.1365-2753.2011.01677.x

Sadeghi-Bazargani, H., Tabrizi, J. S., & Azami-Aghdash, S. (2014). Barriers to evidence-based medicine: A systematic review. *Journal of Evaluation in Clinical Practice, 20*(6), 793–802. doi: 10.1111/jep.12222

Sandström, B., Borglin, G., Nilsson, R., & Willman, A. (2011). Promoting the implementation of evidence-based practice: A literature review focusing on the role of nursing leadership. *Worldviews on Evidence-Based Nursing, 8*(4), 212–223.

Schulman, C. S. (2008). Strategies for starting a successful evidence-based practice program. *AACN Advanced Critical Care, 19*(3), 301–311; quiz 312-313. doi: 10.1097/01.AACN.0000330381.41766.2a

Sesé-Abad, A., De Pedro-Gómez, J., Bennasar-Veny, M., Sastre, P., Fernandez-Dominguez, J. C., & Morales-Asencio, J. M. (2014). A multisample model validation of the Evidence-Based Practice Questionnaire. *Research in Nursing & Health, 37*(5), 437–446. doi: 10.1002/nur.21609

Sherriff, K. L., Wallis, M., & Chaboyer, W. (2007). Nurses' attitudes to and perceptions of knowledge and skills regarding evidence-based practice. *International Journal of Nursing Practice, 13*, 363–369. doi: 10.1111/j.1440-172X.2007.00651.x

Shojania, K. G., Jennings, A., Mayhew, A., Ramsay, C. R., & Eccles, M. P. (2009). The effects of on-screen, point of care computer reminders on processes and outcomes of care. *Cochrane Database of Systematic Reviews (Online), 3*, CD001096. doi: 10.1002/14651858.CD001096.pub2

Soukup, M., & McCleish, J. (2008). Advancing evidence-based practice: A program series. *Journal of Continuing Education in Nursing, 39*(9), 402–406.

Taheri, H., Mirmohamadsadeghi, M., Adibi, I., & Ashorion, V. (2008). Evidence-based medicine (EBM) for undergraduate medical students. *Annals Academy of Medicine, 38*(9), 764–768.

Upton, D., & Upton, P. (2006). Development of an Evidence-Based Practice Questionnaire for nurses. *Journal of Advanced Nursing, 53*, 454–458. doi: 10.1111/j.1365-2648.2006.03739.x

Upton, D., Upton, P., & Scurlock-Evans, L. (2014). The reach, transferability, and impact of the Evidence-Based Practice Questionnaire: A methodological and narrative literature review. *Worldviews on Evidence-Based Nursing, 11*(1), 46–54. doi: 10.1111/wvn.12019

Varnell, G., Haas, B., Duke, G., & Hudson, K. (2008). Effect of an educational intervention on attitudes toward and implementation of evidence-based practice. *Worldviews on Evidence-Based Nursing, 5*(4), 172–181. doi: 10.1111/j.1741-6787.2008.00124.x

Wallen, G. R., Mitchell, S. A., Melnyk, B., Fineout-Overholt, E., Miller-Davis, C., Yates, J., & Hastings, C. (2010). Implementing evidence-based practice: Effectiveness of a structured multifaceted mentorship programme. *Journal of Advanced Nursing, 66*(12), 2761–2771. doi: 10.1111/j.1365-2648.2010.05442.x

Young, T., Rohwer, A., Volmink, J., & Clarke, M. (2014). What are the effects of teaching evidence-based health care (EBHC)? Overview of systematic reviews. *PloS One, 9*(1), e86706. doi: 10.1371/journal.pone.0086706

Yousefi-Nooraie, R., Rashidian, A., Keating, J., & Schonstein, E. (2007). Teaching evidence-based practice: The teachers consider the content. *Journal of Evaluation in Clinical Practice, 13*(4), 569–575.

Zadvinskis, I. M. (2008). Increasing knowledge level of evidence-based nursing through self-directed learning: Lessons learned for staff development. *Journal for Nurses in Staff Development: Journal for Nurses in Staff Development, 24*(4), E13–E19. doi: 10.1097/01.NND.0000320659.18297.fo

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