Redesigning Evidence-Based Initiatives for Nurses: DNP Project Report

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Abstract

Healthcare organization leaders greatly rely on evidence-based practice (EBP) to guide the delivery of care and support clinical decisions on patient care. EBP is a process of assessing and implementing best evidence, patient values, and clinical expertise to make clinical decisions on patient care. Engagement in EBP is an opportunity to overcome the barriers that lead to poor patient and system outcomes. However, EBP implementation can be difficult due to barriers such as lack of time, lack of EBP knowledge, lack of leadership support, and difficulty accessing resources. Several studies support educational programs for nurses to strengthen EBP beliefs and implementation. The purpose of this project was to increase participation in EBP for nurses practicing at Mayo Clinic Arizona. The project involved planning for redesign of existing EBP courses along with new types of support and educational sessions. DNP students participated in the initiative through searching for and synthesizing evidence, collecting and analyzing survey data, and presenting recommendations for program development and outcome measurement to nursing leaders in the organization.

Keywords: evidence-based practice, hospital, nurses, engagement, continuing education

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Healthcare professionals are encouraged to follow evidence-based practice (EBP) because it is linked to improved quality care, better patient outcomes, and decreased healthcare expenses (Friesen et al., 2017). Hospitals have created a variety of ways for nurses to remain engaged in EBP including developing educational programs (EBP courses) or EBP toolkits, implementing EBP competencies for nurses, and designating EBP champions or mentors (Warren et al., 2016). However, not all nurses are participating in these EBP initiatives.

Problem Statement

Nurses play a significant role in healthcare and have a unique opportunity to improve patient care through the use of EBP (Crabtree et al., 2016). However, the limited use of EBP among nurses is a worldwide concern (Skela-Savič et al., 2017). There are barriers to nurses implementing and engaging in EBP, such as lack of time, lack of understanding, lack of leadership support, and inability to access resources. This problem impacts all healthcare professionals, patients, and healthcare entities.

National initiatives have been attempted to encourage EBP engagement and ensure that hospitals use EBP to prevent poor patient outcomes. For example, the Institute of Medicine Roundtable on Evidence-Based Medicine set a goal that by 2020, 90% of clinical decisions would be supported by the best available and most accurate evidence (Olsen et al., 2007). A hospital that shows improved health outcomes and clinical practice based on evidence can be designated as a Magnet organization, which recognizes excellence in nursing practice and improving patient outcomes (Warren et al., 2016). If nurses are not using EBP, then hospitals could lose or fail to gain Magnet status (Warren et al. 2016).

Purpose and Rationale

Quality patient care relies on the utilization of EBP, yet nursing staff often lack engagement in EBP. The purpose of this project is to increase participation in EBP for nurses practicing at Mayo Clinic Arizona. In this phase, the project involved planning for redesign of existing EBP courses along with new types of support and educational sessions to enhance nurses' knowledge and keep nurses engaged in EBP. The overall initiative will continue to the second phase, where the programs designed in this first phase are implemented and evaluated.

Background and Significance

Although several studies have examined the perceived barriers and facilitators to implementing EBP in a variety of settings, healthcare organizations continue to face difficulties in implementing an EBP culture (Bianchi et al., 2018; Bovino et al., 2017; Duncombe, 2018). Common themes identified were limited nurse leader involvement in staff EBP engagement and lack of understanding of the EBP process among nurses providing direct patient care (Warren et al., 2016). Leaders must be aware of the barriers within the organization to provide sufficient resources and programs to engage nurses in EBP. According to Kueny et al. (2015), barriers included lack of clear communication of EBP goals or regulatory changes, no direct contact with CEOs, lack of clear expectations, and not allowing nurses to drive change and EBP within their units. Some facilities implemented EBP lectures, but that was not sufficient for engaging nursing staff in EBP (Jueng et al., 2017). After completing an EBP lecture-type training, most clinical nurses stated they did not feel confident with independently performing EBP (Jueng et al., 2017). Most of the experienced nurses (average 20.5 years) preferred library assistance and professional support for research skills while engaging in EBP rather than lecture-

type training (Jueng et al., 2017). More resources are needed for nursing staff to fully immerse themselves into EBP.

Practicing Nurses

Nurses in different countries and settings have experienced similar barriers to EBP implementation including lack of knowledge and skills, lack of resources and lack of leadership support (Christenbery et al., 2016; Duncombe, 2018; Hwang & Park, 2015; Kim et al., 2017; Skela-Savič et al., 2017; Van Der Goot et al., 2018). Saunders et al. (2016) explained that nurses' education levels affect their confidence in employing EBP; a lower education level leads to decreased engagement in EBP. Leaders may be unaware of their roles in the implementation of EBP for nurses. Nursing leaders can support nursing staff by granting access to resources and organizing educational programs (Bianchi et al., 2018). Quality care transpires when nurses have the resources, knowledge, and skills, as well as the ability to implement and evaluate the effectiveness of EBP (Crabtree et al., 2016).

Current Practice

Although there are many educational interventions to promote EBP in nursing, the implementation of EBP is declining (Schaefer & Welton, 2017). Current clinically integrated interventions include a combination of methods, such as lectures, online computer sessions, EBP mentors, journal clubs, and small-group discussions (Häggman-Laitila et al., 2016). However, nurses are not participating in many current practices; therefore, further, development is needed.

Evidence-Based Fellowship Program

Fellowship programs solely focusing on EBP have been effective in teaching, mentoring, and assisting nurses in the implementation of EBP (Kim et al., 2017). Mentorship programs provide the necessary structure and process of translating new EBP knowledge and innovation to

improve healthcare practice (Tucker et al., 2020). Fellowship programs have effectively reduced barriers, improved skills, and enlightened nurses' attitudes towards EBP implementation (Kim et al., 2017).

A typical design of a fellowship program has involved pairing fellows (nurses implementing an EBP project) with mentors (clinical experts or PhD prepared nurses) to guide them through the program. Education was provided on quality improvement methodology, appraisal process, financial management, and the overall process of an evidence-based project. Fellows presented their projects to their unit colleagues or leadership (Bramley et al., 2018; Diaz et al., 2018). Benefits reported by fellows included: improved leadership skills, networking skills, and confidence in EBP and their own abilities as nurses (Bramley et al., 2018). These fellowships supported nurses to understand and engage in EBP, while improving patient and staff outcomes at their hospitals.

EBP Engagement

There are limited studies on the long-term impacts of an EBP fellowship for nurses. Christenbery et al. (2016) conducted focus groups with fellows (nurses) six months after completing an EBP fellowship to determine what they gained from their experiences. The common themes from each focus group were gaining a support network, access to resources, knowledge about EBP, opportunities to further career, and empowerment to initiate change (Christenbery et al., 2016). Nurse fellowship programs not only reduce barriers after completion of the program, but nurses who participate in these programs are motivated and confident in their skills in engaging in EBP and encouraging peers (Christenbery et al., 2016).

Internal Evidence

In a large metropolitan hospital in the southwestern United States, key stakeholders noticed a decrease in EBP engagement among nursing staff including bedside nurses, team leads, supervisors, managers, and administrators. The hospital has received Magnet recognition and provides several EBP resources such as an EBP program with researchers working on EBP projects, EBP mentors (clinical nurse specialists and clinical nurse educators), online EBP resources created by EBP mentors, and online and in-person EBP courses taught by EBP mentors. There is an annual small grant program for nurses to apply for funding towards individual EBP projects. However, utilization of EBP mentors on each unit, attendance for in-person EBP courses, and completion rates of EBP projects are low. Ultimately, key stakeholders want to find ways to keep nursing staff engaged in EBP long-term.

Site-specific prior data consisted of bedside nurses' participation rates in the EBP courses. These EBP courses were developed as an initiative to enhance EBP knowledge among nurses at this facility. During the collection of data in 2019, 1,985 nurses worked for the hospital. The EBP-related courses offered were titled for nurse residents (new graduate nurses) (N=322), introduction to EBP (N=223), advanced EBP (N=103), EBP competency (N=243), and EBP mentor (N=26). EBP course participants included nurse team leaders (N= 11/109; 10%), nurse supervisors (N=11/54; 20%), nurse managers (10/33; 30%), and nursing administrators (1/9; 11%). Overall, only 27 percent of nursing staff from the hospital participated in EBP courses.

The organization's designated EBP mentors surveyed nurses providing direct patient care from different units to determine which priorities are essential for implementing EBP. The five priorities addressed were engaging bedside nurses in EBP, increasing knowledge and skills, exploring mechanisms to support EBP (funding and protected time), articulating expectations of EBP at all levels, and standardizing communication of evidence. Common feedback reported

was a recommendation for simplifying available EBP information and making it easily accessible, ensuring EBP mentors are readily available, hiring nurses as EBP mentors, and setting expectations for nurse involvement with EBP.

Even though prior EBP initiatives have been implemented, nurses in this setting are not regularly engaging in EBP or applying it to practice. Nursing leaders in the organization began considering implementing a fellowship program to develop higher-level EBP skills in the staff who act as EBP mentors. This inquiry led to the PICOT question, "In nurses within the hospital, how does an evidence-based practice fellowship compared to current practice affect engagement in evidence-based practice within 12 weeks?"

Search Strategy

Databases searched were PubMed, PsycInfo, CINAHL, and Cochrane. Initially the only keyword used for each database was *evidence-based fellowship.* The initial yields were 913 results for PubMed, 145 results for PsycInfo, 27 results for CINAHL, and 548 results for Cochrane. Then, limitations were selected such as: full text, published within five years, and English language. Boolean connectors were used with different keywords of *evidence-based fellowship OR evidence-based practice fellowship OR EBP fellowship*, but this did not change the results. The keyword *nurses* were added with different variations such as *nurses OR nursing staff OR nursing professional OR registered nurses.* Additional keywords were applied to help answer the PICOT question, such as *evidence-based engagement OR evidence-based implementation OR evidence-based adoption OR evidence-based belief OR evidence-based interest.* Final yields were three results for PubMed, 16 results for PsycInfo, two results for CINAHL, and two results for Cochrane. Cochrane results were discarded because the fellowships were for medical residents rather than registered nurses.

Another search was conducted using the PubMed database because the previous searches did not contain MeSH terms. Limitations were applied to this second search using full text, published within five years, and English language. The MeSH term used was *fellowships and scholarships*, which yielded 1,171 results and then the MeSH term *nursing staff, hospital* was added and yielded two results.

Inclusion and Exclusion Criteria

The inclusion criteria were studies published within the past five years, English language, fellowships for nurses, hospital setting, and focus on evidence-based practice. The exclusion criteria were studies published prior to 2015, language non-English, studies that did not focus on evidence-based practice, and fellowships for medical providers or students. Rapid critical appraisals of 16 studies led to the selection of 10 high level studies. Each of these studies address the PICOT and the impact of an EBP fellowship program for nurses.

Critical Appraisal & Synthesis of Evidence

Ten articles were selected for this literature review using Fineout-Overholt and Melnyk's (2009) rapid critical appraisal process. The four qualitative studies had a low level of evidence (see Appendix A, Table 1). The remaining studies consisted of well-designed nonrandomized controlled studies and one mixed-method study with moderate level of evidence (see Appendix A, Table 2). Most of the sample sizes were large; three were small (see Appendix A, Table 3). Four of the articles stated the source of funding. Bias was not identified in any of the studies. Only three of the studies were conducted outside the United States (see Appendix A, Table 3). All of the interventions were executed in medical centers and involved EBP among nurses. The term "nurses" included nurse leaders and clinical nurses.

Only three of the studies explicitly used the term EBP fellowship program (see Appendix A, Table 3). The type of EBP interventions slightly varied among studies. For example, an EBP exemplar pilot and mentorship program was created at one facility, which had a similar format to an EBP fellowship program (Friesen et al., 2017). Underhill et al. (2015) had a similar program, Science and Practice Aligned with Nursing, in conjunction with mandatory EBP online modules and events for nurses to present their EBP projects. Three studies focused on identifying barriers to nurses engaging in EBP (see Appendix A, Table 1).

There was heterogeneity in data analysis used for the quantitative studies and homogeneity in measurement tools and sample demographics. The qualitative studies used focus groups, while the quantitative studies commonly used the Evidence Based Practice Implementation (EBP-I) and Evidence Based Practice Belief (EBP-B) scales (see Appendix A, Table 3). The sample demographics among all the studies were similar with mean ages of 30-40s, average clinical nursing experience over 10 years, and current employment of each participant as a nurse at a medical center (see Appendix A, Table 3). There was slight heterogeneity in the interventions and outcomes. The interventions either focused on EBP engagement overall or specific EBP interventions (see Appendix A, Table 3). Christenbery et al. (2016) reported the only qualitative study that used an EBP fellowship as an intervention (see Appendix A, Table 1).

The qualitative studies reported similar themes in identifying barriers such as lack of time, difficulty accessing resources, lack of rewards, and decreased enrollment in EBP programs (see Appendix A, Table 1). Common dependent variables for quantitative studies included EBP-B, EBP-I, group attractiveness, group cohesion, and Organizational Culture and Readiness for System-Wide Integration of EBP (OCRSIEP) scores (see Appendix A, Table 2). Common

outcomes among the quantitative studies were lower EBP-B and EBP-I scores among nurses who did not have EBP education compared to nurses who did have EBP education. EBP mentors or nurse leaders in these studies had higher EBP-B and EBP-I scores than clinical nurses (see Appendix A, Table 2). However, after EBP interventions the clinical nurses' scores increased significantly (see Appendix A, Table 2). Some facilities incorporated other interventions with the EBP fellowship programs, so it is difficult to draw a conclusion regarding which EBP intervention was most beneficial. For example, the medical centers in Underhill et al. (2015) required nurses to complete EBP online modules, so there was a higher enrollment in those activities than in the EBP program where nurses implemented an EBP project (see Appendix A, Table 2). The three studies that used an EBP fellowship program as a sole intervention showed an increase in EBP engagement (see Appendix A, Table 3).

Strengths identified throughout the literature consisted of providing various perspectives of nurses regarding EBP, a moderate level of evidence used for most of the studies, and the data analysis and methodology used. Weaknesses included greater than 50 percent attrition rate in half of the studies, limited generalizability due to low response rates, and nonrandom sampling for all of the studies. Strong reliability and validity were demonstrated for the quantitative studies by using high-quality methodology and measurement tools (validity was stated using Cronbach's alpha for each tool in the quantitative studies). The qualitative studies demonstrated trustworthiness through methodology used to identify common themes.

Summary

This literature review demonstrates the range of interventions that has been explored to address nurses' adoption of EBP. The evidence showed a gap in EBP engagement among nurses based on role and prior EBP education/training. Nurses in a leadership role tended to be more

engaged in EBP by participating in various EBP interventions, while clinical nurses or direct care nurses often stated there was not enough time and reward to engage in these EBP activities.

The available evidence demonstrates that EBP fellowship programs can increase EBP engagement among nurses provided with education, mentorship, and support to complete an EBP project. These fellowships have led to nurses enhancing their EBP knowledge, professional growth, and empowerment to change practice. Additional studies are necessary to determine how to overcome the low enrollment rate in EBP programs and enhance the long-term impact from nurses completing EBP fellowships.

Implementation and Theoretical Framework

The implementation framework for this project is the Mayo Clinic Nursing EBP model. It was chosen because it was developed for nurses implementing EBP at this organization and it aligns with the Mayo culture. This model provides nurses the foundation to develop an EBP project. Below are the seven steps to this model (Mayo Clinic, n.d.):

1. The nurses will inquire about the best evidence and practice to guide clinical decision making, then develop their PICO question.
2. The nurses will collaborate with librarians at this organization and utilize the online library to conduct a search strategy.
3. The nurse will appraise the evidence using the Johns Hopkins Nursing EBP tools on the organization's website.
4. The nurses will compare and contrast current practice with the literature they found.
5. The nurses will synthesize the evidence ensuring it supports a practice change. Also, this step includes nurses implementing a quality improvement project or a research study.
6. The nurses evaluating the effectiveness of the practice change.

7. The nurses will disseminate their project to the stakeholders.

In addition to the Mayo Clinic Nursing EBP model, Kanter's theory of structural empowerment was chosen as the theoretical framework because it emphasizes the importance of organizations empowering employees by giving them access to support, resources, information, and opportunity (1993). Support refers to receiving feedback and guidance from peers or leadership (Kanter, 1993). In regard to an EBP fellowship program, this would be the mentors providing feedback and guidance to the fellows. Access to resources means nurses will be able to acquire financial means, materials, time, and supplies required for their EBP projects (Kanter, 1993). Access to information refers to having formal and informal knowledge to be effective in the workplace such as policies and procedures for an organization (Kanter, 1993). Providing nurses with opportunity refers to possibility for growth and development within the organization to increase knowledge and skills (Kanter, 1993). An EBP fellowship aligns with Kanter's (1993) theory as nurses will be empowered when completing this type of program because the organization will provide support, resources, information, and opportunities for career progress. In order for all of this to happen, nursing leaders at this organization would be responsible for creating conditions for work effectiveness that ensure nurses feel empowered.

Project Description

Two DNP students started collaborating with Mayo Clinic nursing leaders in August 2019 around the focus of keeping nurses engaged in EBP (see Appendix C, Figure 5). Initially, the idea was to use social media to keep nurses engaged in EBP. Then, through collaborative discussions and review of the literature, nursing leaders suggested the development of a Mayo Clinic EBP fellowship program for nurses. DNP students attended monthly meetings until

December 2019 with nursing leaders to discuss resources already available for nurses at Mayo Clinic and how an EBP fellowship program could improve EBP engagement.

In January to April 2020, DNP students turned the nursing leaders' interest in an EBP fellowship program into a PICO question. Then, the DNP students began an exhaustive search, critically appraised and synthesized evidence, and developed an evaluation and synthesis table of 10 studies. The DNP students presented the synthesized evidence to the nurse leaders at Mayo Clinic, which was later used to develop the outline for the EBP fellowship program. After February 2020, all meetings were transitioned to Zoom (video conference platform) due to the COVID-19 pandemic. This led to reconstruction on the DNP project as well.

From May to July 2020, the DNP students, faculty mentor, and Mayo Clinic nurse leaders met twice a month to collaborate on revising the EBP resources and educational programs. The DNP students presented five recommendations with supporting evidence for the EBP fellowship program to nursing leaders. During this time, DNP students developed a logic model and budget plan for the DNP project. A theoretical and implementation framework was chosen to align with Mayo culture. Outcome measurements were discussed, and that led to the DNP students developing a survey regarding values for EBP competencies that would be dispersed to nursing leaders at Mayo Clinic. Lastly, the DNP students applied for and received IRB approval from Arizona State University in July 2020. In August 2020, the survey was entered into REDCap by the Mayo project champion and dispersed to nursing leaders at Mayo Clinic Arizona.

In October 2020, the DNP students presented their literature review and evidence synthesis to the New Nursing Knowledge and Innovation Subcommittee at Mayo Clinic and received positive feedback about the usefulness of the recommendations. The DNP students

analyzed the survey results, then presented the analysis and recommendations to nursing leaders in November 2020. There were frequent meetings to discuss the analysis and recommendations, and what this meant for the direction of the project. Mayo staff requested DNP student assistance reviewing the criteria for the EBP fellowship program, revising the current mentor program, and searching the literature for appropriate pre/post evaluation tools.

The first phase of this project ended in January 2021. The DNP students presented a list of recommendations for redesigning the Mayo Clinic EBP mentor program and provided evidence to support the recommendations. In addition, they provided a table with a list of EBP knowledge tools that could be used in the future for evaluating the EBP fellowship program.

Since this is the first EBP fellowship program developed at this hospital, the initiative will be completed in multiple phases. The first phase, which is the subject of this report, was begun in August 2020 to determine the competencies for each level of EBP participant and revise the online EBP courses (introduction to EBP, advanced EBP, and EBP mentor). The second phase, to begin in late 2021, will involve implementing the redesigned online EBP courses and implementing the EBP fellowship program. The third phase will aim to evaluate the effects of the EBP fellowship program on nurses' engagement in EBP.

In the first phase, it was important to identify EBP competencies useful for monitoring learners' progress at each level of development (Albarqouni et al., 2018). This inquiry led to developing a survey to answer the question, "Which EBP competencies do nursing leaders value most for nurses in different roles within this organization?"

Survey Methods

The Doctor of Nursing Practice (DNP) students implementing this project developed an electronic survey of EBP competencies based on recent research (Albarqouni et al., 2018;

Melnyk et al., 2019). The purpose of the survey was to capture the Mayo Clinic's nursing leaders' beliefs on which EBP competencies are essential for nurses within the organization. The survey was estimated to take approximately 20 minutes and included 34 EBP competency items. The Arizona State University Institutional Review Board (IRB) approved the project with a designation of exempt from full review (See Appendix B, Figure 1). Mayo Clinic Arizona administrators designated the project as quality improvement not requiring review by their IRB and gave approval for the survey to be deployed.

A recruitment email with survey link and consent form was sent to 50 nurses in leadership positions at this hospital via email communication from the Manager of Education and Professional Development. A follow-up email was sent out with a reminder of the survey deadline one week later. Participants submitted survey responses in the Research Electronic Data Capture (REDCap) system. The data was de-identified by Mayo EBP coordinators. The graduate students analyzed the data using Intellectus Statistics™ (2020).

Measurement Tools

Validity of the survey was supported by the use of research based EBP competencies as the items in the survey (see Appendix C, Figure 2). As this was a new survey, there was no previously established reliability data. There were 34 scaled responses using a five-point Likert scale (1=not at all, 2=slightly important, 3=neutral, 4=important, and 5=extremely important. The last question asked participants what they thought an appropriate time length, in months, would be for an EBP fellowship program. The demographic items included role in the organization, years of clinical experience, level of education, number of EBP projects completed, and number of EBP courses completed. Responses were coded for data analysis.

Survey Results

The survey was completed by 36 nurse leaders (*N*=86, response rate=41.86%). Incomplete survey submissions were discarded. Surveys were considered incomplete if there were no responses listed. The REDCap system automatically listed surveys as complete even if the participant only answered one question. For example, this meant the participant could have scored only basic EBP knowledge competencies and the rest of the survey was left blank. The responses were still valuable, so the surveys were still used for data analysis. Thirty participants answered every question on the survey.

Demographics

The demographics were homogeneous. The most common participant roles were Nursing Education Specialist (N=16, 44.44%) and Clinical Nurse (N=11, 30.56%). The highest education level in nursing was a master's degree (N= 27, 75%). Most nurse leaders had 10 or more years of clinical experience (N=29, 80.56%). Nurse leaders' responses to participation in EBP courses did vary with one to two (N=12, 33.3%), three to four (N=9, 25%), and seven or more (N=9, 25%). Most nurse leaders had participated in one to two EBP projects (N= 11, 30.56%) or three to four EBP projects (N=9, 25%).

Data Analysis

Since there were three different EBP knowledge levels that needed to be ranked for each of the 33 EBP competencies, a grand mean Likert score was calculated to analyze the data. The grand mean Likert score for each EBP knowledge level was as follows: beginner 3.80, advanced 4.25, and EBP mentor 4.43 (See Appendix C, Figure 4). There was a clear distinction between the 33 EBP competencies for basic EBP knowledge level and the two higher levels, but little distinction between EBP mentor and advanced EBP knowledge levels.

The mean Likert score for each level was used to determine which competencies were most valuable to nursing leaders at this organization for EBP project mentors and basic and advanced EBP knowledge. The top five EBP competencies for each EBP knowledge level are listed below.

Beginner

1. The ability to question clinical practice for the purpose of improving the quality of care (*M*=4.50).
2. Describes clinical problems using internal evidence (evidence that is generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data) (*M*=4.31).
3. Ability to distinguish between evidence-based and opinion based clinical practice guidelines (*M*=4.29).
4. Understand and practice shared decision making (*M*=4.22).
5. Convert clinical questions into structured answerable clinical questions using PICO (*M*=4.19).

Advanced

1. Convert clinical questions into structured answerable clinical questions using PICO (*M*=4.46).
2. Communicates best evidence to individuals, groups, colleagues, and policy makers (*M*=4.46).
3. Ability to construct and carry out an appropriate strategy to search for external evidence generated from research to answer focused clinical questions (*M*=4.41).

4. Identify the elements of PICO and use variations of it when appropriate to structure answerable clinical questions (*M*=4.38).
5. Ensure the delivery of care on the unit(s) and organization aligns with the practice recommendations (*M*=4.38).

EBP Mentor

1. Implement practice changes based on evidence and clinical expertise and practice preference to improve care processes and patient outcomes (*M*=4.6).
2. Ability to recognize the difference between systematic reviews, meta-analyses, and nonsystematic reviews (*M*=4.58).
3. Describes clinical problems using internal evidence (evidence that is generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data) (*M*=4.57).
4. Convert clinical questions into structured answerable clinical questions using PICO (*M*=4.57).
5. Ability to integrate evidence gathered from external and internal sources in order to plan EBP changes (*M*=4.57).

The participants answered a closed-ended question about the time frame of the fellowship program. The majority of the nurse participants (N = 21, 58.33%) recommended the time frame of 12 months for the EBP fellowship program.

Lastly, participants were given the opportunity to provide feedback regarding the EBP competencies listed in the survey. Even though only three participants responded to this question, the answers were similar. The participants stated most of the EBP competencies are for "high functioning" research level and it takes time and implementation for these competencies to

be grasped. A participant also stated that most of the EBP competencies do not pertain to bedside nurses.

Discussion

Project Impact

This project was the first step in a program to increase participation in EBP for nurses practicing at Mayo Clinic Arizona. Initially, nursing leaders had proposed implementing a higher level EBP nursing fellowship program at this organization. However, changes in the highest-level nursing executive leaders and new workforce needs due to the current COVID-19 pandemic required revisions to the plans. This phase of the project focused on defining the EBP competencies nursing leaders viewed as most valuable for the roles of EBP project mentors and staff with basic and advanced EBP knowledge. The EBP competencies for each level are being used for the redesigned EBP course curriculum, which will be required for nurses before they start the EBP fellowship program. Once nurses complete the EBP curriculum, then achievement of each competency will be evaluated. Ongoing assessment of curriculum completion and implementation of the EBP fellowship program will be necessary to evaluate the effectiveness of these EBP initiatives.

Budget/Funding

A potential budget was developed to estimate the direct, indirect, and potential costs and savings with implementing an EBP fellowship program (See Appendix C, Figure 3). However, the organization was not ready to move forward with approvals for funding the fellowship development phase, so attention was focused on redesigning the basic, advanced, and mentor levels.

Project Sustainability

This project was designed through an ongoing collaboration through DNP students and EBP coordinators at this organization. There is a strong interest among EBP coordinators and nursing leaders to implement the EBP fellowship program. The DNP students and EBP coordinators have already started revising the EBP curriculum based on the EBP competencies that the nursing leaders valued. The intention is for other graduate students to continue this project in subsequent years to implement the new courses and the fellowship program and evaluate the effectiveness of the EBP curriculum.

Strengths

The project strengths include the inter-organizational collaboration among the site champions and doctoral students, innovative approach to increase participation in EBP by practicing nurses, utilization of evidence to support the intervention, and a smooth and rapid IRB process. Another strength was the use of evidence throughout the process: the EBP competencies used in the survey and all recommendations were based on current research. The participation of nursing leaders within the organization was another strength in this project. Their support will be necessary to implement all levels of the EBP initiatives, including the EBP fellowship program. Lastly, nursing leaders invited the DNP students' feedback and active participation in every aspect of the project. DNP students were included in high-level organizational meetings and provided recommendations, evidence, and data to assist with EBP program development.

Limitations

This project has several limitations. The delayed approval of the EBP fellowship program due to the COVID-19 pandemic led to several changes in the timelines and goals for the process. Initially, the plan was to implement an EBP fellowship program during Spring 2021, but that

project will be delayed. Another limitation due to COVID-19 was not being able to be physically present at Mayo Clinic. All meetings and presentations were conducted via Zoom. In addition, the survey dispersed to nurse leaders was lengthy, which may have contributed to limited participation and some incomplete surveys.

Recommendations

Based on the analysis it was suggested that the basic EBP knowledge course will focus on identifying a clinical problem, developing a PICO, and conducting a search strategy. The advanced EBP knowledge course will involve the next steps of the EBP curriculum. Nurses will learn to collect internal evidence and appraise and synthesize external evidence. The DNP students recommended specific higher level competencies that should be included only in the EBP project mentor course.

The DNP students taking on the next phase of this DNP project should consider using a pre- and post- EBP knowledge tool for nurses in the EBP fellowship program and the EBP mentors. This will provide a way to measure outcomes of the EBP fellowship program. In addition, frequent communication and collaboration with Mayo Clinic leaders and the project mentor will be crucial to maintain the development of the EBP fellowship program. We recommend that goals are realistic and clear based on the amount of time given to complete the project, and that students stay open minded and flexible while the next phases of project are evolving.

Conclusion

Applying the identified EBP core competencies is extremely important for each level of nursing role. Changes in the current EBP curriculum will clarify roles and expectations for the nurses and create a promising pathway for nurses to identify and implement EBP interventions

that improve patient health outcomes. Future phases of this project will include implementation and evaluation of the EBP curriculum and the EBP nursing fellowship program.

This project intervention relates to each Essential of Doctoral Education for Advanced Nursing Practice (DNP Essentials). This project involved developing and evaluating a new approach to engaging nurses in EBP based on nursing theories and disciplines, integrating DNP Essential I. Advanced communication and collaborative skills were used to lead a quality improvement project and develop a new survey using technology systems to analyze data and critically appraise literature; therefore, EBP Essentials II, III, IV, VI, and VIII were incorporated to complete the project. Multiple presentations were given to key stakeholders to influence and educate them in making the changes and implementing an EBP fellowship program that will address gaps in nursing care and strengthen their EBP culture (DNP Essentials V and VII).

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Appendix A

Evaluation and Synthesis Tables

Table A1

Evaluation Table of Qualitative Studies

Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling (Grounded Theory, phenomenology, Narrative…)	Sample/Setting (describe)	Major Themes Studied/ Definitions	Measurement/ Instrumentation (focus group, 1:1, open-ended survey)	Data Analysis	Findings/ Themes	Level/Quality of Evidence; Decision for practice/ application to practice/ Generalization
Christenbery et al. (2016) Immersion in evidence-based practice fellowship program: A transforming experience for staff nurses **Country:** U.S. **Funding:** Not reported. **Conflicts/Bias:** None recognized.	Kanter's Theory of Structural Empowerment	**Method:** Narrative **Purpose:** Explore the "life changing" experiences of staff nurses that they attributed to participating in an EBP FP.	**N**=15 **Setting:** Urban academic MC in southeastern U.S. **Sample Demographics:** Participants completed fellowship between 2007 and 2011. Worked in a variety of settings in the MC. **IC:** NS that completed the	**IV:** EBP FP **DV1:** Changes in behavior **DV2:** Changes in thinking **DV3:** Changes in practice	Focus groups Audiotapes transcribed verbatim	Thematic analysis	**Theme 1:** Support from all staff **Theme 2:** Access to resources **Theme 3:** Knowledge gained through FP **Theme 4:** Professional growth **Theme 5:** Empowerment to change practice	**LOE:** VI **Strengths:** First study to explore "life-changing" manifestations of RNs that completed an EBP FP. **Weakness:** Purposeful sample, small sample size, brief sample demographics, low LOE, attrition and EC not discussed, and funding not reported.

Key: **CSS**-cross sectional survey; **DFCI**-Dana-Farber Cancer Institute; **DV**-dependent variable; **EBP-B**-EBP belief; **EBP-I**-EBP implementation; **EBN**-evidence-based nursing; **EBP**-evidence-based practice; **EC**-exclusion criteria; **EP**-exemplar pilot; **ERI**- Evidence-Based Practice Readiness Inventory; **FP**-fellowship program; **FT**-full-time; **GA**-group attractiveness; **GC**-group cohesion; **HPU**-high-performing unit; **IC**-inclusion criteria; **IV**-independent variable; **JS**-job satisfaction; **LOE**-level of evidence; **LPU**-low-performing unit; **MC**-medical center; **MD**-mean difference; **MM**-mixed methods; **MP**-mentoring program; **n**-number of participants (if SR) or number of participants in subset; **N**-number of studies (if SR) or participants in study; **NM**-nurse managers; **NS**-nursing staff; **OCRSIEP**-Organizational Cultural and Readiness for System-Wide Integration of EBP; **PT**-part-time; **RH**-regional hospital; **RN**-registered nurse; **SD**-standard deviation; **SPAWN**-Science and Practice Aligned with Nursing; **T1**-time 1 in 2011; **T2**-time 2 in 2013; **TL**-team lead; **U.K.**-United Kingdom; **U.S.**- United States

			FP in 2007 or later and employed at the MC at the time of study enrollment. **EC:** Not discussed. **Attrition:** Not discussed.					**Feasibility/ Application to Practice/ Generalization:** Recommended for practice because common themes reflect long-term benefits of an EBP FP. This study found completion of EBP FP led to long-term EBP-I by boosting confidence of NS and validating their competencies. Small sample size, so fellows' perspective may not apply to all NS that have completed a FP.
Jueng et al. (2017) Application of a q method study to understanding nurses' perspective of adopting	Inferred to be Joanna Briggs Institute Model	**Method:** Q method **Purpose:** Identify and describe the various types of RNs' perceptions that are crucially associated with	**N**=60 **Setting:** MC or RH in Taiwan **Sample Demographics:** Age 27 to 54 years old, with a mean ± SD of 37.63 ± 6.65	**IV:** Engagement in EBN **DV:** Perceptions associated with engagement in EBN	Face-to-face interviews to construct Q statements. E-platform for the participants to perform the Q sorting online.	Factor analysis on the rankings (Q sorts) of the Q statements PQMethod 2.35 program was used to analyze the Q sorts	**Factor 1:** Obstacles in evidence searching and reading ability. **Factor 2:** Favored organizational promotive strategies	**LOE:** VI **Strengths:** Large sample size and use of Q method for exploring diverse perspectives.

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evidence-based nursing **Country:** Taiwan **Funding:** National Yang-Ming University Hospital (Yilan, Taiwan). **Bias:** None recognized.		their engagement in EBN.	years. Average clinical experience with a mean ± SD of 14.78 ± 7.10 years. **IC:** RNs currently employed, minimum one-year clinical experience, and general awareness and understanding of the five steps of EBN. **EC:** Not discussed. **Attrition:** Not discussed.			By-person factor analysis	(rewards for EBP, EBN training, or offering flexible work hours). **Factor 3**: Offering available supportive resources (professional support or librarian consultation). **Factor 4:** Supported the value of EBN (promotes critical thinking and enhances quality of care). **Factor 5:** Uncertainty in evidence-searching ability.	**Weaknesses:** Purposeful sampling, low LOE, and attrition and EC not reported. **Feasibility/ Application to Practice/ Generalization:** Feasible because diverse perspectives are provided on what RNs need to engage in EBP. This study found EBN training alone may not be sufficient for some RNs, so EBP FP might help overcome the barriers to EBP engagement. Nonrandom sample size, so RNs perspective may not apply to RNs with different demographics.
Kueny et al. (2015)	Transforming Care at the Bedside	**Method:** Qualitative	**N=** 9	**IV:** EBP-I on an HPU and LPU	Transcribed audio-recorded interviews	Descriptive inductive content analysis	Supportive hospital culture by sending	**LOE:** VI

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Facilitating the implementation of evidence-based practice through contextual support and nursing leadership **Country:** U.S. **Funding:** Not reported. **Bias:** None recognized.	(TCAB) model and Magnet model	descriptive design **Purpose:** Identify contextual factors described by NMs to drive change and facilitate EBP at the unit level, comparing and contrasting these perspectives across nursing units.	**Setting:** Multihospital system **Sample Demographics:** Average experience was 6.5 years and at least one specialty nursing certification. **IC:** NMs from an HPU or LPU who were participating in a large effectiveness study were randomly selected to participate in this study. **EC:** Not discussed. **Attrition:** Not discussed.	**DV:** Driving factors to EBP-I on their units			nurses to EBP conferences, funding to conduct research, and attending EBP meetings. Leadership strategies implemented by NMs to empower staff nurses to implement EBP. Structure of leadership and decision making within an institution. Shared governance model was the preferred method. Accessibility to various resources (internal and external).	**Strengths:** NMs randomly selected and from various hospitals. **Weaknesses:** Small sample size, low LOE, and EC, attrition, and funding not reported. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because study depicts importance of leadership support in EBP-I. This study found that EBP-I is impacted by leadership support, so this would be an important aspect for an EBP FP to ensure RNs adopt EBP. Generalization limited due to small sample

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								size may not depict all NMs perspectives.
Henderson et al. (2015) Nursing culture: An enemy of evidence-based practice? A focus group exploration **Country:** U.K. **Funding:** Local hospitals' charity and Above & Beyond **Bias:** None recognized.	Inferred to be Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) model	**Method:** Narrative **Purpose:** Explore at a local level, barriers to EBP and how nurses believe these can be overcome.	**N=** 17 nurses **Setting:** Pediatric hospital **Sample Demographics:** All participants were acute pediatric nurses within the same hospital but working different pediatric units. Clinical experience ranged from zero to more than 10 years of clinical experience. **IC:** Employed nurse at this facility between January and February 2013. **EC:** Not discussed. **Attrition:** Not discussed.	**IV:** EBP-I **DV:** Perceived challenges to EBP-I	Semi-structured focus groups Transcribed audio-recorded interviews	Thematic analysis	**Theme 1:** Difficulty accessing resources, so they are not being used by nurses. Lack of seeking out independent evidence, interest, time, and support from management. Also, negative attitudes towards EBP. **Theme 2:** Nurses defined EBP as new, cutting-edge way to provide good quality care. Common example of EBP was hospital policies. **Theme 3:** Nurses stated furthering education was the means to	**LOE:** VI **Strengths:** Data analysis used shows barriers among RNs by displaying common themes in detail. **Weaknesses:** Small sample size, nonrandom sample, low LOE, and EC and attrition not discussed. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because barriers of EBP-I are addressed from RNs perspectives. This study found that RNs need support from leadership, adequate resources, and

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							using EBP in everyday practice and they did not view this as a personal priority. **Theme 4:** Nursing culture was explained as not questioning current practice because it is discouraged by management.	sense of empowerment for EBP-I. An EBP FP would help meet the educational needs and empowerment that RNs need to provide quality patient care. Generalization is limited due to small sample size and similar specialty among RNs in this study, so perspectives may not reflect all RNs with different demographics.

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Table A2

Evaluation Table of Quantitative Studies

Citation	Theory/Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/Results	Level/Quality of Evidence; Decision for practice/ application to practice/Generalization
Kim et al. (2016) Predictors of evidence-based practice implementation, job satisfaction, and group cohesion among regional fellowship program participants: Predictors of EBP implementation, job satisfaction, and group cohesion **Country:** U.S. **Funding:** Not reported.	Advancing Research and Clinical Practice through Close Collaboration (ARCC) model	**Design:** Pre-test Design **Purpose:** Examine the relationships among EBP-B, EBP-I, JS, GC, and GA among RNs' participating in a regional, collaborative EBP FP.	**N=** 175 (101 fellows and 74 mentors) **Setting:** Regional, collaborative EBP FP **Sample Demographics:** 52% with graduate degrees, mean age 42 years, and average clinical RN experience 15 years. **IC:** RNs attending the EBP FP from 2012 to 2014 were invited to	**IV:** EBP FP **DV1:** EBP-B **DV2:** EBP-I **DV3:** JS **DV4:** GC **DV5:** GA	EBP-B scale EBP-I scale JS scale GC and GA scale	Descriptive statistics Independent t-tests Bivariate Hierarchical multiple regression model	EBP-B scores: mentors 66.6 vs. fellows 59.3, significant $p < .001$ EBP-I scores: mentors 24.2 vs. fellows 11.0, significant $p < .001$ JS, GC, and GA scores not significant between mentors and fellows	**LOE:** III **Strengths:** Large sample size, instruments used, and data analysis. **Weaknesses:** Nonrandom sampling and attrition, EC, and funding not reported. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because depicted EBP-B and EBP-I of fellows are shown prior to FP completion.

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Bias: None recognized.			participate in the study. **EC:** Not discussed. **Attrition:** Not discussed.					This study found that prior to completing a FP fellows had low EBP-I and EBP-B, which is helpful to know to compare how an EBP FP can improve EBP-B and EBP-I after completing it. Study findings may not apply to all RNs due to some participants already had a high level of EBP-I prior to enrolling in FP.
Kim et al. (2017) Six-month follow-up of a regional evidence-based practice fellowship program **Country:** U.S. **Funding:** Not reported.	Advancing Research and Clinical Practice through Close Collaboration (ARCC) Model	**Design:** Pre-test/Post-test design **Purpose:** Examine the effects of a regional EBP FP among the participants 6 months after program completion and to determine the predictors of EBP adoption	**N=** 175 **Setting:** Regional EBP fellowship program **Sample demographics :** Mean age was 43 years, average 16 years of nursing experience, 62.1% were	**IV:** EBP FP **DV:** EBP adoption at the participants own hospital units	EBP-B scale EBP-I scale JS scale GC and GA scales	Paired t-tests Bivariate correlation Multivariate logistic regression model	Six months after FP completion, there were statistically significant improvements in EBP-B (MD, 6.6; P< 0.001), EBP-I (MD, 3.4; P = 0.013), and GC (MD, 1.2; P = 0.048), compared with the baseline. There were no statistically	**LOE:** III **Strengths:** Large sample size, instruments used, and data analysis. **Weaknesses:** Funding not reported, high attrition rate, and EC and funding not reported.

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Bias: None recognized.		in the participants hospital units.	fellows, 51.5% had graduate degrees, and 39.4% were clinical nurses. **IC:** Fellows that completed the EBP FP from 2012 to 2014 were recruited into the study. **EC:** Not discussed. **Attrition:** 62.3%				significant improvements in JS or GA.	**Feasibility/ Application to Practice/ Generalization:** Feasible to practice because results depict impact of EBP FP on nurses long-term. This study found that after completing FP, more than three-quarters reported that their own hospital units had adopted the EBP changes arising from their projects, which supports the use of EBP FP among RNs. All participants did not return their questionnaires, so findings may not represent the perspective of all RNs that have participated in FP.
Underhill et al. (2015)	Advancing Research and Clinical practice through close	**Method:** Pretest-Posttest survey design	**N=** 350 **n=** 112 (T1)	**IV1:** SPAWN	EBP-B scale EBP-I scale	Descriptive statistics	Level of RN education was positively correlated with	**LOE:** III **Strengths:** Large sample

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Evidence-based practice beliefs and implementation before and after an initiative to promote evidence-based nursing in an ambulatory oncology setting **Country:** U.S. **Funding:** Not reported. **Bias:** None recognized.	Collaboration (ARCC) Model	**Purpose:** Describe and compare nurse EBP-B and EBP-I before and after introducing strategies to inform RNs of EBP across the institute.	**n=** 113 (T2) **Setting:** DFCI **Sample Demographics:** Clinical experience more than 10 years, 59.8% (T1) and 58.4% (T2) were direct care RNs, and 52.8% (T1) and 38.9 (T2) had a bachelor's degree. **IC:** NS working at the DFCI in August 2011 or August 2013. **EC:** Not discussed. **Attrition:** 68%	**IV2:** EBP Posters **IV1:** Online EBP Modules **IV1:** Nursing Scholarship Day **DV1:** EBP-B **DV2:** EBP-I		Mann–Whitney U tests Spearman's correlations	EBP-B ($r = .25$; $p = .03$) and EBP-I ($r = .32$; $p = .01$), indicating the higher level of reported education was associated with higher scores. Time as a RN was not significantly correlated with EBP-B ($p = .38$) or EBP-I ($p = .16$). In 2011, 44.6% denied receiving formal EBP education, but in 2013 43.4% stated they did receive it. There were still low participation rates in SPAWN or EBP projects at DFCI in 2011 (22 RNs) and 2013 (15 RNs).	size and data analysis. **Weaknesses:** High attrition, only form of recruitment was via RNs work email, and EC and funding not reported. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because this study shows how level of education can impact EBP-B and EBP-I. Completion of an EBP FP could help bridge the gap between nurses with different levels of education by providing hands-on and in-depth EBP education, training, and project. Generalization is limited because

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								this was done at one facility and RNs were in the same specialty, so this may not fit the perspective of other RNs.
Warren et al. (2016) Three-year pre-post analysis of EBP integration in a magnet-designated community hospital: Sustaining EBP integration **Country:** U.S. **Funding:** Not reported. **Bias:** None recognized.	Donabedian model	**Method:** Retrospective descriptive study **Purpose:** Assess RNs' EBP-B, perceptions about OCRSIEP, and frequency of EBP-I following implementation of multifaceted interventions to achieve and maintain Magnet designation.	**N=** 2,103 **n=** 981 (2008) **n=** 1,122 (2012) **Setting:** Community teaching hospital and ambulatory care center **Sample Demographics:** Average age was 45.16 years and average years in current position was 7.39 years. **IC:** RNs who were employed at this facility during time of study and	**IV:** EBP interventions **DV1:** EBP-B **DV2:** EBP-I **DV3:** Perceptions of OCRSIEP	EBP-B scale EBP-I scale OCRSIEP scale	Linear mixed models analysis	EBP-B ($p = .036$) and OCRSIEP ($p = .039$) years as RN and RNs role was significant. EBP-I ($p < .001$) RNs role was significant, but years as a RN was not significant ($p= .212$). EBP-B scores: nurse leaders slightly declined, but clinical RNs increased from 2008 to 2012. OCRSIEP scores: both nurses' leaders and clinical RNs drastically increased from 2008 to 2012. EBP-I scores: nurse leaders declined, but	**LOE:** III **Strengths:** Large sample size and data analysis. **Weaknesses:** High attrition and EC and funding not reported. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because this shows how organizational EBP interventions can increase EBP-I among RNs. This study found significant organizational growth in EBP

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			whose primary role was to provide clinical care or nurses who worked in leadership. **EC:** Not discussed. **Attrition:** 72% (2008) 69% (2012)				clinical RNs increased from 2008 to 2012.	and research projects by RNs with a wide range of clinical experience. They have presented and published their projects as well. Number of RNs with EBP projects was low though. EBP FP could help increase the number of RNs adopting EBP. Generalization limited due to low response rate to surveys, so responses may not reflect perspectives of all RNs.
Friesen et al. (2017) Findings from a pilot study: Bringing evidence-based practice to the bedside **Country:** U.S.	Johns Hopkins Nursing Evidence-Based Practice Model and Advancing Research and Clinical practice through close Collaboration (ARCC) Model	**Method:** MM **Purpose:** Assess the EBP-B and EBP-I practices pre- and postimplementation of an EBP education with MP for nurses and EBP EP.	**N=** 232 (pre- and postintervention) **N=** 24 (focus groups) **Setting:** Multihospital system	**IV1:** EBP MP **IV2:** EBP EP **DV1:** EBP-B **DV2:** EBP-I	EBP-B scale EBP-I scale Focus groups (audiotaped and transcribed)	One-sample t test Qualitative content analysis	The change in EBP-I was significant ($t = 1.75$, $df = 56$, $p < .05$, one-tailed), whereas EBP-B was not ($p > .1$). **Theme 1:** Learning and applying EBP process in the clinical area	**LOE:** III **Strengths:** Large sample size and instruments and data analysis used. **Weaknesses:** EC not discussed, high attrition,

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Funding: Inova Seed Grant. **Bias:** None recognized.			**Sample Demographics:** Mean years practicing as RN 11.8 (pre-intervention), 12.95 (post-intervention), and 17.65 (focus group). Mean age 41.21 (pre), 42.63 (post), and 44.6 (focus group). Majority of participants pre/post intervention had a bachelor's degree. **IC:** RNs had to work on a medical-surgical or intermediate care unit. The facility that the RNs were employed at needed to have one EBP TL and one EBP RN recruited from each unit.				**Theme 2:** Simplifying the EBP process, so it can realistically be applied to practice **Theme 3:** Sense of achievement in completing EBP project. **Theme 4:** Ability to sustain innovation to keep the EBP project going forward. **Theme 5:** Getting nurses involved was a huge barrier.	and nonrandom sample. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because the EBP MP and EP increased EBP-I, which led to increased funding and participation at five facilities to continue the program. This study found that EBP programs are beneficial for RNs to fully immerse themselves into the EBP process and increase EBP-I. Also, showed that time should be allocated to these RNs to learn and apply their knowledge gained into practice because it improves the organization as a

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			EC: Not discussed. **Attrition:** 51% (pre-intervention) 63% (post-intervention)					whole. Response rate post-intervention may impact the generalization because perspectives of all nurses were not shown.
Saunders et al. (2016) Nurses' readiness for evidence-based practice at Finnish university hospitals: A national survey **Country:** Finland **Funding:** Finnish Nurses' Education Foundation, Finnish Nurses' Association, Saastamoinen Foundation, and Finnish Work Environment Fund	Stevens Star Model of Knowledge Transformation	**Method:** Descriptive CSS design **Purpose:** Determine nurses' confidence in employing EBP, actual EBP knowledge level, and readiness for EBP at Finnish university hospitals.	**N=** 943 **Setting:** Multisystem hospital **Sample Demographics:** Average age was 44 years, clinical experience 18 years, and years in current position 14 years. 47% of RNs had a bachelor's degree. 74% were clinical nurses. **IC:** Employed (FT or PT) RN at university hospital, any nursing role, aged 21 or	**IV:** EBP-I **DV1:** Self-efficacy employing EBP **DV2:** EBP knowledge **DV2:** EBP readiness	Stevens' ERI Approval to translate ERI into Finnish, which changes the score range from 20-120 (S-ERI) to 1-6 (F-ERI). EBP knowledge test	Descriptive statistics One-way ANOVA and t-tests Bonferroni's correction	Average score of self-efficacy in employing EBP was 3.7 (F-ERI). Average score for EBP knowledge test was 7.5 out of 15. 62% of RNs rated their EBP knowledge at a beginning level. 47% of RNs indicated they had no experience with EBP. Only 2% of RNs rated themselves at an advanced level in terms of EBP experience. RNs' average total self-efficacy in	**LOE:** III **Strengths:** Large sample size and data analysis and instruments used. **Weaknesses:** High attrition and nonrandom sample. **Feasibility/ Application to Practice/ Generalization:** Recommended for practice because most RNs know what EBP is, but they lack the resources and knowledge for EBP-I. Also, this shows the level of self-efficacy

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Bias: None recognized.			older, and fluently read and understand Finnish. **EC:** RNs on annual vacation or various types of leaves at time of survey. **Attrition:** 50%				employing EBP, significant p< 0.001. RNs' who rated their own EBP knowledge at a beginning level, were significantly more confident in employing EBP than those who indicated having no knowledge of EBP (MD=18.6, p < 0.001).	in employing EBP is correlated with the level of actual EBP knowledge. This is supporting the use of an EBP FP because it would provide the knowledge the RNs are lacking in EBP. Fifty percent response rate may impact the generalization because perspectives of all RNs were not shown.

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Table A3

Synthesis Table

Author	Christenbery et al.	Friesen et al.	Henderson et al.	Jueng et al.	Kim et al.	Kim et al.	Kueny et al.	Saunders et al.	Underhill et al.	Warren et al.
Year	2016	2017	2015	2017	2016	2017	2015	2016	2015	2016
Design/Method	Narrative	MM	Narrative	Q Method	Pre-test	Pre-test/Post-Test	Descriptive	CSS	Pre-test/Post-Test	Retrospective descriptive study
LOE	VI	III	VI	VI	III	III	VI	III	III	III
Setting	U.S. MC	U.S. Multihospital System	U.K. MC	Taiwan MC	U.S. MC	U.S. MC	U.S. Multihospital System	Finland Multihospital System	U.S. MC	U.S. MC
Sample Size	15	232 (Pre- and Post-I) 24 (FGs)	17	60	175 (101 fellows and 74 mentors)	175	9	943	350 (T1=112 and T2=113)	2,103 (981 in 2008 and 1,122 in 2012)
Demographics										
Age (mean)		41.21 (Pre-I) 42.63 (Post-I) 44.6 (FG)		37.63	42	43		44		45.16
Years of Clinical Experience (mean)		11.8 (Pre-I) 12.95 (Post-I) 17.65 (FG)		14.78	15	16	6.5	18	>10	
Education Level (%)		Bachelor's degree 67.5 (Pre-I) and 66.7 (Post-I)			Graduate degree 52	Graduate degree 51.5		Bachelor's degree 47	Bachelor's degree 52.8 (T1) and 38.9 (T2)	
Job Title (%)					CN 41.7	CNS/NE/NP 40.9	NM 100	CN 74	DCN 59.8 (T1) and 58.4 (T2)	CN 68.2
Measurement Tools	FGs	EBP-B scale, EBP-I	Semi-structured FGs	E-platform using	EBP-B, EBP-I, JS, GC,	EBP-B, EBP-I, JS,	Transcribed audio-	S-ERI, F-ERI, and EBP	EBP-B and EBP-I scale	EBP-B, EBP-I, and

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		scale, and FGs		Q sorting online	and GA scales	GC, and GA scales	recorded interviews	knowledge test		OCRSIEP scale
IV-Intervention										
Duration of Intervention	12 months	2 months				9 months			24 months	48 months
EBP FP	X				X	X				
EBP MP		X								X
EBP EP		X								
EBP-I			X	X			X	X		
EBP Posters									X	
Online EBP Modules									X	X
Nursing Scholarship Day									X	
SPAWN									X	
DV-Outcome/Findings										
Ability to Access Resources	X						X			
Knowledge Gained	X	X								
Professional Growth	X	X								
Empowerment to Change Practice	X	X					X			
Identify the Value in EBP			X	X						
Lack of Rewards			X	X						
Lack of Time				X					X	
Lack of enrollment in EBP programs				X					X	

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Difficulty Finding Literature			X	X					X	
Supportive Hospital Culture	X						X			
EBP-B scores		≠			Mentors > Fellows *	↑*			RNs formal EBP education > RNs no education * NLs > DCNs *	NLs > CNs *
EBP-I scores		↑*			Mentors > Fellows *	↑*			RNs formal EBP education > RNs no education * NLs > DCNs *	NLs> CNs *
JS scores					≠	≠				
GA scores					≠	≠				
GC scores					≠	↑*				
OCRSIEP scores										NLs > CNs *
F-ERI scores (%)								61.7		
EBP Knowledge Test scores (%)								50		

Key: **CSS**-cross sectional survey; **DFCI**-Dana-Farber Cancer Institute; **DV**-dependent variable; **EBP-B**-EBP belief; **EBP-I**-EBP implementation; **EBN**-evidence-based nursing; **EBP**-evidence-based practice; **EC**-exclusion criteria; **EP**-exemplar pilot; **ERI**- Evidence-Based Practice Readiness Inventory; **FP**-fellowship program; **FT**-full-time; **GA**-group attractiveness; **GC**-group cohesion; **HPU**-high-performing unit; **IC**-inclusion criteria; **IV**-independent variable; **JS**-job satisfaction; **LOE**-level of evidence; **LPU**-low-performing unit; **MC**-medical center; **MD**-mean difference; **MM**-mixed methods; **MP**-mentoring program; **n**-number of participants (if SR) or number of participants in subset; **N**-number of studies (if SR) or participants in study; **NM**-nurse managers; **NS**-nursing staff; **OCRSIEP**-Organizational Cultural and Readiness for System-Wide Integration of EBP; **PT**-part-time; **RH**-regional hospital; **RN**-registered nurse; **SD**-standard deviation; **SPAWN**-Science and Practice Aligned with Nursing; **T1**-time 1 in 2011; **T2**-time 2 in 2013; **TL**-team lead; **U.K.**-United Kingdom; **U.S.**- United States

No EBP training (%)								47	44.6 (T1) and 43.4 (T2)	

Key: **CSS**-cross sectional survey; **DFCI**-Dana-Farber Cancer Institute; **DV**-dependent variable; **EBP-B**-EBP belief; **EBP-I**-EBP implementation; **EBN**-evidence-based nursing; **EBP**-evidence-based practice; **EC**-exclusion criteria; **EP**-exemplar pilot; **ERI**- Evidence-Based Practice Readiness Inventory; **FP**-fellowship program; **FT**-full-time; **GA**-group attractiveness; **GC**-group cohesion; **HPU**-high-performing unit; **IC**-inclusion criteria; **IV**-independent variable; **JS**-job satisfaction; **LOE**-level of evidence; **LPU**-low-performing unit; **MC**-medical center; **MD**-mean difference; **MM**-mixed methods; **MP**-mentoring program; **n**-number of participants (if SR) or number of participants in subset; **N**-number of studies (if SR) or participants in study; **NM**-nurse managers; **NS**-nursing staff; **OCRSIEP**-Organizational Cultural and Readiness for System-Wide Integration of EBP; **PT**-part-time; **RH**-regional hospital; **RN**-registered nurse; **SD**-standard deviation; **SPAWN**-Science and Practice Aligned with Nursing; **T1**-time 1 in 2011; **T2**-time 2 in 2013; **TL**-team lead; **U.K.**-United Kingdom; **U.S.**- United States

Appendix B

IRB Approval

Figure 1

Institutional Review Boards

ASU Knowledge Enterprise Development

APPROVAL: MODIFICATION

Debra Hagler
EDSON: Academic Innovation
602/496-0802
DEBRA.HAGLER@asu.edu

Dear Debra Hagler:

On 7/15/2020 the ASU IRB reviewed the following protocol:

Type of Review:	Modification / Update
Title:	EBP Competencies for Nurses
Investigator:	Debra Hagler
IRB ID:	STUDY00012134
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Consent EBP Competencies for Nurses (1).pdf, Category: Consent Form; • Survey and Consent EBP Competencies for Nurses (1).pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB approved the modification.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Appendix C

Survey

Figure 2

Survey

National nursing standards have been developed for Evidence-Based Practice (EBP) competencies. In order to plan programs supporting EBP at Mayo Clinic Arizona, we are asking you to identify the relative importance of each competency for each skill level listed. The competencies are listed according to the steps in the Mayo Clinic EBP Nursing Model. Definition of Basic EBP Knowledge, Advanced EBP knowledge, and EBP project Mentors:

- Basic EBP Knowledge means that a nurse had completed the Mayo EBP introduction course.
- Advanced EBP knowledge means that a nurse had completed the Mayo EBP introduction and advanced course.
- An EBP Project Mentor is a nurse with EBP project experience and/or who has completed the introduction, advanced, and mentorship course.

Survey Question: To what extent do you believe the EBP competency is important for a nurse practicing at each skill level?

Rate the importance of each competency on a scale of 1-5.

1

Not at all

2

Slightly Important

3

Neutral

4

Important

5

Extremely Important

The ability to question clinical practice for the purpose of improving the quality of care.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Describes clinical problems using internal evidence (evidence that is generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data).	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○

Confidential

Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Convert clinical questions into structured answerable clinical questions using PICO.

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Identify the elements of PICO, and use variations of it when appropriate to structure answerable clinical questions.

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to construct and carry out an appropriate strategy to search for external evidence generated from research to answer focused clinical questions

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to conduct an exhaustive search for external evidence to answer clinical questions.

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Capability to indicate the difference between hierarchy of evidence, level of processing of evidence, and types of evidence-based resources.

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

The knowledge to outline the different major categories of sources of research information, including biomedical research databases or databases of filtered/pre-appraised evidence or resources.

	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Confidential

Ability to identify key competencies relevant to the critical evaluation of the integrity, reliability, and applicability of health-related research.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Participates in the critical appraisal of pre-appraised evidence and published research studies to determine their strength and applicability to clinical practice.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Ability to critically appraise and interpret systematic reviews, treatment studies, and diagnostic accuracy study.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Ability to identify the major categories of bias and random error and the impact of these biases on the results.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Recognize the importance of considering conflict of interest and funding sources.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Ability to interpret the commonly used measures of uncertainty and interpret the different types of measures of association and effect, including key graphics presentations.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Confidential

Capability to identify the difference between statistical significance and importance and between lack of evidence of an effect and evidence of no effect.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to recognize the difference between systematic reviews, meta-analyses, and nonsystematic reviews.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to distinguish between evidence-based and opinion based clinical practice guidelines.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Recognize how qualitative and quantitative can inform the decision making process.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to evaluate and synthesize the body of evidence gathered to determine its strength and applicability to clinical practice.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to collect and present data systematically as internal evidence for clinical decision making in the care of individuals, groups, and populations.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Confidential

Ability to integrate evidence gathered from external and internal sources in order to plan EBP changes.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Implement practice changes based on evidence and clinical expertise and practice preference to improve care processes and patient outcomes.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Ability to outline different strategies to manage uncertainty in clinical decision making in practice.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Understand and practice shared decision making.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Recognize potential individual-level barriers to knowledge translation and strategies to overcome these barriers.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Evaluates outcomes of evidence-based decisions and practice changes for individuals, groups, and populations to determine best practice.	1	2	3	4	5
Basic EBP knowledge	○	○	○	○	○
Advanced EBP knowledge	○	○	○	○	○
EBP Project Mentor	○	○	○	○	○

Confidential

Ability to measure processes and outcomes of evidence-based clinical decisions.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Interpret the results including measures of effect and uncertainty.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Ensure the delivery of care on the unit(s) and organization aligns with the practice recommendations.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Communicates best evidence to individuals, groups, colleagues, and policy makers.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Leads transdisciplinary teams in applying synthesized evidence to initiate clinical decisions and practice changes to improve the health of individuals, groups, and populations.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Participates in the generation of external evidence with other healthcare professionals and implements strategies to sustain an EBP culture.	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Confidential

Formulates evidence-based policies and procedures.

	1	2	3	4	5
Basic EBP knowledge	◯	◯	◯	◯	◯
Advanced EBP knowledge	◯	◯	◯	◯	◯
EBP Project Mentor	◯	◯	◯	◯	◯

Is there any additional information you wish to provide about the competencies listed above? Please write your feedback below.

If an EBP fellowship program was available, what is a feasible time frame to complete EBP coursework and EBP project completion? Please highlight the time frame.

- ◯ 6 months
- ◯ 7 months
- ◯ 8 months
- ◯ 9 months
- ◯ 10 months
- ◯ 11 months
- ◯ 12 months

Role or title at Mayo Clinic

- ◯ Clinical Nurse
- ◯ Nursing Education Specialist
- ◯ APRN (CNS, NP, CRNA)
- ◯ Nurse Supervisor, Manager, Administrator
- ◯ Other

If other is selected, please describe.

What is your highest education level in nursing?

- ◯ Associate degree
- ◯ Bachelors
- ◯ Masters
- ◯ PhD
- ◯ DNP

How many years have you practiced as a registered nurse?

- ◯ 1-3
- ◯ 4-6
- ◯ 7-9
- ◯ 10 or more

How many EBP in healthcare courses have you participated in?

- ◯ None
- ◯ 1-2
- ◯ 3-4
- ◯ 5-6
- ◯ 7 or more

How many EBP clinical projects have you participated in?

- ◯ None
- ◯ 1-2
- ◯ 3-4
- ◯ 5-6
- ◯ 7 or more

Appendix C

Budget Plan

Figure 3

Evidence-Based Nurse Fellowship Program: Budget Plan

Direct Costs	Total
Manager of Education and Professional Development (0.25 FTE dedicated for the creation of the EBP curriculum and the development of the EBP fellowship program)	$540
Evidence-based Practice (EBP) Coordinator (0.3 FTE dedicated for the creation of the EBP curriculum and the development of the EBP fellowship program)	$420
Nurse Full-time Equivalent (FTE) support to complete EBP courses (Commitment of 2 hours per week for a total of 10 hours dedicated to completing EBP courses. $44 X 10)	$440
Nurse Full-time Equivalent (FTE) support to complete EBP project (Commitment of 50 hours maximum in a 6-month time span. Total of 8 nurses selected that is 4 mentors and 4 fellows. $44 X 50)	$17,600
Librarian to assist with research for EBP project (median salary of $64,961 and hourly pay of $31.23 X 40 hrs.)	$1,249
Statistician statistical support for data analysis of EBP project (median salary $55,921 and hourly pay of $26.88 X 40 hrs.)	$1,075
Indirect Cost	
Office supplies (paper, pens, pencils, staples, posters)	These are existing resources at site, so currently there is no cost to be reported. Site has agreed to supply these resources.
Office equipment (printers, fax machines, copier)	
Utilizing laptops/computers at project site (8)	
Meeting space (1 room)	
Zoom software	
Mayo Clinic database	
Research Electronic Data Capture is the statistical software the organization uses	
Blackboard will be the platform used for the online EBP courses	

Funding	
Mayo Clinic Small Grant Program-**Pending because it needs to go to the organization's nursing leadership for approval**	5,000 per awardee
Potential Cost Savings	
Decrease patient length of stay	Depends on EBP project topic, which could lead to generation of cost savings for the organization. An example of how EBP impacts patient and system outcomes is the collection of national data from the Agency for Healthcare Research and Quality (AHRQ) (2018). National scorecard on rates of hospital-acquired conditions (HACs) shows that from 2014 to 2017 HACs fell by 13 percent, saving approximately 20,500 lives and $7.7 billion in healthcare costs (AHRQ, 2018).
Decrease in hospital acquired conditions	
Increase Medicare reimbursement	
Decrease in readmissions	
Decrease turnover rate for nurses	

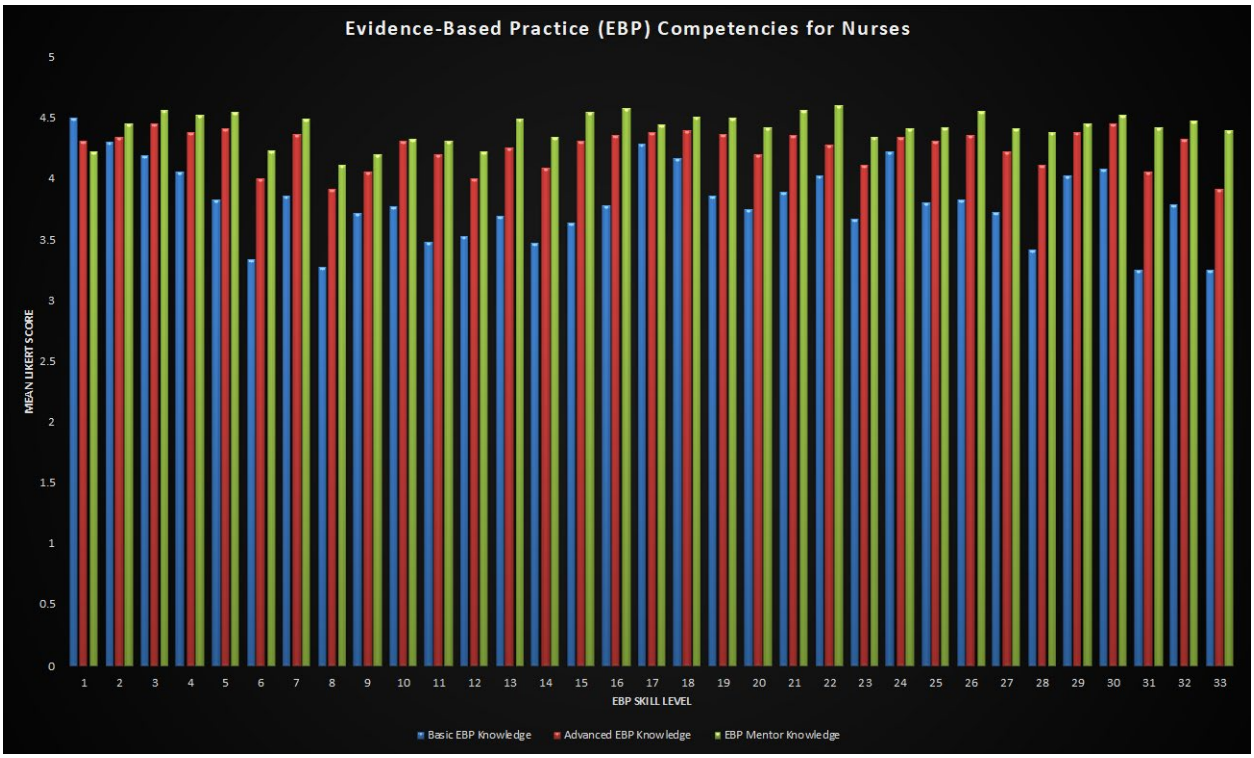
Appendix C

Survey Results

Figure 4

Evidence-Based Practice Competencies for Nurses

Number	Evidence-Based Practice (EBP) Competencies	Basic EBP Knowledge	Advanced EBP Knowledge	EBP Mentor Knowledge
1	The ability to question clinical practice for the purpose of improving the quality of care.	4.5	4.314285714	4.228571429
2	Describes clinical problems using internal evidence (evidence that is generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data).	4.305555556	4.342857143	4.457142857
3	Convert clinical questions into structured answerable clinical questions using PICO.	4.194444444	4.457142857	4.571428571
4	Identify the elements of PICO, and use variations of it when appropriate to structure answerable clinical questions.	4.057142857	4.382352941	4.529411765
5	Ability to construct and carry out an appropriate strategy to search for external evidence generated from research to answer focused clinical questions.	3.828571429	4.411764706	4.545454545
6	Ability to conduct an exhaustive search for external evidence to answer clinical questions.	3.342857143	4	4.235294118
7	Capability to indicate the difference between hierarchy of evidence, level of processing of evidence, and types of evidence-based resources.	3.861111111	4.371428571	4.485714286
8	The knowledge to outline the different major categories of sources of research information, including biomedical research databases or databases of filtered/pre-appraised evidence or resources.	3.277777778	3.914285714	4.114285714
9	Ability to identify key competencies relevant to the critical evaluation of the integrity, reliability, and applicability of health-related research.	3.714285714	4.058823529	4.205882353
10	Participates in the critical appraisal of pre-appraised evidence and published research studies to determine their strength and applicability to clinical practice.	3.771428571	4.314285714	4.323529412
11	Ability to critically appraise and interpret systematic reviews, treatment studies, and diagnostic accuracy study.	3.485714286	4.2	4.314285714
12	Ability to identify the major categories of bias and random error and the impact of these biases on the results.	3.527777778	4	4.228571429
13	Recognize the importance of considering conflict of interest and funding sources.	3.694444444	4.257142857	4.485714286
14	Ability to interpret the commonly used measures of uncertainty and interpret the different types of measures of association and effect, including key graphics presentations.	3.472222222	4.088235294	4.342857143
15	Capability to identify the difference between statistical significance and importance and between lack of evidence of an effect and evidence of no effect.	3.638888889	4.314285714	4.542857143
16	Ability to recognize the difference between systematic reviews, meta-analyses, and nonsystematic reviews.	3.777777778	4.352941176	4.575757576
17	Ability to distinguish between evidence-based and opinion based clinical practice guidelines.	4.294117647	4.375	4.441176471
18	Recognize how qualitative and quantitative can inform the decision making process.	4.166666667	4.4	4.514285714
19	Ability to evaluate and synthesize the body of evidence gathered to determine its strength and applicability to clinical practice.	3.861111111	4.371428571	4.5
20	Ability to collect and present data systematically as internal evidence for clinical decision making in the care of individuals, groups, and populations.	3.75	4.205882353	4.428571429
21	Ability to integrate evidence gathered from external and internal sources in order to plan EBP changes.	3.888888889	4.352941176	4.571428571
22	Implement practice changes based on evidence and clinical expertise and practice preference to improve care processes and patient outcomes.	4.027777778	4.285714286	4.6
23	Ability to outline different strategies to manage uncertainty in clinical decision making in practice.	3.666666667	4.117647059	4.342857143
24	Understand and practice shared decision making.	4.222222222	4.342857143	4.411764706
25	Recognize potential individual-level barriers to knowledge translation and strategies to overcome these barriers.	3.8	4.314285714	4.428571429
26	Evaluates outcomes of evidence-based decisions and practice changes for individuals, groups, and populations to determine best practice.	3.828571429	4.352941176	4.5625
27	Ability to measure processes and outcomes of evidence-based clinical decisions.	3.722222222	4.228571429	4.411764706
28	Interpret the results including measures of effect and uncertainty.	3.416666667	4.114285714	4.382352941
29	Ensure the delivery of care on the unit(s) and organization aligns with the practice recommendations.	4.027777778	4.382352941	4.457142857
30	Communicates best evidence to individuals, groups, colleagues, and policy makers.	4.083333333	4.457142857	4.529411765
31	Leads transdisciplinary teams in applying synthesized evidence to initiate clinical decisions and practice changes to improve the health of individuals, groups, and populations.	3.25	4.057142857	4.428571429
32	Participates in the generation of external evidence with other healthcare professionals and implements strategies to sustain an EBP culture.	3.794117647	4.323529412	4.484848485
33	Formulates evidence-based policies and procedures.	3.25	3.911764706	4.40625



Appendix C

Project Timeline

Figure 5

Project Timeline

August 2019-December 2019

- Completed fieldwork for DNP project
    - Collection of external and internal evidence
- Monthly in-person meetings with nurse leaders at Mayo Clinic
    - Brainstormed ways to keep nurses engaged in EBP
    - Reviewed EBP resources Mayo Clinic offers nurses

January 2020-April 2020

- Developed PICO, background & significance of problem, search strategy, critical appraisal & Synthesis of Evidence, exhaustive search with evaluation table of 10 studies, synthesis table, potential outcomes, application to practice, implementation framework related to EBP fellowship program for nurses
- Developed DNP project report and presentation
- Continued in-person meeting with nurse leaders until February 2020
- Presented the evaluation and synthesis table to Mayo Clinic nurse leaders via Zoom

May 2020-July 2020

- Assigned a DNP project mentor and started weekly Zoom meetings.
- Ongoing revisions of the DNP project report with guidance from project mentor.
- Developed a logic model, budget plan, theoretical framework, and discussed outcome measurement
- Created three concept maps focusing on micro, meso, and macro levels of Mayo Clinic and how that tied into the overall DNP project
- Bimonthly Zoom meetings with Mayo Clinic nurse leaders and project mentor
    - Created an outline for the fellowship program based on current evidence
    - Discussed incorporation of all EBP resources at Mayo Clinic into the EBP fellowship program
    - Developed and presented five major recommendations for the EBP fellowship program with supporting evidence to Mayo Clinic
    - **June 2020** Project objective changed due to COVID-19 pandemic
    - New project focus on revising EBP courses and EBP competencies
    - Presented a chart with comparisons of EBP competencies for various EBP knowledge levels (beginner, advance, and mentor) based on current evidence

- **July 2020** Completed the survey, consent, and recruitment email that would be sent to all nurse leaders at Mayo Clinic
- **July 2020** IRB Protocol submitted and IRB approval received

August 2020-December 2020

- Ongoing revisions of DNP project under guidance of project mentor
- Bi-weekly meetings with project mentor via Zoom
  - EBP Foundations Course Map provided by Mayo Clinic for review and to provide our feedback
  - Mayo Clinic nurse leaders requested by January 2021 DNP students provide recommended revisions to the EBP mentor program and EBP knowledge tools that could be used for the EBP fellowship program
- **August 2020** Survey entered into REDCap by Mayo project champion and dispersed to all nursing leaders at Mayo Clinic
- **September 2020** Mayo Clinic project champion provided survey results
- **October 2020** Presented literature review and evidence synthesis on EBP fellowship program for nurses to the Nursing New Knowledge and Innovation Subcommittee at Mayo Clinic
- **October 2020** Began data analysis using Intellectus
- **November 2020** Data analysis and recommendations based on data analysis presented to Mayo Clinic nurse leaders
- **November 2020** Finalized data analysis and EBP competencies based on survey results

January 2021-February 2021

- **January 2021** last meeting with Mayo Clinic nurse leaders
  - Presented list of recommendations for the EBP mentor program based on current evidence
  - Presented table of EBP knowledge tools that can be used for the EBP fellowship program once it can be implemented

February 2021 Final revisions of DNP project report