

Original Article

Findings From a Pilot Study: Bringing Evidence-Based Practice to the Bedside

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Keywords

evidence-based practice, education/curriculum, mentorship, Rogers Diffusion of Innovations (DOI) theory, Johns Hopkins Nursing Evidence-Based Practice Model, Advancing Research & Clinical Practice through Close Collaboration (ARCC) Model, quantitative, qualitative

ABSTRACT

Background: To translate research supporting inpatient care outcomes and provide evidence-based care, registered nurses (RNs) need continuing education and mentoring support to adopt evidence-based practice (EBP).

Aims: The aim of this study was to assess a demonstration project intended to pilot and evaluate a structured EBP education with mentoring innovation for nurses in a multihospital system.

Methods: Nurses from five units in five hospitals were included in an education with mentoring innovation to implement the Johns Hopkins Nursing Evidence-Based Practice Model and the Advancing Research and Clinical practice through close Collaboration (ARCC) Model. To determine outcomes, the EBP beliefs scale (EBPB) and implementation scale (EBPI) were administered before and after the education with mentoring innovation. Eighty-three RNs completed both preintervention surveys. A total of 57 RNs completed the postintervention surveys. In addition, qualitative data were obtained from focus groups involving 24 participants.

Findings: Statistical analysis indicated positive movement toward EBP in project participants. Qualitative analysis revealed perceived successes and challenges involved with implementing an evidence-based program, provided logistical lessons learned, and indicated that nurses at all levels of practice require mentoring and coaching to foster EBP sustainment.

Linking Evidence to Action: The engagement of nurses in this project supported professional development and clinical application of evidence at the point of care. The pilot project's outcome informed a decision by health system administrators to fund more nurse driven EBP projects in the five hospitals. This innovative program provides a replicable structure for deployment and appraisal of EBP nursing model implementation.

INTRODUCTION

The Institute of Medicine (IOM) recommends “expanded opportunities for nurses to lead and diffuse collaborative improvement efforts” (IOM, 2011, p. 11). Responsibility has been placed on practicing nurses to deliver evidence-based care; however, it is recognized that implementing evidence-based practice (EBP) can be complicated within a healthcare organization. Research indicates that EBP is linked to improved quality of care and patient outcomes, and decreased healthcare expenses (Melnyk, 2007, 2013). The literature also indicates that organizational and leadership support is key to the successful implementation of EBP (Melnyk & Fineout-Overholt, 2015). Hospitals are expected to be high-reliability organizations (HROs; Agency for Healthcare Research and Quality, 2008; Melnyk, 2012). HROs provide patient-centered care (Brady & Shaller, 2012) while supporting patient safety (IOM, 2004) and EBP (Kramer, Schmalenberg, & Maguire, 2010). There is no argument EBP

and HROs are key in providing an optimal care environment. Yet, challenges remain.

Nurses, the largest group of healthcare providers in the United States, encounter barriers to implementing EBP. The paradox is “nurses on the front lines have a firsthand view of the problems and processes that need to be addressed” (Lacey, Olney, & Cox, 2012, p. 57); yet, their input may not be elicited in a manner that will inform patient care. Registered nurses (RNs) providing direct patient care can significantly impact care delivery, but likely require facilitative mentoring and coaching to foster and sustain evidence-based clinical practice (Aitken et al., 2011).

A review of the literature related to acute care RN EBP education with mentoring revealed limited evidence supporting optimal strategies to develop the skills needed to sustain EBP application and enculturation in the acute care setting (Balakas, Sparks, Steurer, & Bryant, 2013; Green et al., 2014; Hauck,

Winsett, & Kuric, 2013; Neville & Horbatt, 2008; Wallen et al., 2010; Yost et al., 2014). The previous nursing utilization studies have shown that mentorship, a positive attitude, and access to necessary resources are associated with a nurse's intent to use research in practice (Davidson & Brown, 2014). Subsequent to education and mentoring interventions, even when statistically significant results were not found, clinical RNs reported feeling empowered to find and apply the research knowledge needed to implement new and improved patient care practices (Hauck et al., 2013).

Instituting a Change in Practice

In order to support the adoption of an EBP model in a multihospital system, the principal investigator obtained a seed grant from the hospital system for a research study to explore the impact of the implementation of a nursing EBP model. The purpose of the research study was to assess the pilot implementation of an EBP exemplar model in a multihospital system.

The successful deployment of the adoption of a specific EBP model requires knowledge to support system-wide change and diffusion of an innovation (the adoption of an EBP model). Theoretical constructs addressing change when a knowledge to action approach (Graham & Logan, 2004; Graham et al., 2006; Rogers, 2003) was integrated into EBP project development and deployment. In addition, the Advancing Research & Clinical Practice through Close Collaboration (ARCC) model (Melnik, Fineout-Overholt, Gallagher-Ford, & Stillwell, 2011; Wallen et al., 2010) was integrated to guide the education and mentorship intervention.

The Ottawa Model of Research Use (Graham & Logan, 2004; National Collaborating Centre for Methods and Tools, 2010) purports that to translate knowledge requires interaction among societal and healthcare environments, and patients or clients, based on a dynamic and interactive process between empirical knowledge and use. The knowledge to action process succinctly describes the following phases: (a) identify a problem; (b) identify, review select knowledge to address the problem; (c) adapt the knowledge to local context; (d) assess the barriers to knowledge use; (e) select, tailor, implement interventions; (f) monitor knowledge use; (g) evaluate the outcome; and (h) sustain knowledge use (Graham et al., 2006, p. 19). These phases were foundational in implementing the EBP model.

Rogers' diffusion of innovations theory (DOI; Rogers, 2003) explains how an innovative idea becomes immersed within a particular setting. Elements including the social system, time, channels for communication, and the proposed new idea itself constitute important components of the DOI theory (Colquhoun, Letts, Law, MacDermid, & Missiuna, 2010; Rogers, 2003). This theory provided a foundation to operationalize and pilot the EBP innovation project across the hospital system. Rogers describes innovators as those willing to take on new ideas. Innovators in this setting were the faculty EBP experts who were implementing and modeling EBP. Early adopters in the setting were the evidence-based practice

team leaders (EBPTL) and resource nurses (EBPRN) who were willing to pilot and try the model. These early adopters were essential to the roll out of the EBP nursing model and helped diffuse EBP through the nursing units.

A nursing model that addresses constructs central to this study is the ARCC model (Melnik et al., 2011). The key strategy of ARCC is intensive structured mentorship that focuses not only on EBP information, but also on changing beliefs about EBP (Melnik & Fineout-Overholt, 2015; Melnik et al., 2011). This model informed the plans for the education and mentoring intervention, addressing barriers, and evaluation component.

The Johns Hopkins Nursing Evidence-Based Practice Model's (JHNEBPM) structured approach to research translation was selected by the hospital system as the model to pilot in five nursing units. The model was developed by nurses from the Johns Hopkins Hospital and School of Nursing to promote incorporation of best evidence into nursing practice for administrative, educational, and clinical decision-making (Dearholt & Dang, 2012; Johns Hopkins Medicine, n.d.). The JHNEBPM practice question–evidence–translation (PET) process provided a concrete structure for EBP education with mentoring program planning, execution, and outcomes data collection. Johns Hopkins provided permission to use the model's tools and resources for the EBP pilot.

With any innovation, including EBP, a number of barriers must be addressed. The barriers to implementation of EBP are well documented. Among the reported barriers are: lack of a mentor, lack of EBP skills and knowledge, lack of time, lack of resources, resistance by professional colleagues, and lack of organizational incentives (Melnik & Fineout-Overholt, 2015). A study of chief nursing executives revealed a high degree of belief in the importance of EBP; however, the actual application of EBP in the hospital setting is low. One major barrier is a lack of financial resources allocated to support EBP implementation and sustainment (Melnik et al., 2016). In an EBP culture, nurses possess the skills needed to independently develop practice questions based on identified practice issues of concern, conduct the literature review, synthesize and then implement, and evaluate the effectiveness of an evidence-based clinical application (Melnik & Fineout-Overholt, 2015; Melnik, Gallagher-Ford, Long, & Fineout-Overholt, 2014). The challenge for nursing remains to identify ways in which to increase evidence translation skills needed for RNs to incorporate evidence-based care strategies into daily practice and thereby enhance clinical outcomes.

Melnik et al. (2014) conducted a Delphi study to determine key registered nurse (RN) EBP competencies needed for healthcare organizations to consistently realize cost effective, high value care. Thirteen competencies were identified for practicing RNs with 11 additional competencies deemed necessary for advanced practice nurses (APNs). The competencies for all RNs roughly comprise the basic skills necessary to perform steps in the EBP process. Additional items specific to APNs include more sophisticated information literacy skills,

interprofessional team leadership, evidence generation and outcome(s) measurement, provision of mentorship, building sustainment strategies, and the broad dissemination of best evidence findings (Melnik et al., 2014).

OBJECTIVES

The research study focused on the beliefs and implementation of EBP practices pre- and postimplementation of an EBP education with mentoring program for nurses and EBP exemplar pilot.

The aim of the overall EBP exemplar pilot project was to bring together expertise from five diverse hospital campuses to implement a system-wide approach to EBP in nursing. A strategic goal for the education with mentoring program innovation was to empower nurses to proactively seek the best available evidence, improve patient care and outcomes, and diffuse the implementation of EBP in the nursing unit. In order to encourage the spread of EBP through diffusion of innovation (Rogers, 2003), EBPTLs were selected for each hospital that could engage staff, mentor colleagues and model the behaviors to encourage the adoption and dissemination of EBP.

This multifaceted endeavor included the development of a nursing EBP model education with mentoring program, EBP PICO exemplar, deployment of an EBP exemplar pilot, and a research study. The EBP exemplar pilot project required system-wide coordination with educators, clinicians, leaders, researchers, librarians, and administrative support personnel.

METHODS

This study employed mixed methods. The quantitative data collection was structured in a pre–post design with the unit of analysis being the nursing unit. Qualitative data were collected in postintervention focus groups with an emphasis on nursing perceptions of EBP program rollout in a real world setting. This study was reviewed and approved by the Inova Health System Institutional Review Board (IRB) and George Mason University IRB. All quantitative data were analyzed using IBM SPSS Statistics Version 22 (IBM Corporation., Armonk, NY, USA). The study was planned to assess the EBP exemplar project designed to address a number of the barriers, support was obtained from leadership to undertake the pilot, and education needs were identified and addressed.

Setting and Sampling

The study setting was a multihospital system. One pilot nursing unit was selected from each of the five hospitals that met the inclusion criteria of being a medical–surgical or intermediate care unit having similar patient populations and diagnoses. One EBPTL and one clinical RN interested in serving as an EBPRN was recruited from each unit. Pre- and postdata were collected from a convenience sample of nurses who staffed the pilot nursing units.

The pilot units had a total of 169 RNs. Of these, 96 RNs participated in the preintervention data collection: of those, 83

completed the Evidence-Based Practice Implementation Scale (EBPI) and Evidence-Based Practice Beliefs Scale (EBPB) survey representing a 49% response rate from the pilot units. A total of 63 RNs participated in the postdata collection: of those, 57 completed the EBPI and EBPB survey representing a 37% response rate from nurses on the pilot units. The preintervention survey was opened on January 29, 2014 and closed to enrollment on February 20, 2014. The postsurvey was opened August 13, 2014 and closed September 20, 2014. Upon completion of the EBP project deployment, nurses and librarians were recruited to participate in focus groups. A total of 24 participated in the focus groups.

Intervention: Education With Mentoring Program

Resources were allocated to support the EBP exemplar pilot including educational materials and designated personnel including EBP experts, educators, and librarians. Nurse leaders, educators, and content experts working with a doctoral nursing student (innovators) developed an education program to promote adoption of the EBP nursing model (outline shown in Table 1).

Purposeful recruitment of EBPTLs (early adopters) involved identification of unit leaders who were willing to commit to the program and serve as an EBP facilitator and staff mentor. The EBPRN role (early adopter) was operationalized by a clinical nurse from each pilot unit who expressed a desire to learn the EBP model and serve as a facilitator and mentor to other staff.

The didactic program was developed first. Through interprofessional collaboration, a resource website was created to house all EBP project course materials. In doing so, the JHNEBPM educational resource materials and ranking or rating tools were made readily accessible for RN staff on the pilot units via a secure intranet. The initial group didactic session included foundational steps in the EBP process. This education was delivered by two Inova EBP nursing experts, a doctoral nursing student, and medical librarian. Throughout the project, in addition to nursing experts, the health sciences library staff collaborated to deliver resources and services. The medical librarians provided training and organizational support to assist in retrieving evidence through extensive literature searches to answer the PICO question for the EBP exemplar project. Details of the comprehensive education and mentoring program (Dearholt & Dang, 2012; Poe & White, 2010) with accompanying roles and responsibilities are shown in Table 2.

Classroom-based instruction for the education program (intervention) was offered in February 2014. There were 21 course participants comprising EBPTLs, EBPRNs, and other nurses who could serve as an EBP mentor. Each participant received: (a) seven continuing education contact hours, (b) a bound course syllabus, (c) eight weekly electronic EBP bulletins, and (d) each pilot unit received one copy of the JHNEBPM text book (Dearholt & Dang, 2012), which was also accessible to RNs via the health system's virtual library.

The intervention for the pilot units in addition to education included the launch of the EBP exemplar project to answer

Table 1. Didactic Program Content Outline

Introduction to Evidence-Based Practice
<ul style="list-style-type: none"> • Definition and history of EBP • Importance of EBP in clinical practice and building an EBP culture in nursing
Guidelines for EBP Nursing Model Implementation and Skill-Building
<ul style="list-style-type: none"> • Described model • Discussed plans for using the model noting the importance of team-building, effective communication, and mentorship within the health system • Described the steps in the process of incorporating EBP in clinical practice • Discussed how to develop an answerable question
Appraising Evidence
<ul style="list-style-type: none"> • Described the types of evidence • Determined where to look for evidence
Searching for Evidence
<ul style="list-style-type: none"> • Discussed library services <ul style="list-style-type: none"> ◦ How to request a search for evidence ◦ How to order full text articles ◦ Review of other available services provided • Demonstrated how to do basic literature search
Appraising the Evidence
<ul style="list-style-type: none"> • Reviewed data management and outcomes monitoring • Briefly explained the EBP nursing model forms used • Appraised/evaluated assigned articles • Completed individual and overall evidence summary forms
Summarizing the Evidence and Beyond
<ul style="list-style-type: none"> • Determined if practice changes are indicated • Determined how changes could be implemented • Discussed how changes can be evaluated
Translation Strategies and Wrap-Up
<ul style="list-style-type: none"> • Identified barriers and facilitators to implementation of an EBP project and strategies for success

Adapted from Dearholt and Dang (2012) and Poe and White (2010).

the PICO (Patient population, Intervention or area of Interest, Comparison intervention or group, Outcome) question “In adult medical/surgical patients in a hospital setting (P), how does an interactive patient education strategy related to medication (I) compared to standard care (C) result in improved patient perceptions as measured by Hospital Consumer Assessment for Healthcare Providers and Systems (HCAHPS) medication questions (O)?” The literature review conducted focused on garnering evidence related to patient medication education and a final list of the most relevant articles was provided (Ahrens & Wirges, 2013; Bowskill & Garner, 2012; Cloonan, Wood, & Riley, 2013; Jager & Wynia, 2012; Kimball et al., 2010; White, Garbez, Carroll, Brinker, & Howie-Esquivel, 2013). The EBPTLs and EBPRNs who attended the didactic program served as early adopters in the diffusion

of the EBP nursing model on their respective pilot nursing units.

After completion of the classroom program, group sessions for literature review and ranking or rating of the evidence were offered via conference calls and scheduled based on input from the EBPTL and EBPRNs. Subsequent to completion of all literature review telephone conference calls, a mentored EBPTL face-to-face synthesis of evidence with project planning meeting was convened. During this face-to-face gathering, participants from the pilot units synthesized the evidence and made a determination on overall quality of the evidence, and agreed that sufficient evidence existed to warrant an EBP implementation project (Figure 1).

Prior to the EBP exemplar project deployment, concurrent formal educational kick-off events were held on each pilot

Table 2. Nurse Education and Mentoring Activities

Week	Meetings, conference calls, accomplishments	RN participants	Role: deliverables
1	<p>EBP education program classroom session (7 hours). Compared/contrasted nursing research, evidence-based practice (EBP), quality improvement (QI); developed researchable practice question (PICO) for unit pilot project; database search demonstrated; reviewed content of JHNEPM literature appraisal tools; conducted hands on mentoring session to review/rank articles using JHNEBPM ranking/rating tools; introduced purpose of sequential EBP educational bulletins; introduced EBP nursing model Web page with course materials</p>	<p>Innovators Faculty, EBP experts (3) Early adopters EBP team leader (EBPTL) (5); EBP resource nurse (EBPRN) (5); nursing research and EBP council chair (NREBPCC) (5); clinical nurse specialist (CNS) (2); nurse educator (1); RNs from hospital NREBPC (2); professional practice nurse administrator (1)</p>	<p>Innovators Developed education program goals, objectives, PICO question to guide literature review for exemplar. Reviewed evidence (peer reviewed articles) to answer PICO question using JHNEBPM tools. Developed educational materials for course including Web page to house all resources Early adopters Attended class, introduced to EBP nursing model. Reviewed evidence to answer PICO, ranked and rated research article. Collaborated with innovators in planning the timeline, roll out and deployment of unit EBP project</p>
2-5	<p>Conference calls held with pilot unit EBP teams per established timeline; reviewed/rated two manuscripts with appropriate research or nonresearch ranking tool</p>	<p>Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN, NREBPCC, CNS</p>	<p>Innovators Facilitated in-depth discussion, critique for evidence ranking/rating discussions; available for direct mentorship and educational support throughout literature review phase Early adopters Reviewed, ranked/rated two assigned articles prior to each call; participated in critique/rating/ranking discussions; shared reviewed articles with unit colleagues</p>
6	<p>Face-to-face synthesis of evidence meeting: reviewed all pieces of evidence, achieved consensus on acceptable overall quality rating; discussed pilot unit EBP implementation project; dissemination of sequential weekly EBP educational bulletins begun, continued over next 8 weeks</p>	<p>Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN</p>	<p>Innovators Facilitated discussion, completed JHNEBPM synthesis of evidence tool with group; prepared teams for next phase of unit-based EBP project Early adopters Completed individual evidence summary tool; participated in consensus debate and evidence synthesis decision; agreed to lead unit discussions/planning for upcoming unit-based EBP pilot project; disseminated weekly EBP bulletins during staff meetings, huddles</p>

(Continued)

Table 2. Continued

Week	Meetings, conference calls, accomplishments	RN participants	Role: deliverables
7-11	Planned EBP strategy for QI project implementation on pilot unit; specific hospital unit plans incorporated patient cohort preferences, values	Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN, NREBPCC, CNS	Innovators Continued contact with unit EBP teams; provided EBP project planning mentorship, logistical support (e.g., medication education cards) Early adopters Held scheduled meetings with unit staff, provided education; designed unit EBP medication education intervention as clinical team; mentored clinical nurse colleagues in designing best process for nursing unit EBP project
12	Finalized plans for unit EBP project	Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN	Innovators Developed educational resources (posters, binders) for each pilot unit to guide the development of EBP exemplar program Early adopters Provided preferences for educational resources to be used at pilot unit EBP kick-off event
12-14	EBP project kick-off event held on each pilot unit	Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN	Innovators Met face-to-face with unit RNs; explained poster, education binder; showed EBP Web page resources on Intranet; answered questions; encouraged outreach for future support Early adopters Provided unit-based education in huddles, staff meetings; related QI project plans to best available evidence; developed additional customized education materials; assured EBP bulletin dissemination to staff
14-16	Follow-up on kick off and sustainment efforts	Innovators Faculty/EBP experts Early adopters EPPTL, EBPRN, NREBPCC, CNS	Innovators Maintained contact to offer support, check progress Early adopters Mentored colleagues on EBP project; shared evidence (literature review findings), reinforced EBP medication strategy with staff

nursing unit to support the education and mentoring program and initiate the clinical EBP project. This activity provided a unique opportunity to meet with the clinical RNs and discuss their EBP related questions. Informational posters were

developed to provide a visual display of the steps involved in clinical problem identification and the EBP nursing process. The presentation also provided the rationale for use of the best available evidence and highlighted the importance of

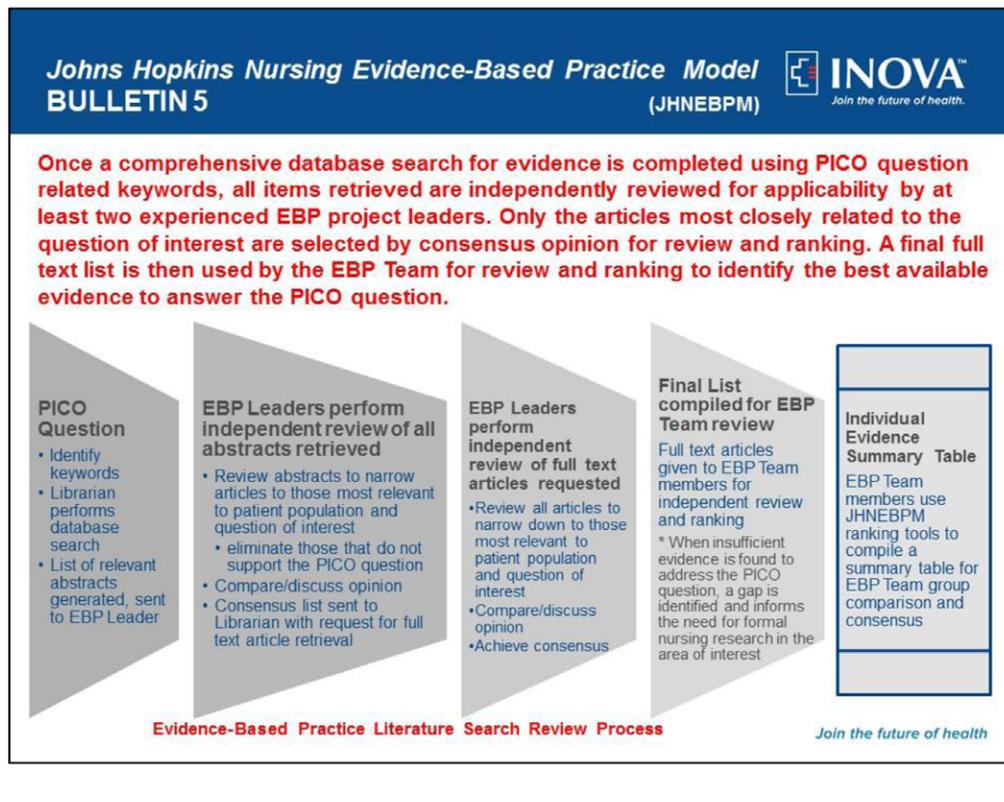


Figure 1. EBP bulletin.

establishing evidence-based clinical practices to improve care delivery outcomes. The direct contact strategy was intended to promote transition to utilization of the JHNEBPM in practice.

Throughout the unit-led EBP exemplar pilot project, education accompanied by mentoring was continued through conference calls, electronic mail contact, Web-based educational resources, and the distribution of EBP Bulletins. The sequential 1–2 page bulletins provided a graphic representation of the model with a concise summary of steps involved in operationalizing the model as outlined in the textbook (Figure 2; Dearholt & Dang, 2012).

Quantitative Instruments

Two instruments with established reliability and validity were used to evaluate EBP beliefs and implementation pre- and postintervention. All nurses on each pilot unit had the opportunity to complete the instruments using a Web-based survey software platform before and after the project. Permission was obtained to use the JHNEBPM (Dearholt & Dang, 2012).

The EBPB scale was “specifically designed to measure a clinician’s belief about the value of EBP and their beliefs/confidence in implementing it in practice” (Melnik, Fineout-Overholt, & Mays, 2008, p. 209). The scale includes 16 items on a 5-point Likert scale with items ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores are indica-

tive of more positive beliefs, and lower scores represent less positive beliefs about EBP. This 16-question scale has established reliability (Cronbach’s $\alpha = .90$) with validity supported by significant correlation with relevant variables (Melnik et al., 2008).

The EBPI scale is designed to identify the frequency of use of EBP behaviors. This scale includes 18 items on a 5-point frequency scale, asking how often in the past 8 weeks the RN has performed an EBP activity. The scale ranges from 0 (*0 times*) to 4 (*greater than 8 times*). The higher score indicates higher frequency of EBP activity. The scale includes 18 questions, with established reliability coefficients reported to be (Cronbach’s $\alpha = .96$) and significant correlations with relevant variables (Melnik et al., 2008).

Quantitative Data Analysis

Because the independence of the preinnovation and postinnovation samples was not assured, and the units as a group were the units of analysis, the following strategy was employed to address the potential significance of changes. The mean at preinnovation for beliefs and implementation was determined. This value was used as a proxy for the population mean. Using a one-sample *t* test, postintervention scores were compared to this mean. Only measures with complete scores, that is, all items answered, were included in the data analysis.

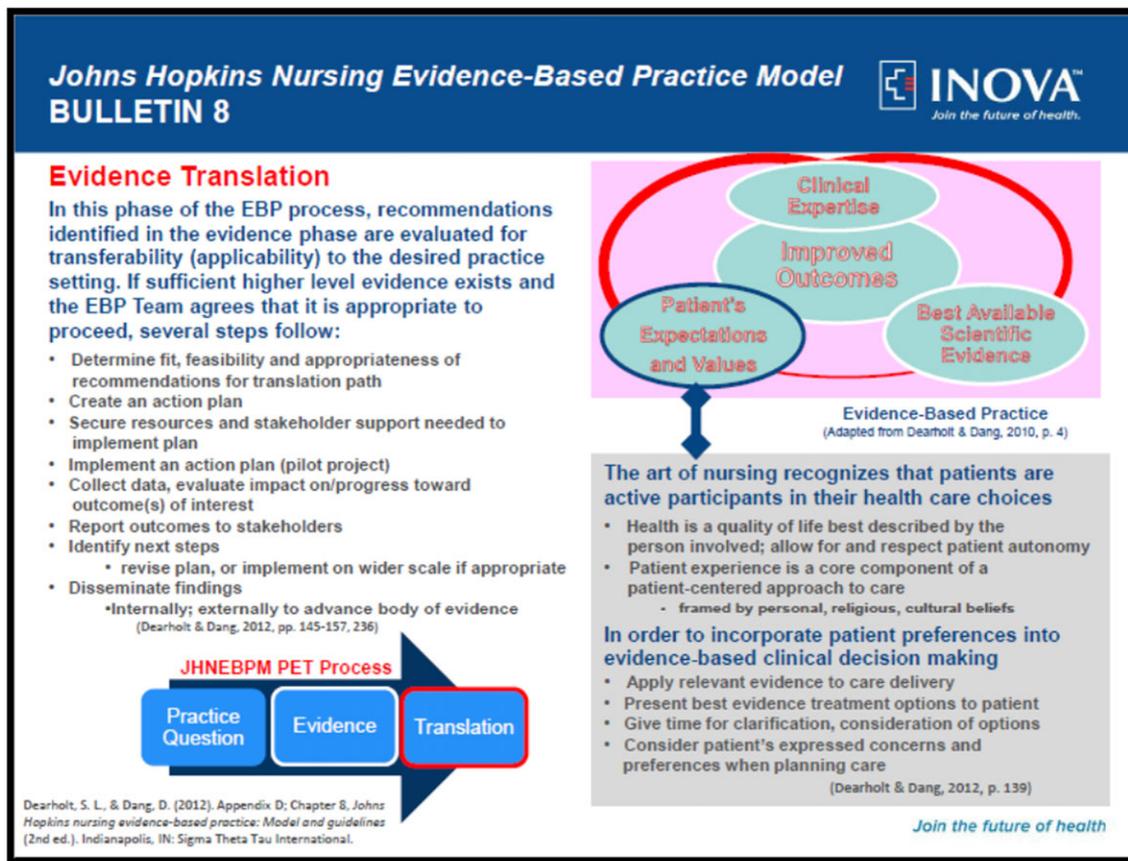


Figure 2. EBP nursing model.

Qualitative Methods

After the project implementation, five focus groups were conducted to explore the perception of staff regarding the EBP model deployment. One focus group involved librarians, whereas the other four groups included nurses who worked on the five pilot units. Pseudonyms were used to protect the confidentiality of participants in focus groups in order to support candor and assure there would be no repercussions for an honest appraisal of the EBP pilot program.

A list of questions was developed for use in the focus groups to elicit comments from the participants about the EBP exemplar pilot (Table S1, found with the online version of this article). Notes were taken during the focus groups and the discussions were audiotaped and transcribed. A qualitative content analysis approach (Hsieh & Shannon, 2005; Weber, 1990) was utilized. Coding was conducted by the principal investigator using Nvivo 10 (QSR International, Doncaster Victoria, Australia). In addition, the doctoral nursing student read and coded the narratives. A third member of the research team performed a code check on 20% of the narratives. Consensus on the codes and themes was achieved.

FINDINGS

Survey Results

Demographics for the sample completing the surveys are presented in Table 3. The number of years practicing as a RN ranged from ≤ 1 to 40 in both the pre- and postsample, with mean years in practice 11.8 and 12.95, respectively.

Analysis of the survey data provided insights about the effect of the innovation related to the participants. The overall scores for EBPI and EBPB increased over time (Table 4). The change in implementation was significant ($t = 1.75$, $df = 56$, $p < .05$, one-tailed), whereas beliefs was not ($p > .1$). There was an improvement in the participants' individual responses to 11 of 16 statements on the EBPB. Improvements were noted for 16 of 18 items on the EBPI scale (Figure 3).

Focus Groups

Twenty-one nurses and three librarians participated in the focus groups. The nurses met in four groups and the librarians in one focus group. The nurses ranged in age from 26 to 61 years with mean 44.6 of those reporting. The years of experience

Table 3. Demographics of RN Sample

Demographic characteristics	N = 83	N = 57
Age	Pre/n = 78*	Post/n = 52*
Range	23–65	24–66
Mean	41.21	42.63
SD	10.38	10.89
*Did not answer	5	5
Education [# , %]	N = 83	N = 57
Doctorate	0	0
Masters	5 (6)	6 (10.5)
Bachelors	56 (67.5)	38 (66.7)
Associate	20 (24.0)	9 (15.8)
Diploma	2 (2.4)	4 (7)
Years practicing as a nurse	Pre/n = 82*	Post/n = 57
Range	≤1–40	≤1–40
Mean	11.8	12.95
SD	10.75	11.40
*Did not answer.	1	-

Table 4. Comparison of EBPB and EBPI Mean Scores

	Preintervention		Postintervention	
	N	Mean (SD)	N	Mean (SD)
EBP Beliefs	83	64.54 (7.72)	57	65.89 (9.8)
EBP Implementation	83	32.9 (12.5)	57	36.9 (17.39)

as a RN ranged from 2 to 40 years with mean of 17.65 years (Table 5).

The focus groups provided rich data illustrating the successes and challenges with implementing an evidence-based program. Information from these groups proved useful in developing recommendations to nursing leadership for the future direction of the nursing EBP program. Five themes emerged from the data:

- i. Learning and applying EBP: Nurses described how they came to know the EBP process and how it could be deployed in the clinical area. “We learned a lot about the evidence base ... I learned a lot from

it . . . It’s been a great help, so I’m very happy to be a participant, so I hope it will continue.”

2. Simplifying the process: The importance of keeping the process simple was central to nurses’ ability to realistically perform the project work. “I think part of it was that we tried so many complicated things to begin with that when something easy came along, that was much more receptive.”
3. Achieving success and improvement: The nurses spoke of how they succeeded in implementing an EBP project. The sense of achievement was an important milestone and contributed to the sense of value for the project. “I think that it improved nursing, the nursing practice.”
4. Sustaining and reinforcing change: The criticality of a continuous effort to sustain the innovation was identified. Nurses emphasized that sustainment was necessary in order to keep the EBP project going forward. “We need reinforcement on how to continue to teach.”
5. Encountering challenges and barriers: Nurses reported addressing numerous challenges and barriers, and efforts undertaken to meet and overcome obstacles. “Getting nurses to sign up to get involved with it, it was tough. But once we got them going, it was okay. It was just the initiation of the whole process.”

LIMITATIONS

A limitation of this study was that it was a small pilot project using a sample of nurses from five specific nursing units with no control group. Another limitation of this study is it focused on nursing outcomes. The primary objective of this study was to assess if an EBP education program and EBP exemplar model improves EBP beliefs and implementation by nurses. Although a structured approach to the unit EBP activities was central to the nursing model implementation strategy, the degree of participation in unit-based education and mentoring activities was not measured. Results were analyzed by the nursing unit cohort, not by individual nurses, to allow for anonymous reporting and to encourage participation and candor in answers. Although using the nursing unit as the unit of analysis allowed anonymity of responses and helped to understand the success of the project on a unit level, the study design did not allow for tracking of individuals across time. The study did not track direct and indirect costs for the nursing units involved. It is recommended that future studies use robust metrics to assess patient outcomes using qualitative and quantitative methods to explore impact of EBP interventions on health behaviors, adherence to treatment plan, and patient perceptions of care provided.

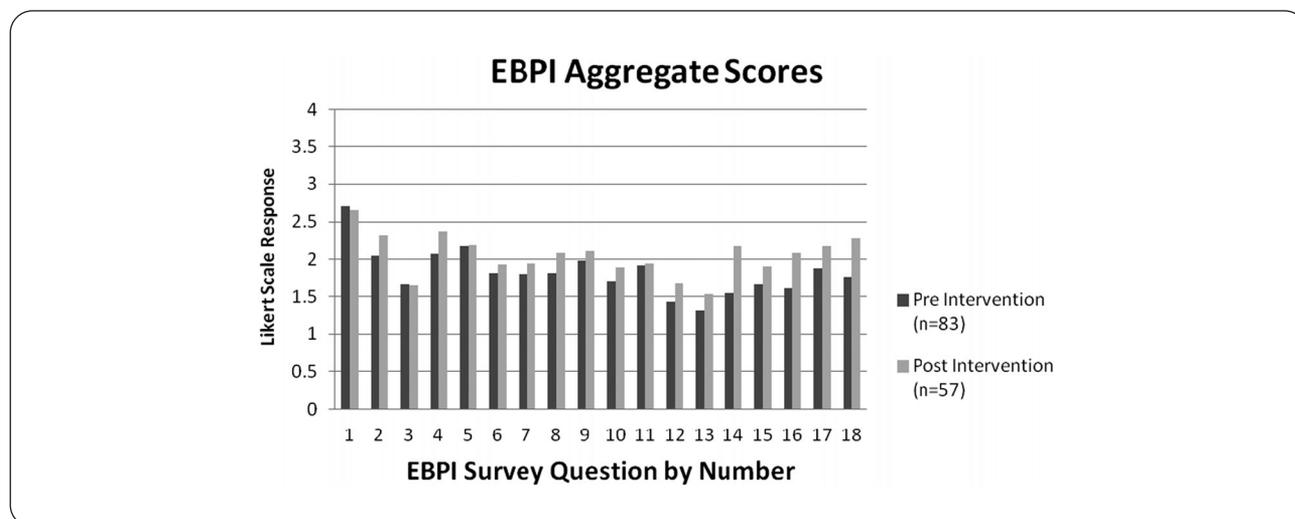


Figure 3. An improvement in the EBPI scores was noted for 16 of the 18 statements with statistical significance ($p < .05$) shown for 6 statements (Melnyk et al., 2008): 2, critically appraised research study evidence; 4, informally discussed research study evidence with a colleague; 12, Cochrane database of systematic reviews accessed; 13, national guidelines clearinghouse accessed; 16, shared outcome data with colleagues; 18, promoted EBP use to colleagues.

DISCUSSION

The value of EBP is frequently identified by health industry experts and nursing administrators as being linked to enhanced safety and quality; yet, few nurse executives include this priority in the strategic planning and resource allocation needed to support EBP nursing care integration (Melnyk et al., 2016). Major barriers include lack of knowledge related to how to retrieve and critically appraise literature among nurses. Another barrier is lack of resources. Resources are required to support nurses to develop skills and target implementation strategies to inform best practice, improve clinical outcomes and advance nursing practice (Aitken et al., 2011; Melnyk & Fineout-Overholt, 2015; Melnyk et al., 2014).

In order to build EBP competencies as suggested by Melnyk et al. (2014), commitment of time and financial resources is needed (Melnyk & Fineout-Overholt, 2015; Melnyk et al., 2014; Melnyk et al., 2016). As U.S. healthcare reimbursement structures are increasingly tied to quality of care and clinical outcomes, incorporation of evidence-based nursing practice can actively support scientific, safe, economic and efficient care delivery. The challenge for nursing remains to identify ways in which to increase evidence translation skills needed for RNs to incorporate evidence-based care strategies into daily practice and thereby enhance clinical outcomes.

A budgetary commitment to human and logistical resources is foundational to bringing an innovation across a hospital system. This project benefited from the leadership of a fulltime system nursing research coordinator and 500 hours of clinical time contributed by the doctoral student, who collaborated system-wide to develop and deliver an EBP education program and conduct the study.

The health system had not adopted a specific EBP model prior to the exemplar pilot. The ARCC Model provided a structured framework to support a system-wide deployment of EBP in the organization (Melnyk & Fineout-Overholt, 2015). This pilot exemplar was instrumental in building an infrastructure to support adoption and implementation of an EBP model.

Adoption of the JHNEBPM provided tools and resources to guide nurses in the application of EBP on the pilot nursing units. The EBP exemplar pilot on each of the five units served to motivate and create synergy with staff. The provision of resources focused on enhancing the knowledgebase and skill set of nurses while seeking to promote the quality of patient care delivery within the organization. The unit projects also supported continuation of work related to medication education for patients and nurses, and allowed nurses to understand their work in relation to the principles of EBP. These EBP exemplar findings are consistent with current evidence regarding low RN information literacy skills (Aitken et al., 2011; Melnyk et al., 2014; Roe & Whyte-Marshall, 2012; Sciarra, 2011).

The study results indicated that nurses benefit from education on EBP, and mentors are needed to support implementation. It is essential there be an education program and structure to support the EBP teams. Also necessary is integration of library staff to guide identification and retrieval of relevant evidence through advanced literature searches. The development of an Intranet Web page to house resources from the EBP nursing model allowed nurses easy access to the materials across hospitals. The EBP teams developed skills in appraising, ranking and rating the literature, but nurses need dedicated time for this effort.

Table 5. Demographics of RN Focus Groups

Demographic characteristics		N = 21	Percent
		*Only 20 chose to complete survey	
Age range		n = 16	
		*5 did not provide age	
		26–61 years	
Mean		44.63	
SD		10.39	
Education highest level completed	Doctorate in nursing	0	0%
	Masters in nursing	4	20%
	Bachelors in nursing	7	35%
	Associate in nursing	6	30%
	Diploma in nursing	2	10%
	Other	1	5%
Years practicing as a nurse		N = 21	
		*Only 20 chose to complete survey	
Range		2–40	
Mean		17.65	
SD		11.59	

The study provided key information to nursing leadership on both successful deployment of EBP teams and challenges to successful deployment within the health system. The EBP exemplar pilot project and research study allowed the organization to learn methods to support nurses in strengthening beliefs about EBP, actually implement EBP interventions, and the confidence to successfully undertake an EBP project. Based on the study findings, a proposal was developed for nursing leadership to expand the program and allocate funding for an EBP fellows program. Subsequently, a new EBP fellows program was developed and nurses were invited to submit an interprofessional EBP project proposal. The proposals were peer reviewed using pre-established criteria and grants were awarded based on the recommendation of the reviewers. The EBP grants awarded in 2015 and 2016 provided budgeted protected time to allow clinical nurses the flexibility to lead and serve on EBP interdisciplinary teams, conduct literature searches, grade the evidence, develop the EBP project, and evaluate the outcomes.

EBP teams now present their project results at an annual symposium and develop abstracts and posters for dissemi-

nation. To date, several EBP project teams have observed an improvement in outcomes and have presented results at professional conferences. Our experience with this project revealed that teaching EBP is a time intensive activity. The nurse learner requires mentoring throughout the EBP process coupled with practical application in the clinical setting in order to master the requisite skill set. This cannot be accomplished without appropriate resource allocation to facilitate EBP adoption (Melnyk et al., 2016). A recommendation for other organizations is to proactively develop a plan to analyze, capture, monitor, and track expenses to quantify cost benefits and calculate return on investment. More research is needed to inform on optimal ways in which to advance RN EBP implementation skills across a hospital system and at the point of care.

CONCLUSIONS

The engagement of nurses in this project supported professional development and clinical application of evidence at the point of care. The pilot project's outcome informed a decision

by health system administrators to fund more nurse driven EBP projects in the five hospitals. **WVN**



LINKING EVIDENCE TO ACTION

- EBP education coupled with experienced mentor support holds promise for acculturating RNs' engagement in clinical practice informed by the best available evidence.
- Strategic EBP adoption measures must be supported through dedicated budgetary and human resource structures that facilitate implementation and sustainability.
- More research is required to test return on investment associated with health system nursing EBP model dissemination and sustainment methods.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web site:

Table S1: Interview Questions Used With RN Focus Groups