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ORIGINAL RESEARCH

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Readiness of U.S. Nurses for Evidence-Based Practice

Many don't understand or value research and have had little or no training to help them find evidence on which to base their practice.

Overview: Evidence-based practice is a systematic approach to problem solving for health care providers, including RNs, characterized by the use of the best evidence currently available for clinical decision making, in order to provide the most consistent and best possible care to patients. Are RNs in the United States prepared to engage in this process? This study examines nurses' perceptions of their access to tools with which to obtain evidence and whether they have the skills to do so. Using a stratified random sample of 3,000 RNs across the United States, 1,097 nurses (37%) responded to the 93-item questionnaire. Seven hundred sixty respondents (77% of those who were employed at the time of the survey) worked in clinical settings and are the focus of this article. Although these nurses acknowledge that they frequently need information for practice, they feel much more confident asking colleagues or peers and searching the Internet and World Wide Web than they do using bibliographic databases such as PubMed or CINAHL to find specific information. They don't understand or value research and have received little or no training in the use of tools that would help them find evidence on which to base their practice. Implications for nursing and nursing education are discussed.

Keywords: Evidence-based practice, evidence, best practice, bibliographic databases, research

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Consider a hypothetical but all-too-common real-world scenario: Nancy Adams is a 52-year-old RN in charge of a medical–surgical unit in a midsize acute care facility in Southern California. One of her patients, an 82-year-old woman with cancer and dementia, recently died from asphyxiation when her head became trapped between the side rails and the mattress on her bed. Ms. Adams had learned in nursing school to make sure that the side rails were always up on her patients' beds, and she has emphasized that to the nurses who work with her. Now she wonders whether that's the right intervention and how to find out. She asks several of her peers how they know that this intervention is best for patients. No one is able to provide actual evidence. It's just what they've always been taught to do. There is a small locked medical library in her facility—used mostly by a few physicians—and no one has ever told her where the key is. She'd heard about the CINAHL database and PubMed at a conference she'd attended recently, but her facility has no access to them. Besides, she has very limited computer skills. She has a computer in her office but uses it mostly for in-house e-mail; the hospital administration doesn't allow Internet access because it might be abused. She's at a loss as to how to find the information she needs.

Most nurses, according to Estabrooks, practice nursing according to what they learned in nursing school as well as their experiences in practice.[1] But the average age of the nurse today is older than 40 years; according to the National Sample Survey of Registered Nurses conducted by the U.S. Health Resources and Services Administration (HRSA) in March 2000, 70% of nurses graduated from nursing programs before 1990.[2] This presents the nursing profession with a serious dilemma. On the one hand are the demands for a professional practice, based on up-to-date information, that come from government agencies, payers, accrediting bodies, and patients; on the other hand are health care providers who may not be prepared to meet these demands because they don't know how to find information or don't have the tools to obtain it and don't have the time to solve either of these problems. Both the information and tools to obtain it are necessary components of evidence-based practice, which is characterized by the use of the best evidence currently available for clinical decision making in order to provide the most consistent and best possible care of patients. A frequently quoted definition of evidence-based practice from Sackett and colleagues includes "integrating individual clinical expertise with the best available external evidence from systematic research."[3] In a later definition, Sackett also included patient preferences as a significant component.[4] Thus, evidence-based practice is a systematic approach to problem solving for health care providers.

PURPOSE

This study, which builds on knowledge gained from recent research addressing the readiness for evidence-based practice of RNs in various work settings,[5-7] specifically examines nurses' perceptions of their skills in obtaining evidence and their access to tools with which to do so.

To understand the tools and skills required for evidence-based practice, it's important, first, to understand what evidence-based practice involves. As described by Sackett and colleagues, evidence-based practice is a process, similar to that of nursing as it's taught to nursing students. It entails

- assessing and defining a problem and formulating a specific question.
- searching for, finding, and evaluating appropriate evidence.
- planning and implementing an intervention by integrating the evidence into practice.
- evaluating the process and the results.[3]

It's obvious that the part of the process that includes the search for and evaluation of the evidence is critical. However, personal and organizational barriers to the use of research and the implementation of evidence-based practice are substantial.

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BARRIERS TO EVIDENCE-BASED PRACTICE

A lack of time and access. A lack of time has frequently been identified as an important barrier to applying research to practice.[8-12] Retsas, in a study of 400 nurses working in an Australian hospital, stated that, "if the use of research evidence by nurses is to increase, the most important organizational change that needs to occur is increasing the time available for nurses to achieve this goal."[13] Additional time is, therefore, the first prerequisite for accessing, reading, and evaluating research.

In addition to time, however, is the equally important issue of access to the tools necessary to search for the evidence. Electronic access to information resources and the appropriate skills to use the tools effectively are essential. In a six-month

trial project published in 1994, King and Carroll found that computerized resources were accessed far more frequently when located on the nursing unit (as compared with the hospital library).[14] The visibility of the computer terminal, the presence of a "technology champion" (one who understands computer technology and promotes its use), and rewards for using the system (such as promotion and tenure) have all contributed to an increase in online searching by nurses.[15] As King and Carroll pointed out, access in a library provides a "formal means of communication" while access in a clinical setting provides "an informal tool" that's more user-friendly.[14] Yet studies conducted recently by Pierce and by Tanner (both coauthors of this report) demonstrate that nurses have neither the skills nor the resources to conduct information searches.[5, 7] This is due, in part, to the amount of time most nurses have been out of school and the fact that, for many, tools such as personal computers, the Internet, and electronic databases didn't yet exist when they were in school. Pierce and Tanner each found that nurses educated after 1990 were likely to be more skilled at seeking information.

Marshall's important research and Wood and Wright's later study demonstrated that access to appropriate information can change practice.[16, 17] In fact, while Wood and Wright found that 14 of 20 general practitioners said that the impact of the clinical information they received was of at least some importance to the patient, 96% of the physicians in Marshall's study stated that they were able to make better-informed clinical decisions as a result of information provided to them by librarians. In a survey of nurses and physicians in the United Kingdom that sought to identify sources of information and the importance of these sources among the two groups in changing practice, Kerrison and colleagues found that nurses perceived gaining access to evidence-based information as "extremely difficult," whereas physicians found it easier.[18] Nurses reported that access to both libraries and electronic resources was frequently restricted. Professional literature was the most important source cited for changes in practice, but nurses found that professional literature wasn't readily available to them at the workplace.

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The Institute of Medicine's 2001 report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, makes a strong case for the importance of information technology while acknowledging that the systematic reviews it recommends are only "the first step in making knowledge more usable by both clinicians and patients."[19] As Bakken and colleagues point out, "external sources of information are often required to provide care consistent with the best evidence."[20] In order to take advantage of all the features of information technology and available information resources, however, nurses must know how to use them.

Searching skills in an electronic environment. While some health care facilities have librarians to assist in obtaining information, many don't, in which case nurses must have the ability to perform such activities unaided. Tanner's study of a random sample of 223 RNs and advanced practice nurses in Louisiana and Pierce's examination of 339 nursing faculty members and graduate and baccalaureate nursing students, also in Louisiana, demonstrated that only a small percentage of those surveyed were familiar with the process of evidence-based prac-

MEDLINE vs. PubMed

ARE THEY THE SAME?

MEDLINE is the National Library of Medicine's electronic database of citations and abstracts. It indexes more than 4,800 journals from more than 70 countries, from approximately 1966 to the present. (Index Medicus is the paper equivalent of MEDLINE.) MEDLINE is available online and at no cost through PubMed, or it can be obtained for a fee through the subscription database Ovid, as well as through other companies.

PubMed is the National Library of Medicine's Web interface, through which MEDLINE can be accessed, but PubMed also includes citations from 1950 through 1966 (OLDMEDLINE), in-process citations (citations that are available but haven't yet had subject terms assigned), and publisher-supplied citations from journals that weren't originally chosen by MEDLINE for indexing. PubMed has a greater scope than MEDLINE and is freely available on the Web. For more information, go to www.nlm.nih.gov/pubs/factsheets/dif_med_pub.html.

tice.[5,7] Although approximately half of the advanced practice nurses and RNs surveyed said that they had access to the Internet at work, fewer than 20% of the other groups used it. Regardless of access, fewer than 20% of nurses in all groups said they were able to conduct successful literature searches with either the MEDLINE database or the CINAHL database, the two primary bibliographic databases of medical, nursing, and allied health literature. Other researchers, including Russell and Alpay, have also concluded that nurses simply have not acquired "adequate knowledge of information technology."[21] (For more see "Evidence-Based Practice Resources," at right, and "Making the Most of Nursing's Electronic Resources," page 79.)

Building on the knowledge gained from such studies of practicing nurses, we recently conducted a pilot study that examined nursing administrators' perceptions of the status of information resources in their facilities (see "Are Nurses Ready for Evidence-Based Practice?" *Nursing Resources*, May 2003). Respondents in two states indicated that "less than 35% [of their facilities] provided access to the Internet or computerized references on the clinical units where the information could be most easily and readily used."[6] Although these nursing administrators believed the provision of print material to be at least adequate, the majority felt that online resources were less than adequate or completely inadequate to meet the needs of their staff.

We wanted to determine whether a larger sample of U.S. nurses had access to resources and possessed skills in finding information that were comparable to those found in our earlier studies, and whether the availability of resources and the skills in finding information were sufficient for nurses to implement evidence-based practice. Specifically, we intended to

- determine whether RNs were aware of their need for information and the importance of using evidence (including research) in practice.
- investigate the availability of information resources to RNs at work and at home.
- define, from the RN's point of view, the individual and institutional barriers to using research and other evidence in practice that are present in the clinical environment.

METHODS

Design. This was a descriptive, exploratory survey to examine U.S. RNs' perceptions of the information resources available to them and their skills in using those resources.

Sample. Approval for the study was obtained from the institutional review board of Northwestern State University College of Nursing, with which two of the investigators are affiliated (S.P. and A.T.). The

Evidence-Based Practice Resources

WHERE TO BEGIN YOUR SEARCH.

The following are some resources supportive of evidence-based practice.

GUIDELINES AND BEST PRACTICES

The National Guideline Clearinghouse, a program of the Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services, is a database of evidence-based clinical practice guidelines and related documents designed for nurses, physicians, and other health care providers. Go to www.guideline.gov.

The Joanna Briggs Institute, based in Adelaide, Australia, is affiliated with Royal Adelaide Hospital and has a large network of collaborators throughout the world. It produces both best-practice information sheets and systematic reviews on dozens of topics of interest to nurses. Go to www.joannabriggs.edu.au/pubs/best_practice.php.

SYSTEMATIC LITERATURE REVIEWS

A systematic literature review is a type of research with a defined question or objective, a methods section describing the search of the literature, a synthesis of literature concerning the question or objective, and a discussion of the implications of that synthesis.

The Cochrane Collaboration, an international nonprofit organization, produces the Cochrane Database of Systematic Reviews, written by collaborative groups of health care professionals. Topics covered are primarily biomedical, but there are many nursing topics, as well. Go to www.cochrane.org.

The Sarah Cole Hirsh Institute for Best Nursing Practices Based on Evidence is a repository of systematic reviews of evidence-based practices at the Frances Payne Bolton School of Nursing, Case Western Reserve University. It publishes the reviews through the *Online Journal of Issues in Nursing*. Go to http://fpb.case.edu/HirshInstitute/reviews.shtm.

Worldviews on Evidence-Based Nursing is a relatively new journal published both in print and electronically by Sigma Theta Tau International. It contains both systematic reviews of the literature and other articles and abstracts. Go to www.blackwellpublishing.com/journal.asp?ref=1545-102X.

The *Online Journal of Clinical Innovations* is an electronic publication from Cinahl Information Systems (www.cinahl.com) that contains systematic reviews of literature on key issues in patient care, such as pain assessment and fall prevention. Go to www.cinahl.com/cexpress/ojcionline3/index.html.

OTHER RESOURCES

Evidence-Based Nursing, a quarterly publication of BMJ Publishing Group and the Royal College of Nursing Publishing Company, provides abstracted information and commentary on research studies from a wide variety of international journals. http://ebn.bmjjournals.com/misc/about.shtml.

TABLE 1. Characteristics of Clinical Nurses (n = 760)*

SEX	(%)
Female	91
Male	7
Not known	2
AGE IN YEARS	
< 30	5
30–39	16
40–49	36
50–59	33
≥ 60	10
RACIAL OR ETHNIC BACKGROUND	
White (non-Hispanic)	86
Black, African American	4
Asian	4
American Indian or Alaskan native	1
Hispanic, Latino	2
Two or more races (non-Hispanic)	1
Not known	1
HIGHEST NURSING EDUCATION	
Diploma	17
Associate's degree	34
Baccalaureate	39
Master's degree	9
Doctorate	< 1
Not known	< 1
YEAR OF MOST RECENT NURSING DEGREE	
2000–2004	10
1995–1999	18
1990–1994	13
1985–1989	16
1984–earlier	41
Not known	1
WORK SETTING	
Hospital	60
Nursing home	6
Community or public health	6
School health	4
Nonhospital occupational health	1
Nonhospital ambulatory care	12
Other	11

*Percentages may not add up to 100 because of rounding.

survey was mailed to a geographically stratified random sample of 3,000 U.S. RNs, whose names were generated from a list of more than 2 million RNs available from a nationwide publishing company. Because our earlier pilot study focused on only two states—Louisiana and New York—wider geographic representation was desired for this study. Geographic stratification was based on response percentages obtained in the 2000 National Sample Survey of Registered Nurses. For example, 10.5% of responses to the national sample survey were obtained from the Pacific region (Alaska, California, Hawaii, Oregon, and Washington); therefore, 10.5% of the questionnaires for this study were sent to randomly selected RNs in that region.

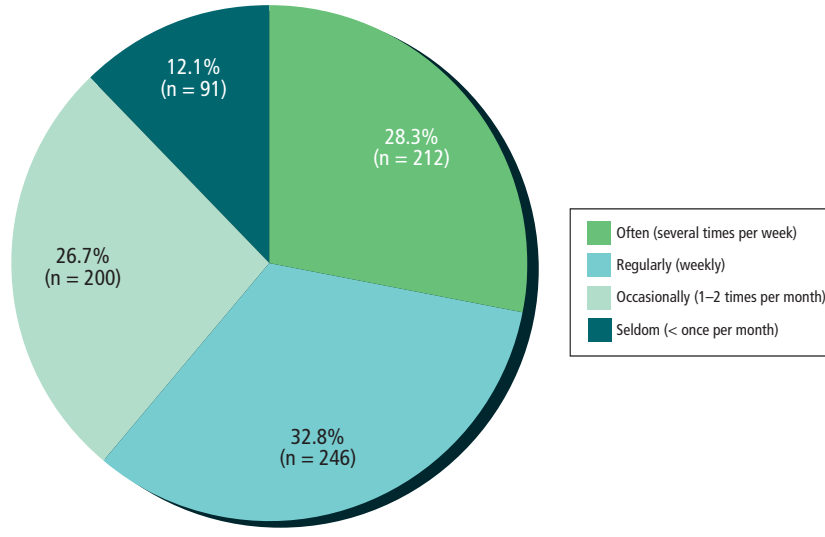
Of the 3,000 surveys sent, 53 were undeliverable either because of incorrect addresses or because addressees were deceased. Responses from 1,097 (37%) were returned. Of these, 987 respondents were currently working as RNs in administration, education, or clinical practice, and these composed our sample. The 760 clinical RN respondents (77% of the sample of working RNs) are the focus of this article. Those working solely as administrators or educators were excluded from this analysis. Data from the full sample of working RNs were presented last September at Medinfo 2004, a conference sponsored by the American Medical Informatics Association, and published in the *Proceedings of the 11th World Congress on Medical Informatics*.[22]

Instrument. The survey used for this study, a 93-item questionnaire, was originally developed for earlier studies (conducted by S.P. and A.T.) that focused on RN faculty, graduate nursing students, and clinical staff in Louisiana.[5,7] The questionnaire was modified for use in the pilot study of nursing administrators in Louisiana and New York, mentioned above.[6] Content validity was established by experts in nursing, nursing informatics, and information science. The tool was configured for use with Teleform technology, a high-volume, high-accuracy automated character-recognition and -capture technology that supports batch processing of data forms.

Items were designed in various formats. Some required respondents to answer "yes," "no," or "do not know" to questions about the existence of resources (such as print indexes, electronic databases, current journals, and online resources) and access to them. Other items required respondents to rank terms in a provided list—for example, the top three individual barriers to using research in practice (from a list of 10) or the top three organizational barriers (from a list of six). Because the lack of time is generally recognized as a major problem, it wasn't included in the list of choices (respondents were instructed "Besides time, rank the three primary barriers . . .").

Procedure. Using the Tailored Design Method developed by Dillman for mailed surveys,[23] we mailed cards introducing the survey one week prior to mailing the questionnaires. The initial survey mailing was followed by reminder postcards and then a second mailing of the questionnaire to those from whom responses had not been received. Returned questionnaires were delivered to the Center for Nursing Research at the University of Texas at Arlington, where trained research assistants processed them. Data were analyzed using SPSS 12.0 software.

FIGURE 1. SURVEY ITEM: How Often Do You Need Information to Support Your Nursing Role? (749 Respondents)



RESULTS

Characteristics of the 760 clinical RN respondents are described in Table 1 (page 44). The typical respondent was a 40-to-49-year-old white woman who worked in a hospital, held a diploma or associate's degree in nursing, and last attended a degree-granting educational program in 1984 or earlier. (Note that some didn't respond to all questions.)

Information need and information seeking. Respondents were asked how often they needed information to support their everyday practice. Sixty-one percent said they needed to seek information at least once a week or several times a week (see Figure 1, at right). When asked how they found the information they needed, 67% of the respondents said they always or frequently sought information from a colleague (rather than from a reference text or journal article) (see Figure 2, page 46). Journal articles, research reports, and hospital libraries were seldom used as sources of information. In fact, 58% of respondents reported not using research reports at all to support their practice; 82% never used a hospital library (see Figure 3, page 46).

Although evidence-based practice has been widely discussed in the literature over the last several years, fewer than half (46%) of respondents said they were familiar with the term.

Resource availability and use. Fifty-seven percent of respondents said that their facility did have a medical or health sciences library, and 5% didn't know. Most of these libraries were available to all employees and even the general public, but a small percentage of respondents (3%) said that their facility's library was available only to physicians. This percentage is an improvement over the pilot study, in which 6% of respondents indicated that their hospital's library was available only to physicians.[6]

Information seeking in today's electronic environment is partly dependent on one's ability to use resources such as computers and search engines. When asked to rate their computer skills on a 5-point scale that ranged from novice (1) to expert (5), respondents were fairly confident in their ability to use computers (mean rating = 3.08), the Windows operating system (3.02), and word processing applications (2.87) but less confident in their ability to use other programs, including bibliographic databases (2.58). Although 83% of respondents considered themselves at least somewhat successful when searching the Internet or World Wide Web, only 19% and 36%, respectively, were as confident in their ability to search CINAHL or MEDLINE. Seventy-six percent of respondents apparently never searched CINAHL, and 58% never searched MEDLINE.

Seventy-six percent of respondents apparently never searched CINAHL, and 58% never searched MEDLINE.

Most respondents rarely or never sought a librarian's assistance (83%), didn't use the hospital library (if one existed) (82%), and had never received instruction in the use of electronic resources (77%). When asked whether they had identified a researchable problem in their practice within the last year,

FIGURE 2. SURVEY ITEM: When You Need Nursing Information, How Do You Find it?

FIGURE 3. SURVEY ITEM: Please Indicate the Frequency That You Personally Seek Information from Each of the Following Sources.

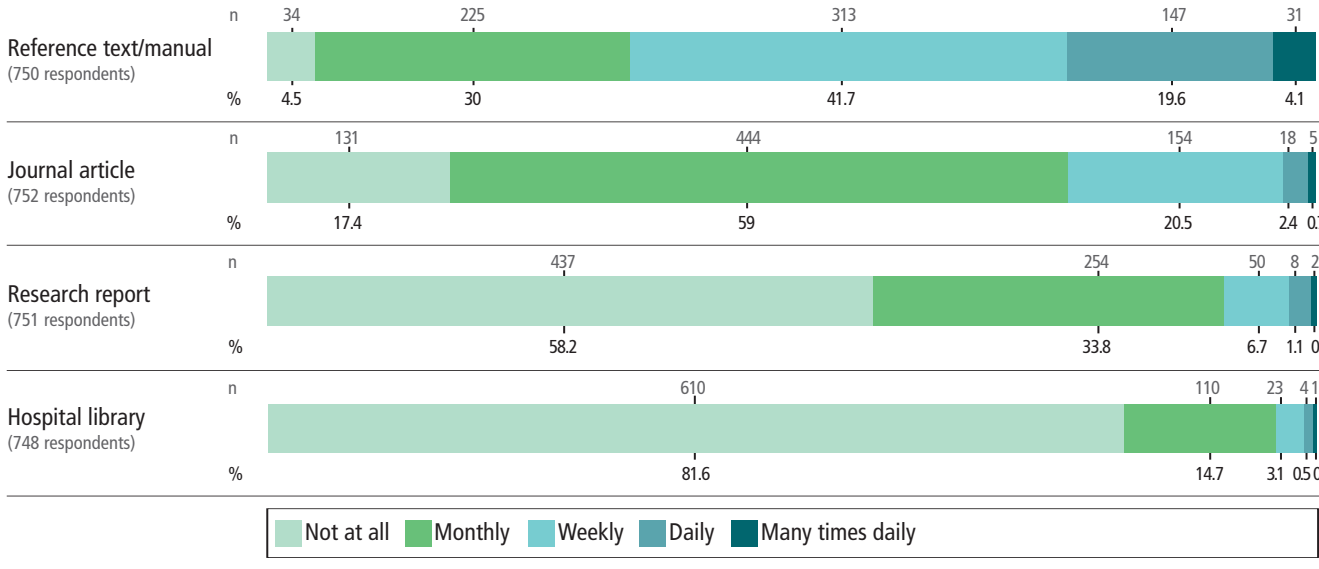


FIGURE 4. SURVEY ITEM: In the Last Year, How Frequently Have You Personally Participated in the Following Activities?

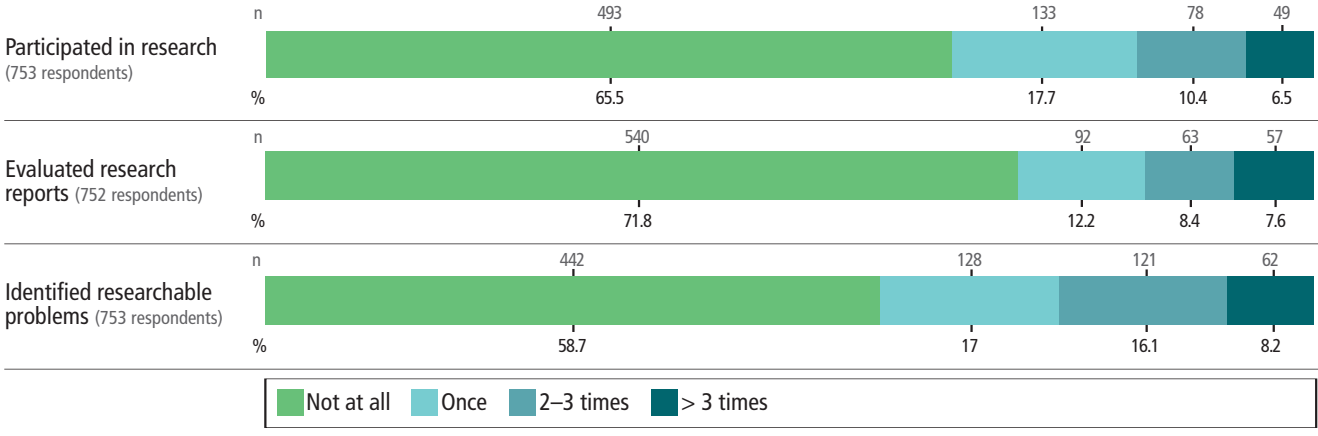
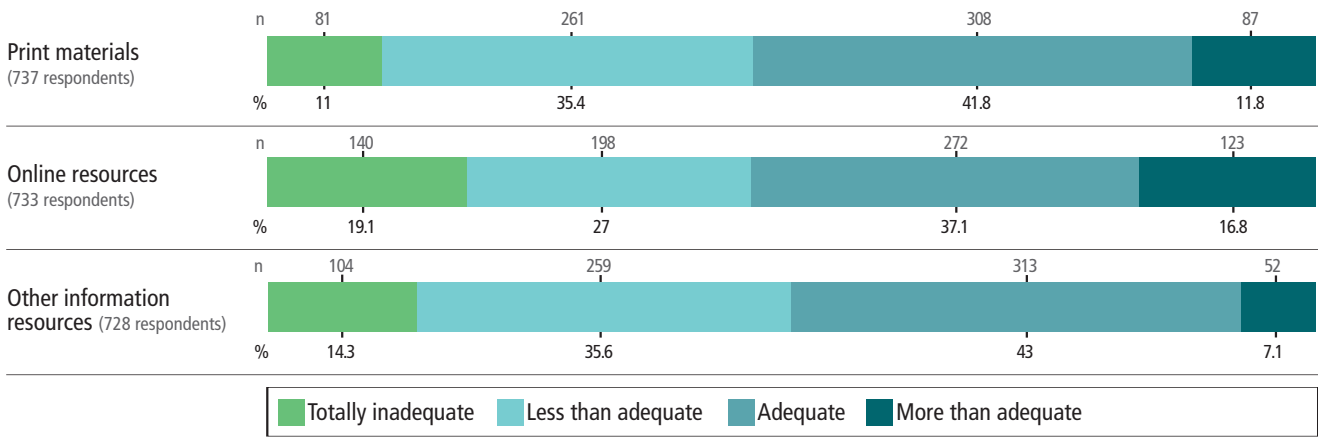


FIGURE 5. SURVEY ITEM: Overall, How Would You Rate the Following Information Resources in Your Workplace?



most (59%) said that they hadn't, and a greater percentage (72%) said they hadn't evaluated research reports. (See Figure 4, above.)

Only 36% of respondents reported that their facilities provided access to electronic databases, and 29% didn't know whether such access was provided or not. Perhaps even more important are the resources available to nurses throughout a facility, particularly at the point of care. Of those who said that current print journals were available in their facility (n = 360), only 40% (144) had access to the journals on nursing units. This group represents only 19% of the total sample of 760 clinical RNs. Similarly, 26% of the total sample said they had access to electronic databases on nursing units, and 49% believed they had access to the Internet or World Wide Web on units.

When nurses were asked whether they personally had access to electronic resources (at home or at work), 72% said "yes." Of those, 18% said they had access to the CINAHL database, 40% to MEDLINE, and 98% to the Internet and World Wide Web. Fifty-three percent of the total sample had access at work. Simply because the resources are available, however, doesn't necessarily mean they are adequate. Therefore, we asked respondents about the adequacy of the various resources in their institutions (see Figure 5, above). As shown in the figure, almost half (approximately 46%) characterized online resources as less than adequate or totally inadequate.

Barriers to evidence-based practice. Barriers to the use of research in practice exist at both the institutional level and the individual level. Because of

TABLE 2. Primary Individual Barriers (Other Than Time) to Nurses' Use of Research in Practice, in Order of Importance

1	Lack of value for research in practice
2	Lack of understanding of organization or structure of electronic databases
3	Difficulty accessing research materials
4	Lack of computer skills (tied with no. 5)
5	Difficulty understanding research articles (tied with no. 4)
6	Lack of access to a computer
7	Lack of library access
8	Lack of search skills
9	Lack of knowledge about research
10	Lack of skills to critique or synthesize the literature (or both)

TABLE 3. Primary Institutional Barriers (Other Than Time) to Nurses' Use of Research in Practice, in Order of Importance

1	Presence of other goals with a higher priority
2	Difficulty in recruiting and retaining nursing staff
3	Organizational budget for acquisition of information resources
4	Organizational budget for training in resource use
5	Organization perceives that nursing staff is not eager or prepared to incorporate or pursue evidence-based practice
6	Organization perceives evidence-based practice or research use as not achievable in the "real world"

the vast amount of literature acknowledging that a lack of time is the greatest of all such barriers,[8-12] we assumed that lack of time would be the most important impediment among our respondents and asked them about other barriers. Respondents were asked to rank the top three barriers from a list of 10 (excluding the lack of time) that interfere with their own use of research (see Table 2, above); the barrier chosen by the greatest number of respondents was a lack of value for research in practice, followed by a lack of understanding of organization or structure of electronic databases and difficulty accessing research materials. Other barriers such as a lack of skills to critique and synthesize the literature, a lack of search skills, and difficulty understanding research articles were also ranked highly. Clearly, most RNs believe that they're not adequately prepared to appraise research and interpret its usefulness for clinical decision making. This, coupled with how little value the nurses said was placed on research in practice, reveals serious limitations to implementing evidence-based practice.

Nurses' perceptions of organizational barriers—those presented by the facility in which they work—are given in Table 3 (at left).

Obviously, the existence of such organizational barriers is an expression of how much, or how little, institutions and their administrators value information resources and nurses' access to them.

DISCUSSION

The sample of clinical RNs in this study is similar to nurses nationally in terms of sex, race or ethnic identity, highest degree of nursing education achieved, and work setting, but they are slightly older (79% were 40 years of age or older, as compared with 68% in the national sample survey conducted by HRSA[2]). The majority of the respondents in the sample survey received their basic nursing education before 1990, before the widespread availability of electronic information resources and personal computers. Because of the similarities in age and the period during which most of the nurses attended school, it's probably safe to assume that the respondents in the national sample survey would have perceptions similar to those who participated in the current study with regard to their need for information, the resources available to them, and the confidence they have in their skills in using these resources.

Because the number of clinical nurses in the current study's sample was a large percentage of the total sample, the overall findings presented at Medinfo 2004, which included the responses of administrators and educators as well as clinicians, were similar.[22] However, clinical nurses reported less use of bibliographic databases, less availability of instruction, less access to resources, less familiarity with evidence-based practice, and less success in using electronic resources than did the total sample.

Awareness. Although RNs recognized the need for information in their practice, their most frequent source of that information was a peer or colleague. However, 39% of the respondents stated that they need information only occasionally or seldom. This is alarming when one considers the number of changes in practice that are recommended on a regular basis today. As Thompson and colleagues point out, when decisions must be made quickly, nurses trust a real person—a colleague, clinical specialist,

or supervisor—more than they do printed and electronic resources.[24] One wonders, however, whether this would still be the case if search and evaluation skills were stronger. In the group of RNs studied, a disappointingly high percentage identified gaps in their experience with research appraisal (72% reported not having evaluated a research report within the previous year) and identifying researchable problems (59% hadn't done so within the previous year). Seventy-seven percent indicated never having been trained in how to conduct bibliographic database searches. As Scollin wrote, "technology is readily available to [help people] make use of resources; however, if those who can benefit most from this technology are unaware of its existence, or do not have the training, support, or access to make full use of these resources, then the benefit to enhance their knowledge is of little value."[25] It's worrisome that sources of new information, new research, and new evidence for practice were used infrequently, if at all, by the RNs in our study. The fact that they weren't using these resources is also apparent from their lack of familiarity with the term "evidence-based practice," which has appeared in the titles of hundreds, if not thousands, of journal articles in recent years. If the term is unfamiliar, the successful integration of evidence-based practice can scarcely be anticipated.

Resource availability and use. According to responses to open-ended questions, the majority of respondents in this study were aware that their facilities had a library, but many had never been inside it or didn't know where it was located. In qualitative responses, some respondents said the library was locked and the location of the key or key holder was unknown. A caveat should be made in reading the results concerning the resources available in libraries because, as findings of this study indicate, few RNs used the library at all. It's quite possible that respondents' knowledge about the resources available within the library was incomplete or inaccurate.

The Internet and the World Wide Web were frequent sources of information for many respondents. That search engines are easy to use and success at retrieving results are probably two major reasons for such use. However, problems with using the Internet as a source of information include the time required for online searches and (as has been corroborated in several studies[26-28]) the uncertain reliability of the information retrieved.

While the responses to the questions concerning the use of computers could indicate that nurses perceived themselves as having less expertise as the complexity of the application increased, it could also mean that they simply had less experience with "other programs, including databases." If that's the case, greater use of such applications will likely result in greater expertise.

In order to safely integrate the information retrieved from online sources into clinical practice, the nurse must be skilled in evaluating the credibility of such information. Further, most nurses aren't adept at advanced searching techniques that could make the time spent searching the Internet more productive by limiting results to specific areas of interest. Bibliographic databases, on the other hand, have many filtering options and are a more appropriate resource through which to examine the current research on a given topic. In this group of RNs, 87% didn't search CINAHL, the nursing and allied health database, and 69% didn't search MEDLINE.

It's worrisome that sources of new information, new research, and new evidence for practice were used infrequently, if at all, by the RNs in our study.

Barriers. The finding that a *lack of value for research in practice* was the most frequently selected barrier to the use of research in practice is of great concern to us. It would seem that the case for the importance of research to patient care hadn't been made to our respondents in either education or practice. In fact, all of the major barriers can be addressed through teachable skills, but the extent to which such skills are taught in diploma, associate's-degree, or even baccalaureate programs varies widely. Indeed, we have been saying for a number of years that—as one of us (D.P.) wrote in a 2000 editorial—"to stress the importance of information seeking and information literacy to their students along with the professional obligation of career-long literature searching, faculty [have] to believe it and live it themselves."[29]

CONCLUSIONS AND IMPLICATIONS FOR NURSING

According to this study, RNs in the clinical arena generally acknowledged that they need information for effective practice. Yet according to their own responses, they weren't prepared to use the information resources available to them, however adequate or inadequate. They received little or no education or training in information retrieval, didn't understand or value research, and were generally unprepared for a practice built on evidence.

Some of this can be attributed to the technologic changes that have occurred over the last 10 or 15 years. Some of it, however, has to be blamed on the failure of nursing education programs to prepare students at all levels to understand and value the importance of maintaining a practice based on more than tradition, intuition, and experience. These are important components of nursing practice, of course, but searching for and reading current literature, including research, are essential. Many things that we have "always done" may not be the best patient-care practices today. The case of Nancy Adams at the beginning of this article is just one such example.

Our conclusion is that RNs in the United States aren't ready for evidence-based practice because of the gaps in their information literacy and computer skills, their limited access to high-quality information resources, and above all, the attitudes toward research. These attributes are reinforced by their perception of organizational priorities. These gaps must be addressed if the largest group of health care providers in the nation is to embrace a culture of evidence-based practice as directed by health care policy and nursing leaders. Nursing education's paradigm must change so that information literacy, research use, and evidence-based practice are integrated into the curricula of *all* RN education programs, to instill not only the knowledge and skills necessary for evidence-based practice, but to help nurses value research.

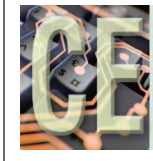
Our conclusion is that RNs in the United States aren't ready for evidence-based practice.

Nurse administrators should lobby within their health care organizations and facilities for the resources, time, and training to support and integrate evidence-based practice. They will need to identify cost-effective, creative approaches to establishing evidence-based practice that overcome the barriers, including lack of time.

Finally, clinicians must

- recognize the gaps in their own information-retrieval and evaluation skills.
- look for and obtain continuing education that enhances the relevant skill sets.
- demand greater access to high-quality information resources in the workplace.
- demonstrate a commitment to using information resources effectively to improve care.
- set goals for integrating evidence-based practice that link practice interventions to patient and organizational outcomes.

Integrating evidence-based practice into nursing requires a multifaceted approach that involves students, educators, clinicians, and administrators working collectively to facilitate the change. Neither Ms. Adams, nor any other nurse, should be left at a loss when searching for the information she needs. ▼



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REFERENCES

1. Estabrooks CA. Will evidence-based nursing practice make practice perfect? *Can J Nurs Res* 1998;30(1):15-36.
2. Spratley E, et al. *The registered nurse population March 2000: findings from the National Sample Survey of Registered Nurses*. Rockville, MD: U.S. Department of Health and Human Services; 2001.
3. Sackett DL, et al. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312(7023):71-2.
4. Sackett DL. *Evidence-based medicine: how to practice and teach EBM*. London: Churchill Livingstone; 2000. p. 1.
5. Pierce S. *Readiness for evidence-based practice: information literacy needs of nursing faculty and students in a southern U.S. state* [Unpublished Dissertation]. Natchitoches, LA: Northwestern State University of Louisiana; 2000.
6. Pravikoff DS, et al. Are nurses ready for evidence-based practice? *Am J Nurs* 2003;103(5):95-6.
7. Tanner A. *Readiness for evidence-based practice: information literacy needs of nurses in a southern U.S. state* [Unpublished Dissertation]. Natchitoches, LA: Northwestern State University of Louisiana; 2000.
8. Funk SG, et al. BARRIERS: the barriers to research utilization scale. *Appl Nurs Res* 1991;4(1):39-45.
9. Haynes RB. Some problems in applying evidence in clinical practice. *Ann N Y Acad Sci* 1993;703:210-24; discussion 24-5.
10. Omery A, Williams RP. An appraisal of research utilization across the United States. *J Nurs Adm* 1999;29(12):50-6.
11. Parahoo K, McCaughan EM. Research utilization among medical and surgical nurses: a comparison of their self reports and perceptions of barriers and facilitators. *J Nurs Manag* 2001;9(1):21-30.
12. Royle JA, et al. Literature search and retrieval in the workplace. *Comput Nurs* 1995;13(1):25-31.
13. Retsas A. Barriers to using research evidence in nursing practice. *J Adv Nurs* 2000;31(3):599-606.
14. King BA, Carroll P. Nurses as end-user searchers of the literature on CD-ROM. *J Nurs Staff Dev* 1994;10(6):319-22.
15. Ash JS. Factors affecting the diffusion of online end user literature searching. *Bull Med Libr Assoc* 1999;87(1):58-66.
16. Marshall JG. The impact of the hospital library on clinical decision making: the Rochester study. *Bull Med Libr Assoc* 1992;80(2):169-78.
17. Wood F, Wright, P. The impact of information on clinical decision-making by general medical practitioners. *Information Research: An Internet Electronic Journal* 1996;2(1). http://informationr.net/ir/2-1/paper11.html.
18. Kerrison S, et al. People and paper: information for evidence-based practice and the differing needs of doctors and nurses. *J Interprof Care* 1999;13(3):289-99.

19. Institute of Medicine Committee on Quality of Health Care in America. *Crossing the Quality Chasm.* Washington, DC: National Academies Press; 2001.
20. Bakken S, et al. Promoting patient safety and enabling evidence-based practice through informatics. *Med Care* 2004;42(2 Suppl):II49-56.
21. Russell A, Alpay, L. Practice nurses' training in information technology: report on an empirical investigation. *Health Informatics Journal* 2000;6(3):142-6.
22. Tanner A, et al. Readiness for evidence-based practice: information literacy needs of nurses in the United States. In: Fieschi M, et al., editors. *Proceedings of the 11th World Congress on Medical Informatics.* Amsterdam, Belgium: IOS Press; 2004. p. 936-40.
23. Dillman D. *Mail and Internet surveys: the Tailored Design Method.* 2nd ed. New York: John Wiley and Sons; 2000.
24. Thompson C, et al. Research information in nurses' clinical decision-making: what is useful? *J Adv Nurs* 2001;36 (3):376-88.
25. Scollin P. A study of factors related to the use of online resources by nurse educators. *Comput Nurs* 2001;19 (6):249-56.
26. Crocco AG, et al. Analysis of cases of harm associated with use of health information on the Internet. *JAMA* 2002;287 (21):2869-71.
27. Jadad AR, Gagliardi A. Rating health information on the Internet: navigating to knowledge or to Babel? *JAMA* 1998;279(8):611-4.
28. Schloman BF. Now you see it, now you don't: the ephemeral nature of digital information. *Online J Issues Nurs* 2003;8(2):7.
29. Pravikoff D. On the information highway, or sitting on the curb? *J Nurs Educ* 2000;39(3):99-100.

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