Staff Practice, Attitudes, and Knowledge/Skills Regarding Evidence-Based Practice Before and After an Educational Intervention

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abstract

Background: Today's clinicians have different levels of knowledge and skill related to evidence-based practice, depending on their educational background, level of experience, and interest. This multidisciplinary study assessed nurses' baseline and posteducation practice, attitudes, and knowledge/skills regarding evidence-based practice.

Methods: A descriptive pre- and postsurvey design study evaluated clinical staff's practice, attitudes, and knowledge/skills regarding evidence-based practice with the Clinical Effectiveness and Evidence-Based Practice Questionnaire.

Results: A total of 327 participants (24%) completed the presurvey and 282 (20%) completed the postsurvey. No statistically significant changes were found in practice, attitudes, and knowledge/skills after the online education. In the multivariate analysis, online education was not a significant predictor of practice, attitudes, or knowledge/skills regarding evidence-based practice; graduate educational degree, formal evidence-based practice classes, and registered nurse status were statistically significant positive predictors.

Conclusion: Administering self-learning online modules may not be the most effective method for expanding evidence-based practice abilities and knowledge/skills of nurses.

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Because regulatory agencies are placing increased importance on the delivery of safe patient care and improved clinical outcomes, health care leaders are encouraging staff to adopt evidence-based practices that use current research to improve clinical care. However, recent reports showed substantial gaps between practice and current research evidence (Bonner & Sando, 2008; Heiwe et al., 2011; Johansson, Fogelberg-Dahm, & Wadenstein, 2010).

Implementation of evidence-based practice has been challenging, with only an average of 25% of staff practicing within an evidence-based practice framework (Bonner & Sando, 2008; Gerrish et al., 2007; Schreiber, Downey, & Traister, 2009). Today's clinicians have different levels of knowledge and skill related to evidence-based practice, depending on their educational background, level of experience, and interest (Gerrish, Ashworth, Lacey, & Bailey, 2008; McCloskey, 2008; Schreiber et al., 2009). Obtaining baseline information about evidence-based practice allows an organization to create ongoing educational initiatives and process changes to successfully incorporate evidence-based practice into daily practice. Because practice, atti-

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tudes, and knowledge/skills of staff potentially affect the success of initiatives to implement evidence-based practice, researching these concepts is important for evaluating implementation plans. This study evaluated the effect of an online educational program on the practice, attitudes, and knowledge/skills related to evidence-based practice among multidisciplinary health care providers.

BACKGROUND

Hospital Description

Sharp Grossmont Hospital is a not-for-profit, Magnet®-designated community hospital with 536 acute care beds, located in San Diego County, California. The hospital uses predominantly registered nurses to deliver and coordinate bedside care. Patient care is supported by other professional clinical and support staff, such as licensed therapists, registered dieticians, respiratory therapists, pharmacists, licensed radiology technicians, and nursing assistants. Patient care is planned, implemented, and evaluated from an interdisciplinary approach from admission to discharge. Because of this interdisciplinary approach, it was important to evaluate the practice, attitudes, and knowledge/skills of nursing and other clinical staff related to evidence-based practice.

Evidence-based practice is promoted at all levels within the organization. Policies, procedures, and guidelines of care incorporate published evidence. Bedside practitioners are encouraged to question practices, bring forward new evidence to the appropriate committee, and provide care based on the latest evidence. However, most staff continue to practice based on what they learned in school and their practice experiences (Fruth et al., 2010; Koehn & Lehman, 2008). Because practice was not always based on evidence, the hospital's leadership team decided to increase the use of evidence-based practice in all aspects and areas of practice through an online educational program.

Review of the Literature

Incorporating evidence into practice continues to be a challenge for clinical staff despite the presence of evidence-based practice in the literature for the past decade (Pravikoff, Tanner, & Pierce, 2005). Among clinical staff with some level of exposure to evidence-based practice, there frequently continues to be a lack of research knowledge, skills, and understanding in terms of how to translate evidence into practice (Akindipe & Guidon, 2008; Fruth et al., 2010; Sabus, 2008).

Many studies have identified consistent barriers to the implementation and use of evidence-based practice (Brown, Wickline, Ecoff, & Glaser, 2009; Fink, Thompson, & Bonnes, 2005; Fruth et al., 2010; Gerrish et al., 2007; Koehn & Lehman, 2008). These barriers include limited skills and knowledge about the use of research, time, financial constraints, absence of administrative interest, lack of support for research consultation, and resistance by peers to the incorporation of new ways of practice. Understanding how the perception of barriers affects staff's use of research and the transfer of research into practice is vital for the transition to an evidence-based practice model of care.

Few studies have evaluated the effect of evidence-based practice education on the practice, attitudes, and knowledge/skills of bedside nurses and other interdisciplinary staff. Brown et al. (2009) studied nurses' practices, knowledge, and attitudes toward evidence-based practice related to perceived barriers to evidence-based practice. Organizational barriers (lack of time and lack of autonomy) correlated with a lower perception of nurses' own knowledge and skills related to evidence-based practice. Nurses' attitudes toward evidence-based practice were more positive than their knowledge and practice regarding evidence-based practice (Brown et al., 2009). A study by Koehn and Lehman (2008) investigated nurses' perceptions, attitudes, and knowledge/skills associated with evidence-based practice. This study found a statistically significant difference in attitudes regarding evidence-based practice between nurses with higher education levels (baccalaureate degree and higher) and those with lower education levels (associate's degree and diploma).

Sherriff, Wallis, and Chaboyer (2007) evaluated the effect of an evidence-based practice educational program on attitudes and perceptions of skills and knowledge related to evidence-based practice. The educational program was a 4-hour workshop designed to increase awareness of organizational resources available to assist staff in engaging in evidence-based practice. Participants also received an accompanying workbook designed to supplement skills taught in the workshop. This study found an improvement in nurses' attitudes and perceptions of skills and knowledge related to evidence-based practice after the educational workshop (Sherriff et al., 2007).

Kajermo et al. (2008) found that nursing leadership support for participation in research and development activities greatly reduced perceived barriers to research and facilitated progress toward evidence-based nursing care. Other studies (Brown et al., 2009; Fink et al., 2005; Heiwe et al., 2011) found that organizational characteristics and inadequate support for the development of evidence-based practice skills created barriers

to evidence-based practice. The findings of Kajermo et al. (2008) supported the importance of nursing leadership in developing and communicating clear strategies and goals for increasing evidence-based practice skills within all levels of the organization. In addition, leadership support for research and evidence-based practice projects within an interdisciplinary model would also strengthen and develop evidence-based practice skills across all disciplines.

Studies of allied health care professionals have shown similar outcomes to studies conducted solely with nursing participants. Akindipe and Guidon (2008) examined physiotherapists' attitudes toward and use of evidence-based practice. Results showed an overall positive attitude toward evidence-based practice, with 95% of respondents indicating an interest in learning and improving evidence-based practice skills. This study also found that master's- and doctorally prepared physiotherapists were significantly more confident in their ability to review and use research for clinical decision making. Heiwe et al. (2011) explored the attitudes, beliefs, knowledge, and behavior of dieticians, occupational therapists, and physical therapists. Their research findings also showed positive attitudes toward evidence-based practice and the use of evidence-based practice to support clinical decisions. The majority of participants indicated confidence in their ability to understand and interpret the evidence.

Several studies reported the effectiveness of and student satisfaction with online learning (Lim, Kim, Chen, & Ryder, 2008; Pullen, 2006; Roberts, Brannan, & White, 2005). Lim et al. (2008) found that students in an online learning group or a combined online and traditional learning group had statistically significantly higher levels of achievement than students in a group who were given traditional learning only. Most students in this study indicated an interest in additional online course options. Pullen (2006) examined the effect of web-based learning on more than 300 health care professionals. This study found online learning to be an effective means of increasing health care professionals' knowledge and improving self-reported practice performance changes (Pullen, 2006).

Research has clearly defined many barriers to the infusion of evidence-based practice, but methods to address these barriers are less clear. Providing health care practitioners with exposure to evidence-based practice through educational interventions and the literature appears to improve attitudes and perceptions of knowledge/skills regarding evidence-based practice. However, future research is needed to evaluate the effect of educational interventions on knowledge and skills in the actual use of evidence-based practice.

Theoretical Framework

Two theoretical frameworks were used to guide this study: Adult Learning Theory (Knowles, 1978) and Diffusion of Innovation Theory (Rogers, 2003). Knowles' (1978) Adult Learning Theory supports the notion that adult learners are autonomous and self-directed and build new knowledge on existing knowledge and a framework of life experiences. Rogers' (2003) Diffusion of Innovation Theory centers on conditions that increase or decrease the likelihood that a new practice will be adopted. According to Rogers (2003), attitudes toward a new technology are a key element in its diffusion.

METHODS

Study Design

A descriptive pre- and postsurvey design was used to examine the effect of an online evidence-based practice educational intervention on clinical staff's practice, attitudes, and knowledge/skills related to evidence-based practice. Survey data were collected 1 month pre- and 1 to 2 months posteducation.

Participants

Clinical staff participating in bedside care (registered nurses, licensed vocational nurses, case managers, social workers, respiratory therapists, physical therapists, occupational therapists, speech therapists, recreational therapists, dieticians, and pharmacists) were included in the study, and 1,381 staff members were eligible to participate. Participants were recruited through unit staff meetings, posted flyers, e-mail announcements, and hospital newsletters. Excluded from the study were nonprofessional clinical staff and those who did not provide direct care (e.g., nursing assistants, licensed practitioners with no patient care responsibilities, patient transporters).

Educational Intervention

In-house clinical educators created the mandatory online learning module. The module provided an overview of evidence-based practice, listed the steps of evidence-based practice, and offered examples of evidence-based practice projects. The educational module was available via the organization's intranet system and could be reviewed during working hours or after hours at home, with no time restriction for completion. The module was accessible to the staff for a 2-month period, and completion compliance rates were sent to managers weekly. Because this education was part of the infusion of evidence-based practice throughout all disciplines and was required regardless of study partici-

TABLE 1
DEMOGRAPHIC CHARACTERISTICS (*N* = 609)

Characteristic	Presurvey (*n* = 327)	Postsurvey (*n* = 282)
Mean age in years (range)	42 (22 to 76)	41 (21 to 81)
Gender		
Female	289 (88.4)	245 (86.9)
Male	36 (11.0)	37 (13.1)
Ethnicity		
White (non-Hispanic)	213 (65.1)	176 (62.4)
Asian/Pacific Islander	68 (20.8)	64 (22.7)
Hispanic	19 (5.8)	16 (5.7)
Black	5 (1.5)	9 (3.2)
Other	15 (4.5)	16 (5.7)
Profession group		
RN	256 (78.3)	232 (81.9)
Staff nurse	221	199
Lead	23	23
Educator/CNS	12	10
Respiratory therapist	19 (5.8)	27 (9.6)
Physical therapist	16 (4.9)	9 (3.2)
Occupational therapist	7 (2.1)	4 (1.4)
Speech therapist	3 (0.9)	3 (1.1)
Social worker	7 (2.1)	4 (1.4)
Dietician	6 (1.8)	1 (0.4)
Pharmacist	9 (2.6)	2 (0.7)
Recreational therapist	1 (0.3)	0
LVN	2 (0.6)	0
Highest degree earned		
Associate's degree	88 (26.9)	95 (33.7)
Diploma	22 (6.7)	14 (5.0)
Baccalaureate degree	156 (47.7)	123 (43.6)
Master's degree	37 (11.3)	26 (9.3)
Doctoral degree	13 (4.0)	5 (1.8)
Years of work experience (*M* ± *SD*)	12.9 ± 11.2	12.6 ± 10.3
Mean number of formal evidence-based practice classes	2.8	2.6

Note. RN = registered nurse; CNS = clinical nurse specialist; LVN = licensed vocational nurse. Values are number (%), unless otherwise indicated. Percentages may not total 100% because of missing data or rounding.

pation, managers were asked to remind staff who had not completed the module to do so. At the end of the module, staff were not tested on evidence-based practice knowledge, although they did certify completion of the module.

Instruments

Staff practice, attitudes, and knowledge/skills regarding evidence-based practice were measured with the Clinical Effectiveness and Evidence-Based Practice Questionnaire (EBPQ). The EBPQ is a self-report measure of practice, attitudes, and knowledge/skills related to evidence-based practice that was developed by Upton and Upton (2006). The questionnaire explores the day-to-day use and implementation of evidence-based practice. Internal reliability for the questionnaire was reported at 0.87, and reliability ranged from 0.79 to 0.91 for each subscale (Upton & Upton, 2006). Upton and Upton (2006) showed adequate reliability for internal consistency and construct and discriminant validity during the development of the EBPQ.

Demographic information, including profession, current work title, years of experience, gender, race/ethnicity, and educational background, was collected by means of a demographic questionnaire. Participants were asked how they learned about evidence-based practice, how frequently they sought information from various resources, and their perceived skill level for the various tasks of evidence-based practice. Information resources were rated on a five-point Likert scale (1 = never to 5 = every day) and included other people (peers, physicians, faculty), library databases, print journals, the Internet, personal digital assistants, medical librarians, textbooks, and the Cochrane Database. Perceived evidence-based practice skill level was rated on a five-point Likert scale (1 = novice to 5 = expert) for ability to formulate a key clinical question, find the best clinical evidence to answer a question, search electronic databases, understand research articles, appraise research articles, synthesize research articles, and apply research evidence to patient care (Kim et al., 2012).

Data Collection Procedures

Data collection began after approval was received from the institutional review board and the hospital's administrative review committee. Data collection packets contained an informed consent letter, the EBPQ survey, a demographic questionnaire, and a preaddressed return envelope. Collection boxes were conveniently placed on each unit for ease in returning completed surveys. Participants could also return surveys via internal mail if use of the collection box was inconvenient or if staff feared compromised confidentiality. Research team members visited unit staff meetings during a 1-month period to

introduce and explain the study. Survey materials were distributed to staff via their unit mailboxes to ensure that all staff received the study packet materials, not just the staff present at the unit staff meeting. In addition, unit managers posted flyers on the unit to encourage staff to participate in the study.

Two weeks after the distribution of the survey packets to staff mailboxes, a series of e-mail reminders were distributed via the internal e-mail system. These e-mail reminders were repeated every 2 weeks during the initial 2-month data collection period. Unit managers and educators were asked to encourage participation in the study. This same procedure was repeated for postsurvey data collection.

Data Analysis

SPSS software, version 18.0, was used for data analyses, and the level of significance was set at $p < .05$ for all data analyses. Descriptive statistics were performed to describe the demographic characteristics and types of information resources used. Pre- and postsurvey EBPQ subscale mean scores were compared with independent *t* tests. To identify the potential predictors of practice, attitudes, and knowledge/skills associated with evidence-based practice, bivariate Pearson product-moment correlation procedures were first performed among demographic characteristics and EBPQ subscale scores. The dummy variable of evidence-based practice education and the demographic characteristics that had statistically significant correlations with one or more of the evidence-based practice subscales were selected as the potential predictor variables. These potential predictors were entered into the exploratory multiple regression models simultaneously.

RESULTS

Sample Characteristics

A total of 609 participants completed the survey: 327 for the presurvey and 282 for the postsurvey, with response rates of 24% and 20%, respectively. Table 1 shows the demographic characteristics of the participants. Most were female, White, registered nurses who had earned baccalaureate degrees. The average work experience was approximately 13 years, and approximately one fourth did not have any previous formal training in evidence-based practice.

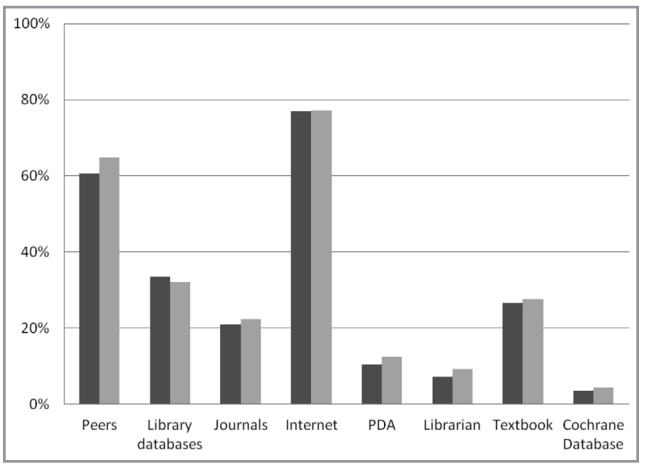

Figure 1. Type of information resources used at least weekly (N = 609). Black bars represent presurvey values; gray bars represent postsurvey values. PDA = personal digital assistant.

Type of Information Resources Used

There were no statistically significant changes between pre- and postsurvey use of information resources when clinical questions arise (Fig. 1). The most frequent pre- versus postsurvey types of information resources used at least once weekly were Internet (76.9% vs. 77.1%) and peers (60.6% vs. 64.9%). The least frequently used resources were librarians (7.2% vs. 9.2%) and the Cochrane Database (3.6% vs. 4.3%).

Pre- Versus Postsurvey Comparisons of Evidence-Based Practice

The Cronbach's alpha internal consistency reliability was 0.94, 0.78, and 0.96 for the practice of evidence-based practice, attitude toward evidence-based practice, and knowledge/skills associated with evidence-based practice subscales, respectively. Table 2 presents the

TABLE 2
COMPARISON OF PRE- VERSUS POSTSURVEY EVIDENCE-BASED PRACTICE QUESTIONNAIRE MEAN SCORES

Subscales	Presurvey *M* (*SEM*)	Postsurvey *M* (*SEM*)	Mean Difference[a]	*t* (Independent)	*p*
Practice of evidence-based practice	4.51 (0.09)	4.46 (0.10)	-0.05	-0.396	.692
Attitude toward evidence-based practice	5.22 (0.07)	5.16 (0.08)	-0.06	-0.547	.585
Knowledge/skills associated with evidence-based practice	4.55 (0.06)	4.58 (0.07)	0.03	0.330	.741

Note. [a]Postsurvey minus presurvey. Possible range for each subscale was 1 to 7.

TABLE 3
BIVARIATE CORRELATIONS AMONG VARIABLES (*N* = 609)

Variable	Practice of Evidence-Based Practice	Attitude Toward Evidence-Based Practice	Knowledge/Skills Associated With Evidence-Based Practice
Age	0.059	0.002	-0.042
Years of work experience	0.050	-0.037	-0.035
Female gender	0.071	-0.009	-0.105*
Registered nurse	0.047	0.088*	0.030
Hispanic ethnicity	-0.061	-0.098*	-0.001
Black ethnicity	0.034	-0.044	0.059
White ethnicity	0.025	0.108**	0.034
Asian ethnicity	0.015	-0.042	-0.034
Associate's degree/diploma	-0.109*	-0.137**	-0.121**
Baccalaureate degree	0.020	0.071	-0.010
Graduate degree	0.123*	0.088*	0.182**
No. of formal evidence-based practice classes	0.140**	0.012	0.144**
Online evidence-based practice education	-0.016	-0.023	0.014

Note. *$p < .05$. **$p < .01$.

comparisons of pre- and postsurvey mean scores of subscales. There were no statistically significant changes in practice, attitudes, and knowledge/skills associated with evidence-based practice after the online evidence-based practice education.

Predictor Variables of Evidence-Based Practice

Table 3 shows the bivariate Pearson's correlations among independent demographic characteristics and the three dependent variables of the EBPQ subscales. Registered nurse status, White ethnicity, graduate degree, and number of formal evidence-based practice classes had statistically significant positive correlations with one or more of the three EBPQ subscale scores (r = 0.088 to 0.182; $p < .05$). In contrast, female gender, associate's degree or diploma, and Hispanic ethnicity had statistically significant negative correlations. However, the online educational program had no statistically significant correlation with any of the EBPQ subscale scores. These statistically significant independent variables were entered as potential predictors in the exploratory multiple regression model simultaneously.

The results of the simultaneous multiple regression analyses using the EBPQ subscale scores as dependent variables are shown in Table 4. For the practice of evidence-based practice subscale as the dependent variable, the combination of predictor variables explained 5.8% of the variance (R^2 = 0.058, p = .024). Among the predictor variables, registered nurse status (beta = 0.13, p = .015), graduate degree (beta = 0.18, p = .002), and number of formal evidence-based practice classes (beta = 0.11, p = .031) reached statistical significance. For the attitude toward evidence-based practice subscale, 8.3% of the variance was explained by the predictor variables (R^2 = 0.083, p = .001). Among the predictor variables, registered nurse status (beta = 0.13, p = .019), baccalaureate degree (beta = 0.15, p = .008), and graduate degree (beta = 0.20, p = .001) reached statistical significance. For the knowledge/skills associated with evidence-based practice subscale, the predictor variables explained 8.8% of the variance (R^2 = 0.088, p = .001). Among the predictor variables, female gender (beta = -0.10, p = .046), graduate degree (beta = 0.25, $p < .001$), and number of formal evidence-based practice classes (beta = 0.11, p = .043) reached statistical significance.

Ability to Perform Evidence-Based Practice Steps

Figure 2 shows the comparison of pre- and postsurvey mean scores for ability to perform tasks related to the steps in evidence-based practice. There were no statistically significant changes in the ability to perform these tasks after the online evidence-based practice education. The mean rating of the respondents' ability to perform these tasks was "competent" for most of the steps, except for appraising articles critically and synthesizing the research article findings, for which the mean rating was "advanced beginner."

First Exposure to Evidence-Based Practice

Narrative data describing how participants first learned about evidence-based practice showed that a majority of participants' first interaction with evidence-based practice was through a formal school setting, despite area of profession. However, most of the participants who had exposure through school were nurses and physical therapists compared with other participating disciplines. The majority of the other study participants who did not have formal school exposure learned about evidence-based practice through coworkers, conferences, professional journals, previous employment, and professional organizations. In addition, a few partici-

TABLE 4
SIMULTANEOUS MULTIPLE REGRESSION MODELS PREDICTING SUBSCALES OF EVIDENCE-BASED PRACTICE QUESTIONNAIRE (*N* = 609)

	Practice of Evidence-Based Practice			Attitude Toward Evidence-Based Practice			Knowledge/Skills Associated With Evidence-Based Practice		
Variable	***B***	***SE (B)***	**Beta**	***B***	***SE (B)***	**Beta**	***B***	***SE (B)***	**Beta**
Constant	4.19	0.57		4.21	0.46		4.31	0.41	
Female gender	-0.23	0.23	-0.05	-0.08	0.18	-0.02	-0.32	0.16	-0.10*
Registered nurse	0.50	0.21	0.13*	0.38	0.16	0.13*	0.26	0.14	0.11
Baccalaureate degree	0.22	0.17	0.07	0.36	0.14	0.15**	0.12	0.12	0.06
Graduate degree	0.76	0.25	0.18**	0.67	0.20	0.20**	0.71	0.17	0.25***
Number of formal evidence-based practice classes	0.02	0.01	0.11*	-0.00	0.01	-0.02	0.01	0.01	0.11*
	$R^2 = 0.058$			$R^2 = 0.083$			$R^2 = 0.088$		
	$F\Delta_{(12,391)} = 1.990$*			$F\Delta_{(12,387)} = 2.919$**			$F\Delta_{(12,360)} = 2.903$**		

Note. *$p < .05$. **$p < .01$. ***$p < .001$. Age, ethnicity, and years of work experience and dummy variable of online evidence-based practice education were entered, but the coefficients were not statistically significant and were not shown.

pants learned about evidence-based practice from online literature search engines, research committees, and hospital-specific leadership and practice council meetings. Finally, a few participants reported not knowing much about evidence-based practice.

DISCUSSION

The current study results indicate that the online educational intervention was not effective in improving the practice, attitudes, and knowledge/skills regarding evidence-based practice among multidisciplinary health care providers. In the multivariate analysis, the online education again was not a significant predictor of practice, attitudes, and knowledge/skills in terms of evidence-based practice; instead, a graduate educational degree, attendance at a formal evidence-based practice class, and registered nurse status were found to be statistically significant positive predictors. It is not surprising that educational and professional backgrounds appear to have a significant effect on the practice, attitudes, and knowledge/skills related to evidence-based practice. These results support the narrative data, which showed the majority of participants reporting their first exposure to evidence-based practice in school and not at work.

Because the educational intervention did not include a test of knowledge at the end of the module, it was difficult to know whether staff actually read and learned from the module. Administering self-learning online

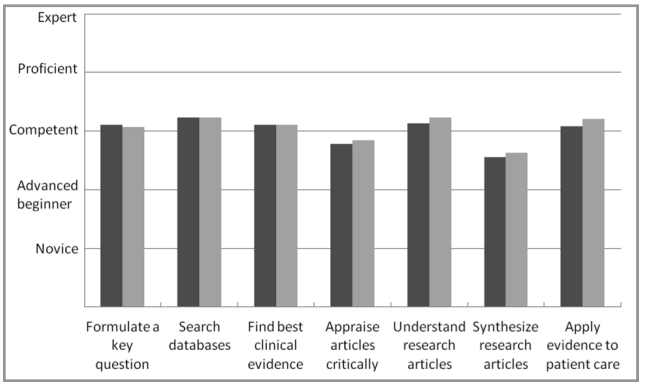

Figure 2. Rating of ability to perform evidence-based practice (*N* = 609). Black bars represent presurvey values; gray bars represent postsurvey values.

modules may not necessarily be the most effective method for introducing and expanding practical evidence-based practice ability and knowledge/skills. The staff need opportunities to practice evidence-based practice, not necessarily simply education modules. Creating avenues for individuals to practice, such as journal clubs, evidence-based practice workshops, and formal classes, might be a more effective method for increasing ability and knowledge/skills of evidence-based practice than education alone.

Staff with graduate-level education or previous formal training in evidence-based practice had a statistically

key points

Evidence-Based Practice

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1. Administering self-learning online modules may not be the most effective method for expanding evidence-based practice abilities and knowledge/skills of nurses.
2. Graduate-level education is predictive of better practice, attitude, and knowledge/skills regarding evidence-based practice.
3. While staff are improving their competency in critically appraising and synthesizing research article findings, they should be encouraged to use professional databases with critical appraisals of the literature, such as the Cochrane Library.

significant positive correlation in two or more EBPQ subscales. With staff with an associate's degree or a diploma showing a negative correlation for practice, attitudes, and knowledge/skills, it is important for leaders and educators to highly encourage staff at this level of educational preparedness to return to school for higher-level degrees. Because no statistically significant positive or negative correlation was seen for baccalaureate-prepared staff, encouraging these staff members to return to school for advanced degrees, or at least to attend formal classes and workshops in evidence-based practice training and skills practice, would be beneficial for advancing practice, attitudes, and knowledge/skills in evidence-based practice.

The results of this study are congruent with previous research on self-rating of ability to perform the steps of the evidence-based practice process. Staff consistently rated themselves as "competent" in most of the evidence-based practice steps. However, staff perceived their ability in critically appraising and synthesizing research article findings at the lower "advanced beginner" level. Having the ability to critically appraise and synthesize research is at the core of the evidence-based practice process, and without these skills, staff will be unable to implement practice changes based on current, valid, and statistically significant research. Staff should be encouraged to use professional databases with critical appraisals of the literature, such as the Cochrane Library, MD Consult, and UpToDate®. Many hospital libraries subscribe to these or similar services.

In addition, in both the pre- and postsurveys, staff reported a positive attitude toward evidence-based practice. Leadership can leverage this positive attitude by offering opportunities for practice, which will increase knowledge/skills regarding evidence-based practice. Because self-rating of abilities in evidence-based practice did not change pre- to postsurvey, there continues to be room for improvement in all aspects of evidence-based practice.

The EBPQ was developed with nursing professionals, and all previous research appears to have used only nurses in the samples. This study is the first known study to include interdisciplinary professional staff as part of the sample. Further research is needed to determine whether this tool is appropriate for measuring practice, attitudes, and knowledge/skills related to evidence-based practice beyond nurses.

The results of this study provide guidance for leaders and educators to promote growth in the practice, attitudes, and knowledge/skills related to evidence-based practice within the interdisciplinary team. Analyzing the results of this study shows that promoting and encouraging advanced educational degrees and formal classes, programs, and in-services in evidence-based practice correlates with improved practice, attitudes, and knowledge/skills in the area of evidence-based practice. In addition, creating opportunities for staff to critically appraise and synthesize research articles through journal clubs and evidence-based practice projects would create situations for staff to use and improve knowledge and skills in this area. To allow staff to grow and evidence-based practice to progress, organizations must not only provide evidence-based practice role models at all levels of the organization but also actively integrate the tenets of evidence-based practice into everything they do.

LIMITATIONS

There are several limitations associated with this study. First, because the pre- and postsurveys were identical in content, it was difficult for staff to understand that they needed to complete both surveys. Despite efforts to clarify the need to complete both surveys, some staff completed only the presurvey. This difficulty resulted in a low overall response rate for both the pre- and postsurveys. Another limitation was related to the educational intervention. With no knowledge evaluation associated with the online learning module, it was impossible to determine whether the module was read and whether staff knowledge improved after reading. This study was also limited by the focus on lack of knowledge, and there may be a need to focus on multiple barri-

ers related to evidence-based practice, not just an educational deficit. Finally, because the study population was drawn from convenience sampling in only one hospital setting, the results of this study may not be generalizable to other settings.

CONCLUSION

Although this study did not provide many statistically significant correlations within the EBPQ subscales or in relation to the demographic data, there was valuable information gained from the results. Incorporating evidence-based practice into the culture of an organization is a process that takes time and consistent leader support and resources. Advancing evidence-based practice and knowledge/skills is important for improving patient safety, patient outcomes, and staff satisfaction. Obtaining baseline data on practice, attitudes, and knowledge/skills related to evidence-based practice is a necessary step for determining staff levels of ability and for future planning of interventions specific to the organization's population. Skill comes only through multiple exposures and repeated practice of evidence-based practice.

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