Translating Evidence-Based Research into Practice

ROBIN M. SOMMERS, DNP, ANP-BC, AOCNP®

From the University of Massachusetts Graduate School of Nursing, Worcester, Massachusetts.

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Correspondence to: Robin Sommers, Dana-Farber Cancer Institute, 44 Binney St, Boston, MA, 02155. E-mail: rsommers@partners.org

Abstract

The demand for a transformation of the health-care system has led to an emphasis on evidence-based practice (EBP) to ensure safe, quality care. The gap between research and translation into practice has resulted in the call for changes in organizational cultures to promote the delivery of quality patient care and to ultimately improve patient outcomes. Knowledge of EBP and skills, theoretical models, and barriers to implementation is necessary to incorporate changes in clinical practice. New practice models such as interprofessional collaborative partnerships may foster environments that are supportive of problem-solving, innovation, and best practices. An overview of EBP, a discussion of challenges to its implementation, and a summary of the Doctorate of Nursing Practice student's experience in the implementation of an evidence-based project are described.

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Complex medical care systems, rising patient acuity, and the explosion of technical innovations have led to an ever-increasing demand for the delivery of safe, quality health care by the U.S. government and consumers. Integrating evidence into clinical decision-making can contribute to better quality of care and enhanced patient safety. As early as 1988, a meta-analysis of nurse-led experimental research by Heater, Becker, and Olson (1988) reported that patients who received care based on evidence experienced 28% better outcomes. Recent studies have also identified significant improvements in outcomes when patients received evidence-based care (Hann, Avila, Metteer, Nicholas, & Kaminsky, 2008; Kavanagh, Connolly, & Cohen, 2006; Moyer, 2009). The gap between new knowledge and translation of research into clinical practice has led health care and professional organizations to develop a culture that promotes an evidence-based approach to the delivery of care and ultimately to improved patient outcomes.

Evidence-based practice (EBP) is defined as a systematic approach to the delivery of clinical care that incorporates best available evidence from research with clinical expertise as well as patient preferences and values (Melnyk & Fineout-Overholt, 2005). The

Table 1. Evidence-based practice models for individuals and organizations: Major components or phases

Stetler Model[a] (Stetler, 2001)	Funk et al. Model[a] (Funk, Tornquist, & Champagne, 1989)	DiCenso et al. Model[b] (DiCenso, Ciliska, & Guyatt, 2004)
Preparation	Quality of research	Clinical state and circumstances
Validation	Characteristics of communication	Patient preferences and actions
Comparative/evaluation	Facilitation of utilization	Health-care resources
Translation/application		Research evidence
Evaluation		Clinical expertise

Note. [a]Organizational and individual. [b]Individual.

term has been written about extensively over the past decade, given driving forces that have called for a radical transformation of the health-care system. The broader concept underlying EBP is that the delivery of patient care should be based on research findings and not on traditional approaches. That said, there is considerable variability in what is considered evidence and how it is translated into practice (Youngblut & Booten, 2001).

The EBP movement began in 1972 with the work of Dr. Archibald Cochrane, who identified a gap in the medical professions' effectiveness in providing the public with scientific evidence to make decisions about health care (Fineout-Overholt, Melnyk, & Schultz, 2005). The influence of his work led to the establishment of the Cochrane Center in 1992, and later the Cochrane Collaboration, with the mission of providing clinicians with updated systematic reviews of the effectiveness of interventions (Cochrane Collaboration, 2010).

Since it may take an average of 20 years to translate research into clinical practice (Agency for Healthcare Research & Quality [AHRQ], 2010), major initiatives are under way by governing agencies, health-care organizations, and educational programs to improve this transition. In a landmark report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, the Institute of Medicine (IOM, 2001) identified major defects in the health-care system, including a gap in translation of evidence to improve clinical practice. Inadequacies in the health-care system as well as problems with quality called attention to the need to develop strategies to improve care. Government and consumer demands for health-care providers to assume accountability in patient safety and quality improvement led to the development of EBP (Stevens & Stanley, 2006).

This article will provide an overview of EBP models, the usefulness of systematic reviews in EBP implementation, necessary organizational infrastructures, interprofessional collaboration, and challenges in translating research in practice. Personal challenges and strategies to facilitate the implementation of an evidence-based project are described.

EBP Models

Several models have been developed over the past decade to advance EBP (Fineout-Overholt, Melnyk, & Schultz, 2005). Theoretical models organize specific strategies being tested and provide a systematic approach to implementing EBP. Although these models may have used individual or organizational approaches, common threads included the selection of a practice issue or problem, systematic review and critique of the literature, implementation, and evaluation of the impact of practice change on outcomes (Gawlinski & Rutledge, 2008). Although some EBP models may be implemented through individual or organizational processes (Table 1), a number of approaches have been developed that consider the impact of organizational infrastructures on successful EBP implementation (Table 2). As a result, the selection of a theoretical model will depend on the practice setting and the needs of the organization.

SYSTEMATIC REVIEW OF THE LITERATURE

A formulated clinical question should be developed using the PICOT format (population, intervention, comparison, outcome, and time frame) prior to searching the literature for evidence (Stillwell, Fineout-Overholt, Melnyk, & Williamson, 2010; Boss, 2009). Once the clini-

Table 2. Selected evidence-based practice models involving organizational infrastructures

Iowa Model (Titler, Cullen, & Ardery, 2002)	Rosswurm & Larrabee's Model (Rosswurm & Larrabee, 1999)	ACE Star Model of Knowledge Transformation (Stevens, 2004)	ARCC Model (Fineout-Overholt, Levin, & Melnyk, 2004)
Problem-focused triggers	Assess need for practice change	Discovery: knowledge-generating stage	Promote use of EBP among advanced practice and staff nurses
Knowledge-focused triggers	Link problem interventions and outcomes	Evidence summary: synthesis of the literature	Organizational assessment of readiness and culture
Team formation	Synthesize best evidence	Translation into practice	Identification of strengths and major barriers to EBP implementation
Literature review	Design change	Integration	Use of EBP mentors and champions
Synthesis and critique of literature	Implement and evaluate	Evaluation	Implementation of ARCC strategies: EBP skill-building workshops, EBP rounds, journal clubs, Web pages
Analysis	Integrate and maintain		EBP implementation
Pilot change			Improvement in patient outcomes
Evaluate appropriateness			
Implement change			
Disseminate findings			

Note. ACE = Academic Center for Evidence-based Practice; ARCC = Advancing Research and Clinical Practice through Close Collaboration; EBP = evidence-based practice.

cal question has been identified, a systematic review of the literature should be conducted to search for the best available evidence (Melnyk & Fineout-Overholt, 2005). EBP, using the best research findings as well as clinical and patient experiences, should guide the delivery of care (Rycroft-Malone et al., 2002; Melnyk & Fineout-Overholt, 2005). The strongest level of evidence should be sought and based on systematic review of randomized clinical trials (RCTs), meta-analyses of RCTs, and/or clinical guidelines (McInnes et al., 2001; Melnyk & Fineout-Overholt, 2005). If these resources do not yield specific information for evidence being investigated, other databases such as MEDLINE, CINAHL, and PUBMED should be searched. The methodology of the literature search should be replicable.

Knowledge of systematic review methodology including search strategies, hierarchy of evidence (Figure 1), and critical appraisal and synthesis of the literature is essential to ensure the integration of best evidence into practice. Furthermore, the implementation of evidence should take into consideration patient preferences as well as health-care resources (Melnyk & Fineout-Overholt, 2005; McInnes et al., 2001).

Critical appraisal of the literature is required prior to making recommendations for practice. Ranking the level and quality of the literature will guide the process of filtering out research that is not applicable to clinicians' practices (Stevens, 2005). Knowledge, interpretation, and understanding of evidence-based statistics will be key when appraising the literature (Welk, 2007). Examination of each study's validity, relevance, and applicability will assist the clinician in determining the sources of evidence that will support practice (O'Rourke & Booth, 2010). Examples of instruments available to assess the methodologic quality of systematic reviews and clinical guidelines include the Assessment of Multiple Systematic Reviews (AMSTAR) tool (Shea, 2007) and the Appraisal of Guidelines Research and Evaluation (AGREE) tool (AGREE Collaboration, 2001). A rapid critical appraisal checklist for RCTs was developed by Melnyk & Fineout-Overholt (2005) to facilitate the process of determining whether the findings from an RCT are valid and applicable to clinical practice settings.

Considerable time and resources are needed to complete systematic reviews. In a study by Rutledge, DePalma, and Cunningham (2004), using a Triad Model of Research Synthesis, advanced practice clinicians, educators, and researchers conducted three systematic reviews of the literature on a variety of topics (Figure 2). They demonstrated that this type of triad partnership can effectively conduct systematic reviews on a number of topics. Strategies are needed to assess available resources and learning needs of the staff

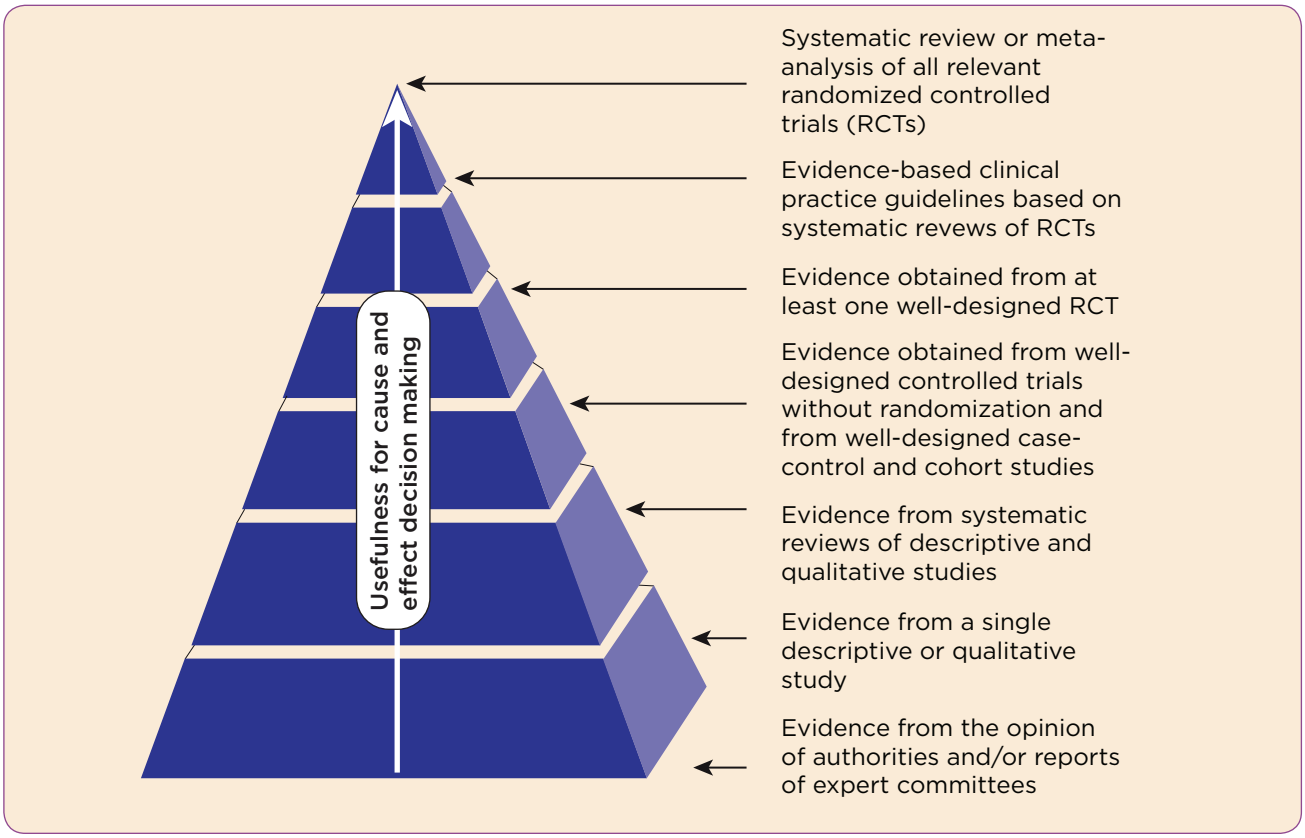

Figure 1. Levels of evidence for answering clinical questions about the effectiveness of interventions. Reprinted from Fineout-Overholt, E., Melnyk, B. M., & Schultz, A. (2005). Transforming health care from the inside out: Advancing evidence-based practice in the 21st century. *Journal of Professional Nursing, 21*, 335–344, with permission from Elsevier.

to support evidence-based systematic reviews of the literature.

ORGANIZATIONAL INFRASTRUCTURES

Health-care leaders in many diverse settings are stepping up to the challenge of developing and sustaining EBP programs. Incorporation of EBP requires leadership and systems support to foster a culture of inquiry and learning (Pravikoff, 2006). Leaders have an influential role in shaping the environment by creating a culture where individuals and groups feel supported (Rycroft-Malone et al., 2002).

Organizational culture drives how the leadership improves effectiveness or influences the behaviors of its clinicians (Scott-Findlay & Golden-Biddle, 2005). To successfully promote and implement EBP, several organizational infrastructures must be considered. Strong visible leaders who encourage staff in educational activities, availability of necessary educational resources/tools to enhance use of evidence, and organizational structures that support desired behaviors are needed to integrate EBP into the culture of an organization (Stetler, et al., 1998).

One example of a comprehensive approach to change practice and stimulate self-learning is the use of clinical coaching (Ervin, 2005). This activity provides staff with assistance in developing knowledge and skills to use EBP within an organization. Other suggested support strategies to enhance professional development and promote research-based practices include nursing research internships (Wells, Free, & Adams, 2007), EBP fellowships (Gawlinski, 2008), collaborative partnerships (Newhouse, 2007), scholarly forums (Bauer-Wu, Epstein, & Reid-Ponte, 2006), EBP rounds (Fineout-Overholt, Levin, & Melnyk, 2004), and investment in continuing professional development (Covell, 2009).

Conversely, Foxcroft and Cole (2009) found a lack of sufficient quality evidence to recommend standard organizational infrastructures, which

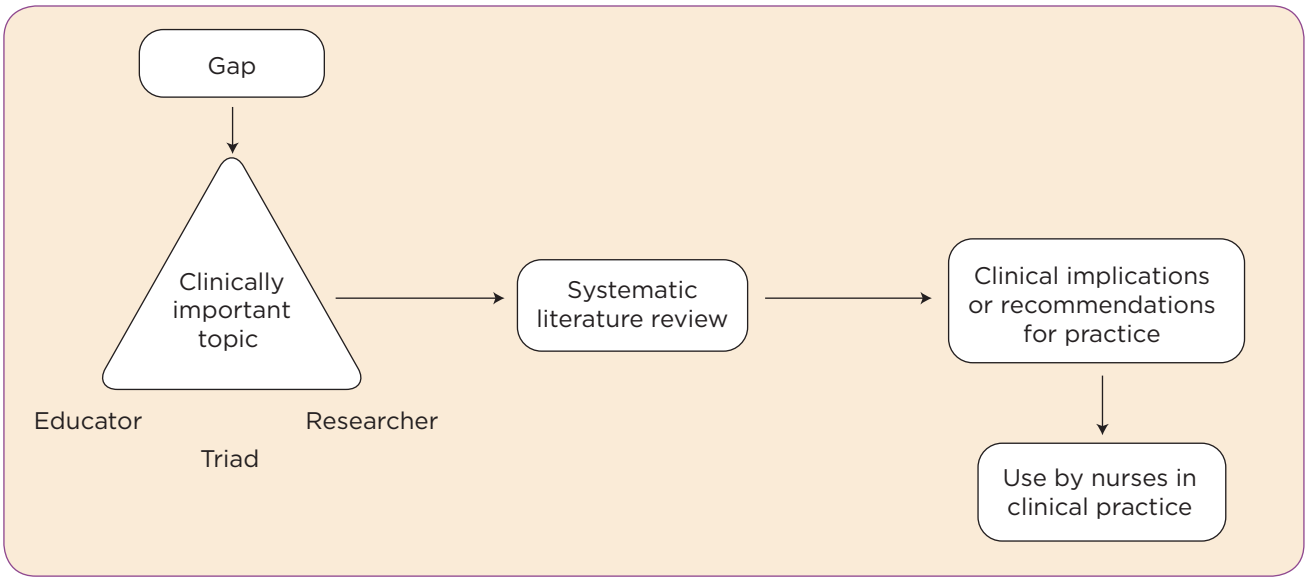

Figure 2. Oncology Nursing Society Triad Model of Research Synthesis. Reproduced with permission of Oncology Nursing Society from Rutledge, D. N., DePalma, J. A., & Cunningham, M. (2004). A process model for evidence-based literature syntheses. *Oncology Nursing Forum, 31*, 543–550.

may influence evidence-based nursing practice. In a study of registered nurses at a Magnet hospital (that is, accredited by the American Nurses Credentialing Center's Magnet Recognition Program), Fink, Thompson, and Bonnes (2005) reported that nurses' perceptions and attitudes toward research improved with use of multifaceted interventions such as unit-based journal clubs, EBP workshops, and evidence-based champions. Building infrastructures that engage clinicians will be important strategies to establish a foundation for EBP.

Challenges of EBP Implementation

Although the benefits of EBP in delivering quality health care have been written about extensively over the past several years, the adoption of EBP has been inhibited by many barriers. Prior to the design and development of EBP programs, organizational efforts had to be directed toward the modification of barriers and identification of strategies to promote the use of research in practice. These obstacles can occur at different levels of the health-care system and may involve the patient, clinician, health-care team, organization, or environment (Grol & Grimshaw, 2003). In an effort to bridge the research-to-practice gap, several studies have focused on barriers to EBP and creative strategies to promote clinical inquiry and learning. The process of implementation involves an examination of potential individual, organizational/environmental, and clinician challenges.

INDIVIDUAL CHALLENGES

Individual barriers to the use of research in practice have included insufficient time, lack of value in using research to guide practice, inadequate knowledge about research, inability to critique literature, minimal access to computers, and perceived lack of authority (Sams, Penn, & Facteau, 2004; Gale & Schaffer, 2009; Pravikoff, Tanner, & Pierce, 2005). In a study of 760 U.S. registered nurses employed in clinical settings, Pravikoff, Tanner, and Pierce (2005) found that 54% were not familiar with the term EBP, and 72% reported that they had not evaluated research studies in the past year. Furthermore, Gale and Schaffer (2009) reported that although there were no significant differences between nurse managers and staff nurses in the ranking of top barriers to the use of research, newly licensed nurses (less than 3 years' of experience) rated insufficient time higher than nurses who had been practicing longer.

Although many studies exploring barriers to EBP have been conducted in the acute care setting, such barriers also exist in primary care. In a survey of 3,411 registered nurses (Cadmus et al., 2008), lack of computer knowledge, time, and li-

brary resources were identified as gaps that hinder access to evidence in practice.

ORGANIZATIONAL/ENVIRONMENTAL CHALLENGES

A supportive practice environment is necessary to influence the use of research in practice. Health-care leaders continue to struggle with addressing the many barriers to the adoption of EBP. Factors that need to be considered include the various stakeholders involved in creating an organizational culture that supports practice changes. Researchers have reported organizational/environmental barriers as perceived insufficient support, minimal financial resources for training and information resources, staffing issues, diverse practice goals, and lack of physician collaboration (Sams, Penn, & Facteau, 2004; Gale & Schaffer, 2009). Lack of administrative support and lack of mentoring were cited as the top barriers to using research in practice (Fink, Thompson, & Bonnes, 2005). Numerous organizational barriers have been cited in the literature, but strategies to address these concerns are still needed.

CLINICIAN CHALLENGES

Clinicians must overcome many challenges as they try to complete research or evidence-based projects. These obstacles may include study accrual, financial support, research design, data collection, time constraints, research inexperience, and insufficient knowledge of the content area (Chulay, 2006). Institutional review board (IRB) approval can be a challenging process, especially when there are time constraints. As neophyte researchers, Brim and Schoonover (2009) reported challenges involved in IRB approval given the institution's limited experience with nursing research and questions surrounding the required qualifications. Additional problems with data collection included poor attendance at scheduled in-service sessions, changes in leadership, and underestimation of staff support needed for the research project.

Transformational leaders in health-care organizations must be able to break down these barriers and challenges to create a foundation that supports EBP. These leaders must engage all levels of staff to implement EBP in their care of patients. Strategic approaches to planning and building an infrastructure for EBP are needed. Ongoing commitment from leaders to allocate necessary resources (staff, supplies, time, and education) will be essential in an effort to incorporate evidence into practice.

Interprofessional Collaboration: A Means to Facilitate EBP

The terms interprofessional collaboration (IPC), interdisciplinary teams, team partnerships, and multidisciplinary teams have been used over the past decade to describe teamwork between disciplines, following the publication of the IOM's landmark reports, *To Err is Human: Building a Safer Health System* (Kohn, Corrigan, & Donaldson, 2000) and *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001). Collaborative models of care have gained popularity in efforts to meet the needs of an aging population, patients with complex health problems, and organizational processes within the health-care system. The role of IPC will be described in reference to translating EBP.

IPC in health care may be defined as a partnership among health-care professionals across disciplines and with patients to enhance patient- and family-centered care while optimizing and recognizing the contributions of health-care professionals (Barret, Curran, Glynn, & Godwin, 2007). Collaborative partnerships support knowledge translation by creating processes in which knowledge, values, and beliefs of each profession are synthesized and interfaced (Zwarenstein & Reeves, 2006). This process results in staff/provider satisfaction and optimal outcomes of care and may serve as a foundation for EBP. This form of strategic partnering may be a solution to bridging the gap between research and practice.

In a synthesis of IPC by Barrett et al. (2007), several high-quality studies with collaborative elements identified positive outcomes for patients, providers, and health-care systems, specifically in mental health and chronic disease management. Practice-based interventions using IPC may lead to positive improvements in health-care outcomes and professional practice (Zwarenstein, Goldman, & Reeves, 2009). Collaboration among team members may foster awareness of others' skill sets and knowledge, leading to integrated interventions.

Knowledge-translation interventions should be designed with a consideration of other health professionals, as changes in practice generally

impact other disciplines (Zwarenstein & Reeves, 2006). Professional boundaries have often inhibited the diffusion and adoption of innovations (Dopson, Fitzgerald, Ferlie, Gabbay, & Locock, 2002). Although there is evidence that IPC may enhance positive patient outcomes, challenges exist. Complications may include "turf wars" (Dopson et al., 2002), lack of confidence or trust in other team members, and insufficient knowledge of the skill sets of other professionals (AHRQ, 2001).

An environment that fosters collaboration and teamwork is essential to improve outcomes and optimize care. Organizational leaders must provide the tools and resources necessary to support and facilitate collaborative practices. The creation of an organizational culture that fosters communication among health-care professionals will help facilitate the implementation of EBP.

Lessons Learned

For students in a Doctor of Nursing Practice (DNP) Program, completion of a capstone DNP project that demonstrates synthesis of knowledge and clinical expertise is required. The capstone project is a systematic investigation of a clinical question related to practice. It involves appraisal, synthesis, and translation of best evidence in practice. These scholarly projects may take many forms, such as quality improvement projects or pilot studies, with the overall theme of improving patient and practice outcomes (American Association of Colleges of Nursing [AACN], 2006). The author's project integrated *The Essentials of Doctoral Education for Advanced Nursing Practice* (AACN, 2006). It also highlighted opportunities for advanced practice nurses to serve as leaders in designing and promoting changes within the health-care system to improve patient outcomes.

SELECTION OF AN EVIDENCE-BASED THEORETICAL MODEL

The author's capstone project explored the feasibility of a practice-based intervention using the Synergy Model for Patient Care, the framework of nursing practice within the organization, and the Ottawa Model of Research Use. It involved a collaborative interprofessional approach to measure adherence and provide education to gastrointestinal oncology patients who were initiating oral chemotherapy.

The Synergy Model for Patient Care was useful because it guides practice, aligning nursing core competencies of concern to patients, families, and system programs, which ultimately can lead to improved patient care (Curley, 2007). The Ottawa Model, developed by Logan and Graham (1998), is an interactive model of research use that includes six crucial elements: (1) evidence-based innovation, (2) potential adopters, (3) practice environment, (4) implementation of interventions, (5) adoption of innovation, and (6) outcomes. The use of these models served as a framework to guide the author during the assessment, monitoring, and evaluation phases of the project.

ORGANIZATIONAL CULTURE

The organization's nursing and patient care services value the delivery of expert clinical care through evidence-based, collaborative practice and partnering with patients and families. Moreover, the organization embraces a multidisciplinary team model approach composed of highly skilled professionals dedicated to providing individualized care. Support from nursing administration was necessary, as resource allocation was a key factor in the success of the project. It was important to engage nursing and physician leaders, as well as nurse champions, for support and buy-in of the project.

Although this educational opportunity and organizational support provided the author with the necessary tools to conduct an evidence-based research project, unexpected challenges including the IRB process, participant recruitment, and data collection were encountered. These challenges will guide future clinicians in implementing evidence-based projects, facilitating completion in a timely manner.

IRB APPROVAL PROCESS

IRB approval was necessary before recruitment of patients was allowed. Obtaining IRB approval was challenging for a number of reasons, including timing of the IRB meetings, need for documentation to be reviewed, and lack of familiarity with the process. Because the author was a first-time principal investigator, the IRB required additional educational training. Furthermore, all study team members were required by the IRB to complete training offered by the Collaborative Institutional Training Initiative (CITI) to participate in this project.

The author agreed to flexibility in the study team members' work schedule to allow for the demands of patient care, and the time commitment to complete basic CITI training was longer than anticipated. As a result, additional amendments were needed to add study team members at later dates. Nurse researchers need to be aware of the IRB processes and regulations within health-care organizations when undertaking a project. In order to meet the timelines established for the study, initiating the IRB application process months ahead of implementation is recommended.

RECRUITMENT

Although recruitment strategies included meetings with the gastrointestinal oncology division nurse practitioners and physicians, e-mail communication, and "daily reminders" during clinic hours, accrual of patients was a significant challenge. Because several therapeutic clinical trials investigating medication adherence with oral chemotherapy were opening at the same time, many potential patients were unable to participate in the author's project. Despite support from key stakeholders in nursing and medicine, accrual lagged behind schedule. As such, the study inclusion criteria were revised after 1 month in an effort to increase recruitment. The protocol amendment was submitted and approved by the IRB. Although ongoing assessment of the ever-changing health-care environment is essential, the opening of new therapeutic clinical trials was an uncontrollable variable that could not have been predicted.

DATA COLLECTION

Maintaining enthusiasm and interest is crucial for project completion. Indeed, implementation of an EBP project entails group efforts and the interest of all staff members who will be involved. This project involved every member of the division, including physicians, nurse practitioners, nurses, a nurse scientist, and a nursing leader. The nurses within the division had identified oral medication adherence as a topic of interest. Furthermore, oral medication adherence was a key area of interest within the cancer care organization.

In-service sessions were held with members of the project team to facilitate their understanding of the EBP project and the roles of all study team members. For the study team nurses, it was important to allow for data collection during their workday to facilitate the flow of patient care. Realistically, the time limitations stemming from the nurses' workload were a challenge and need to be considered when developing a proposal in the future.

Identification of potential patients, eligibility assessment, and the consent process take a significant amount of time. Accurate record keeping was crucial, as data were collected at varying time points—at consent, within 72 hours of initiating oral chemotherapy, and at completion of the patient's first cycle of chemotherapy. Further unanticipated challenges included the need to track patients' follow-up appointments for data collection, the filling of oral chemotherapy prescriptions, and monitoring if therapy was put on hold because of side effects. Ongoing assessment, monitoring, and evaluation are essential for any EBP research project. Communication and coordination with key stakeholders are important to identify and address challenges at varying stages of the project.

Advance practice clinicians need to take the above issues into consideration when planning, implementing, and evaluating research projects.

IMPLICATIONS

EBP has the potential to improve patient outcomes and bridge the gap between research and clinical practice. With the increasing complexity of patient care, the health-care system needs to be transformed to improve quality. Establishment of an evidence-based culture requires the necessary knowledge, skills, and resources to guide practice. Advanced practice clinicians, as expert clinical leaders and mentors, are well prepared to serve as champions in guiding EBP through the promotion of scholarship. Early recognition of potential barriers—whether individual or organizational—will potentially avoid unnecessary delays in the implementation and adoption of EBP. Strong organizational infrastructures are necessary to develop and sustain evidence-based programs. IPC and partnerships can facilitate opportunities for personal and professional growth, creation of evidence-based teams, and improved patient care.

DISCLOSURES

The author has no potential conflicts of interest to disclose.

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