

Barriers and Benefits Associated with Nurses Information Seeking Related to Patient Education Needs on Clinical Nursing Units

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Abstract: The purpose of this study was to answer the following two questions: What are clinical nurses' rationales for their approaches to finding patient educational materials on the web? What are perceived barriers and benefits associated with the use of web-based information resources for patient education in the context of nursing clinical practice?

Over 179 individual data units were analyzed to understand clinical nurses' rationales for their approaches to find patient educational materials on the web. *Rationales* were defined as those underlying catalysts or activators leading to an information need. Analyses found that the primary reasons why clinical nurses conducted web-based information searches included direct patient requests (9 requests), colleague requests (6 requests), building patient materials collections (4), patients' family requests (3), routine teaching (1), personal development (1), or staff development (1). From these data, four broad themes emerged: professional reasons, personal reasons, technology reasons, and organization reasons for selecting information resources. Content analysis identified 306 individual data units representing either 'benefits' (178 units) or 'barriers' (128) to the nurses' use of web resources for on-unit patient care. Inter-rater reliability was assessed and found to be excellent ($r = 0.943$ to 0.961). The primary themes that emerged as barriers to the used of web-based resources included: 1) time requirements to perform a search, 2) nurses' experience and knowledge about the resources or required technology, 3) specific characteristics of individuals electronic information resources, and 4) organizational procedures and policies. Three primary themes that represented the benefits of using web-based resources were also identified: 1) past experiences and knowledge of a specific resource or the required technologies, 2) availability and accessibility on the unit, and 3) specific characteristics of individual information tool. In many cases, nurses commented on specific characteristics or features of favorite information resources. Favorite sites included a variety of reputable health care organizations that displayed context in text, audio, and/or video. In addition such sites were described as easy-to read and provided content related to patient-focused information or specific content such as toll free telephone contact numbers.

Information searching is the interaction between and among information users and computer-based information systems. Information seeking is becoming an important part of the knowledge work of nurses. Information seeking and searching intersects with the field of human computer interaction (HCI), which focuses on all aspects of human, and computer interactions. Users of an information system are understood as "actors" in situations, with a set of skills and shared practices based on work experiences with others. Designing better tools and developing information searching strategies that support, extend, and transform practices, begins by asking: Who are the users? What are the tasks? What is the interplay between the technology and the organization of the task? This study contributes fundamental data and information about the rationales nurses use in information seeking tasks. In addition it provides empirical evidences regarding barriers and benefits of information seeking in the context of patient education needs in inpatient clinical settings.

Keywords: Health information systems, nurses' information seeking, searching web-based knowledge resources, patient education.

INTRODUCTION

On clinical patient care units, patient education is a significant part of regular nursing care. In fact, with the increasing use of information prescriptions and information therapy in evidence-based practice, clinical nurses regularly seek information in support of patient care [1-4]. Patients value information related to their illnesses and treatments. Some patients and caregivers, however, may doubt that their information needs are adequately addressed because the

resources may not be available on the clinical unit [5-8]. Verbal information and instructions, for example, are significantly less effective than written/printed information. Often patients and families quickly forget what is said to them [8, 9]. Therefore, it is important that nurses develop and master information seeking skills so that they can access and find information resources they can offer directly to patients and caregivers. This observation study provides an understanding of searching habits of nurse patient educators regarding the retrieval of patient education information on clinical inpatient care units. The results provide an understanding of the process by which clinical nurses seek patient education information and materials on the web.

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The benefits of high quality patient information are well documented [10-12]. Quality patient information promotes active patient participation in healthcare decision-making and helps to improve patients' and caregivers' psychological well-being and overall wellness [13-15]. Receiving symptom-linked information resources about expected recovery experiences improves compliance with prescribed care routines and reduces emotional distress during recovery [8, 10-12, 16]. A positive correlation exists between the provision of patient information and improved communication with healthcare professionals [8]. Research illustrates, however, that people need not just general information, but patient-centered, staged information that supports teaching and learning throughout all phases of a disease and recovery trajectory [8].

INFORMATION SEEKING AS NURSING KNOWLEDGE WORK

Information seeking in nursing practice is activated as a result of direct patient care needs related to the disease/recovery cycle. Such activation may be stimulated by a patient or family request, particularly when transferring in or out of a ward, or upon discharge [8]. The amount and timeliness of information needs are often non-uniform and vary across the different tasks and roles that a nurse may perform. Most clinical nurses are often charged with finding information for patients to take home. Answering patient or caregiver information requests, searching for patient-appropriate materials, preparing learning materials and enacting the teaching role, as well as providing colleagues with necessary information or care plans, are all important aspects of professional nursing care.

While internet access to electronic resources is available on the clinical unit, nurses still tend to under-use it. The extent to which information seeking for evidence-based practice is valued or encouraged within a particular unit creates obstacles to pursuing high quality information for patient education [8, 17-20]. Information seeking is becoming part of nurses' knowledge work and an expected professional competency. However, nurses' rigid work schedules leave little time for the increased demands of information seeking and attending to the knowledge work inherent in the assessment, evaluation and critique of available patient care/education information. Nurses are expected to find or produce patient-focused information at the point-of-care and need, particularly when a patient waits while the nurse conducts a search [18, 21-24]. It is not unusual that nurses are confronted with requests from patients or their caregivers for information not included in the standardized education packages or materials that are accessible *via* the hospital intranet. Standardized patient education materials may not be staged to the individual recovery process nor organized in a manner that is optimum for time relevant use. Information is often too abstract or impersonal, with content geared toward generalized 'survival skills' for patients' self-care management. When content is not based on the patient's individual priorities and characteristics, it ultimately fails to address a person's specific needs and problems [5-8]. "Furthermore the patient may require care, not normally undertaken in that clinical area (e.g. tracheostomy care)," creating an additional information challenge [8]. With patients requesting

information that is relevant to their own disease or recovery process, nurses must focus their attention on patient-tailored information resources, seeking information from a variety of resources including colleagues, the patient record, or other high quality sources [23, 24]. Despite the plethora of free-of-charge web-based information and widespread access to information resources in the workplace, nurses find that much of the information is not very useful for clinical practice: too much undifferentiated information or incomplete information.

Common barriers to nurses' information seeking on the clinical unit are lack of access to the most relevant resources; search results that are too large to be useful; search results that retrieve information that is incomplete, inaccurate, inconsistent and non-evidences based; and information that is too difficult to read or understand [8, 17, 18, 20, 25].

Clinical nurses are not typically professionally trained to find and quality-filter condition-specific, patient-centric content to satisfy sophisticated information needs. Clinical nurses may not "understand or value research and have received little or no practice"[26]. They may not possess the information literacy or knowledge management skills required to actually apply in clinical practice the principles of evidence-based nursing [18, 21, 26]. Lack of basic bibliographic and web searching skills, and not knowing when to use important resources such as MEDLINE (PubMed or OVID), MEDLINEplus or others [21, 22, 27] represents a professional nursing knowledge deficit that negatively impacts quality care and patient education efforts. For example, in one study, data revealed that nursing students used more online databases including CINAHL and PubMed than did their clinical nurse counterparts. Nursing students were more likely to perform a database search one to five times a week than were clinical nurses [27].

Even if resources are available and nurses are trained to use them, little attention is given to the efficiency and effectiveness of the materials retrieved for patient education. What do nurses' web-based searching skills look like? Do they use information literacy skills to find and evaluate web-based information appropriate for patient use? The purpose of this study was to answer the following two questions:

- What are clinical nurses' rationales for their approaches to finding patient educational materials on the web?
- What are perceived barriers to and benefits of the use of web-based information resources for patient education in the context of nursing clinical practice?

METHODOLOGY

Observing nurse participants on the clinical units provides fundamental data about the practice context and the issues that emerge when information seeking is required. Such observational data and analysis are likely to provide librarians and other health educators with knowledge about web-based patient care information resources as well as barriers and facilitators to nurses' information seeking needs.

A convenience sample of eight volunteers was recruited from an urban teaching hospital with multiple affiliated clinics as well as a small urban community hospital with an associated home care agency. Both institutions value patient

education. In the teaching hospital, patient education is coordinated through the "Learning Center," a nursing unit which is exclusively responsible for all patient and family teaching. At the community hospital, patient education is integrated into daily nursing care, rather than offered by a distinct unit. One of the hospitals has a medical library with no particular emphasis on consumer health. At both institutions, patient education activities are largely based on clinical pathways, as well as more individualized education for individual problems, questions, or issues. Most nurses make heavy use of the standardized educational materials on the hospitals' intranets, since on-unit web searching is not advocated by the nursing administration in either institution.

Demographic Variables

All research participants were Caucasian; seven were female and one was male. All were actively involved in patient education. Two of the eight participants were formal 'nurse patient educators.' The remaining six worked as clinical nurses on medical-pediatric, surgical, and day-surgery units. All participants had significant computer experience (>2 years) and used computers every day at work or at home.

Participant data summarized in Table 1.

Table 1.

Age Range (8 Participants)	29-55 (Mean=43)
Educational Level	3 diploma 4 BSN 1 MSN
Hospital Units Represented	Medical-pediatric Surgical Day-surgery
Years in Nursing	6-34 (Mean = 19.25 yrs; Median = 21 yrs)
Years in Current Position	8 months – 23 years (Mean = 7.75 yrs; Median = 6.5 yrs)

Data Collection

The nurse participants were observed on their clinical units on 16 separate occasions (two observations per participant). A trained researcher was on the units during previously-schedule dates and times. During this time, when the nurse decided to seek out patient information or look for materials not available in the standardized educational packages on the unit or through the hospitals' intranets, nurse participants informed the researcher-observer and the data collection process began.

If a patient encounter initiated the information need, participants were asked to describe their recall of the encounter. Specifically the nurses were asked to recall why, when, and how the nurse decided that the patient's information needs were unmet. Nurse participants then conducted a web search for information. During the search, participants were asked to think out loud and verbalize their thoughts and feelings, their approaches to the search process, and the selection of materials. Nurse participant comments

were audio-taped and later transcribed. A detailed log of the search path, search history, and search terms was also recorded; the research observer also took field notes during the observation.

Immediately after finishing their searches, nurse participants completed an open-ended questionnaire about the information searching process. The questionnaires asked about the information needs that initiated the information search. In addition, they were asked about their reasons for selected search terms, moves, and paths; possible alternative search terms that might have facilitated the search; and the nurse participants' perceptions of the search process and its results. The questionnaire also asked about the nurse participants' perceptions, likes, and dislikes related to finding and using web sources for patient education. Nurse participants took various lengths of time searching for patient information; therefore, data collection lasted between 30 minutes to two hours for each of the 16 observations.

These observations resulted in rich qualitative data from multiple sources:

1. Transcripts of nurses' think-aloud processes during 16 search session (two per participant)
2. Observer field notes during 16 search sessions
3. 16 completed search logs (recorded detail of links, pages viewed, search terms, and search history, etc.)
4. Detailed results of the information-seeking questionnaire (8 completed)

Data Analysis

All data sources were content analyzed. Individual data units were identified, organized, classified, and edited to process qualitative data to a manageable set of content categories [28-32]. Two independent analysts with expertise in qualitative research methods and knowledge of patient education were recruited to assist in content analysis [28, 31]. Inter-rater reliability was assessed, with the resulting correlation coefficients ranging from 0.782 to 0.990, indicating a very good to excellent relationship between analysts' coding schemes [33].

What are Clinical Nurses' Rationales for their Approaches to Finding Patient Educational Materials on the Web?

One of the primary purposes of this study was to understand the rationales nurses use for searching for web-based patient educational material. Over 179 individual data units were analyzed in this study to understand such rationales. *Rationale* was defined as the underlying catalysts or activators leading to an information need. Analyses found that the primary reasons why clinical nurses conducted web-based information searches included direct patient requests (9 requests), colleague requests (6 requests), building patient materials collections (4), patients' family requests [3], routine teaching [1], personal development [1], or staff development [1]. From these data, four broad themes emerged: professional reasons, personal reasons, technology reasons, and organization reasons for selecting information resources.

Table 2. Nurses' Rationales for Searching Patient Educational Materials in Electronic Resources

Professional [76] (M = 42)	Personal [65] (M = 36)	Technological [26] (M = 14.5)	Organizational [12] (M = 7)
Patient request [40] (M=53)	Experience and knowledge [14] (M = 21.5)	Bookmarked [8] (M = 31)	Routine procedure [11] (M=92)
Request of colleague [11] (M = 14.5)	Perceived time requirements [14] (M = 21.5)	Ease and accessibility of information [8] (M = 31)	Use not allowed [1] (M = 8)
Building teaching material [8] (M=10.5)	Familiarity and confidence [12] (M 21.5)	System features [5] (M = 19)	
Request family member [7] (M = 9)	Perceived availability [11] (M = 17)	Hyperlinked documents [3] (M = 11.5)	
Professional development (personal) [7] (M = 9)	Perceived variety and amount of information [11] (M=17)	Time requirements [2] (M = 7.7)	
Professional development (staff) [2] (M= 2.6)	Information suitable for patient use [9] (M = 14)		
Routine teaching procedure [1] (M=1)	Positive feeling (e.g., comfort, etc.) [5] (M= 7.7)		

[n] = Number of data units that describe the rationale.
(M) = Mean.

Professional Information Requests

Professional reasons were the most frequently cited for searching for patient education materials. "Professional reasons" included information requests that, in most cases, came directly from patients during pre-discharge teaching or during clinic or hospital-based medical encounters. In these cases, patients' requests were for information that was not included in the hospital intranets' standard information resources or published in their printed educational packets. Additionally, information requests were primarily for content that was tailored toward specific patient characteristics or specific patient population.

The second most frequently cited reason for web-based patient education searches was a request from a colleague, for example, "I received a request regarding Marfan (syndrome) and the cardiac link to Marfan. For starters, the patient wanted information, but the nurses also wanted to know what Marfan was. They knew of gigantism, but they didn't know much more than that."

Personal Information Queries

The next most frequently cited reasons were "personal reasons," including previous experience, familiarity and comfort; perceived availability or variety; and other site-specific favorite features. The positive relationship between usage of an information resource and an individual's previous experience, perception of a tool's accessibility, availability, accuracy of content, perceived trustworthiness, convenience and usefulness have been documented [34-37]. The current finding that nurses' perceptions of the information resource, knowledge, and past experiences influences the choice of an information resource confirms those earlier studies. As one would expect, specific

information resources were mostly likely to be used when the nurse perceived that the required information was available and the site contained a variety of content from which to select. Perceived time needed to located information was also an important factor in nurses' information searching. If the nurse perceived that less time was needed to find the information in an electronic resource, the nurse was more likely to go to that source. The perception that information from certain electronic resources is suitable for patient use was also reported. For example, one nurse commented, "The reason I use this (site) is because it seems to be organized in a way that patients...would ask the questions: what is this, how is it caused, how is it treated? And it gives them just sort of a start.

Technological Features

Technological reasons for initiating an information search included the selection of specific information resources based on key system features such as friendly interface (visually and spatially appealing), easy access, on-demand accessibility of content independent of physical location, the availability of hyperlinked documents, and so on. This finding attested to the popularity of many information resources largely due to the visual appeal and comfort users feel in manipulating and navigating the environment, primarily through visual icons and readily identified interface features [38, 39].

Additionally, nurses relied heavily on existing bookmarks on unit computers, assuming that if a site has been marked by another user in the clinic, it would perhaps be useful in this situation as well. One nurse explained, "So I go into the browser, and the first thing I do is check the bookmarks that we have here...to see if there is anything that

can help me. So, that's what I usually look for – o see if it's under our bookmark first. If it isn't, then I'll do a general search.”

Organizational Factors

Organizational reasons for web-based information searches were identified as hospital/unit policies or procedures that required the nurse to find information for patient education. Results of data analysis illustrated that nurses fairly routinely conduct information searches to provide patients with discharge instructions. In other cases, hospital policy or procedures either promote or prevent the use of specific tools, for in cases when a hospital intranet had standard educational materials, hospital policy discouraged nurses from searching for additional Internet resources. Indeed, organization procedures and policies have previously been shown to influence ways in which information is made available organizationally, and impact on how information flow is contained and directed across an organization [40].

BARRIERS AND BENEFITS

The second primary research question asked “What are perceived barriers to, and benefits of, the use of web-based information resources for patient education in the context of nursing clinical practice?” An operational definition of “barriers” and “benefits” includes those factors that impede or hinder – or facilitate or promote – the integration of web resources for patient education in the context of daily work. These may include situational factors (i.e., task requirements, task complexity, and the related type of information need), organizational factors (e.g., procedures and policies), technical issues (e.g., system's interface, presentation of information), or personal factors (e.g., prior experience and knowledge).

Content analysis identified 306 individual data units representing either benefits (178 units) or barriers (128) to nurses' use of web resources for on-unit patient care. Interrater reliability was assessed and found to be excellent ($r = 0.943$ to 0.961).

Barriers of Using Web-Based Knowledge Resources

The primary themes that emerged as barriers to the used of web-based resources included: 1) time requirements to perform a search; 2) nurses' experience and knowledge about the resources or required technology; 3) specific characteristics of individual electronic information resources; and 4) organizational procedures and policies.

Not surprisingly, “time requirements” were identified as the primary barrier to effective use of web-based resources. Clinical nurses simply do not have the time to search for patient materials and filter the information during working hours. Interestingly, at some point, all research participants expressed a perception that searching the web for information is time-prohibitive, especially when patients or family members are waiting for information. One research participant commented, “If a patient is waiting for info [sic] and the search takes too long, the search is abandoned. The search will be resumed when the patient is gone and the documents will be mailed to the patient.” Other participants noted, “I like the concept of using the web for information, but time is prohibitive as a staff nurse,” and, “...a lot of

times when you're going through the Internet and you see the first sentence or two from a link or a page. Sometimes you get a good idea of what that's about, but a lot of times you get on it and think this is not at all what you thought it was. And you spend a lot of time, wasted time, doing that.”

Observational data showed that the duration of research participants' searches for this research ranged from just less than five minutes up to 45 minutes, with an average of 17.8 minutes each. This is far more time that the average nurse has to invest.

Lack of knowledge about specific resource or the technologies required to use them, as well as previous negative experiences with specific resources, were also important factors that hampered effective information searching and retrieval in clinical practice. As illustrated through the comments below, despite using computers daily, clinical nurse participants were not particularly comfortable or confident with their web searching skills: “I like to look up something on the web... but I really don't know how to use it,” “I have a difficult time just searching the web for patient information,” and “You know, if it's (the searching process) driving me nuts then I go back to something I'm familiar with.”

In addition, the specific characteristics of information resources also posed barriers to effective use. Browser-based search engines, for example, maximize search results, leading to long, undifferentiated list of both appropriate and inappropriate information resources. Nurse participants who used Google or other searching engines were, on average, willing to browse through eight documents before giving-up. Participants were also unwilling to dig deeply (that is, use multiple internal hyperlinks) into a resource before abandoning it.

Finally, organizational barriers commonly cited among participating nurses concerned hospital policies and procedures that dictated preference of intranet packages. Policies limited access to certain web sites, and in some cases, discouraged the use of the web from clinical units.

Benefits of Using Web-Based Knowledge Resources

Three primary themes that represented the benefits of using web-based resources were also identified: 1) past experiences and knowledge of a specific resource or the required technologies; 2) availability and accessibility on the unit; and 3) specific characteristics of an individual information tool. In many cases, nurses commented on specific characteristics or features of favorite information resources. Favorite sites included a variety or reputable health care organizations that displayed context in text, audio, and/or video. In addition, such sites were described as easy-to read and provided content related to patient-focused information or specific content such as 1-800 numbers. Table 3 shows frequencies of data units in each category as well as the data units counted for each theme.

DISCUSSION

This research investigated how the use of information technology for the retrieval of patient educational material supports and expands patient education. Information retrieved can be transferred to patient and caregivers, and

Table 3. Barriers and Benefits of Web-based Patient Education Materials: Frequencies of Factors

Characteristics of Information Resources Including the Search Engine's Operation	Characteristics of Information Available such as Content, Presentation, Accuracy, Publisher of Information
[67] (M= 52)	[107] (M=60)
Time requirements	Knowledge and positive experience
[34] (M = 26.5)	[57] (M =32)
Lack of knowledge and experience	Accessibility and availability of electronic resources on the unit
[25] (M = 19.5)	[14] (M = 8)
Organizational procedures and polices	
[2] (M = 1.5)	

[n] = number of data units that describe the rational.
(M) = Mean.

perhaps more important, the information available in electronic resources allows for more patient-centered education. The amount, presentation, and diversity of information available make it possible to tailor patient education materials to the patient's need and preferences.

Overall, data analyses revealed that research participants perceived and valued patient education in clinical practices as a complex range of planned and ongoing activities and communication practices requiring constant coordination and mediation. In patient education, participants reported making use of a combination of methods such as teaching, counseling, and behavior modification to influence patients' knowledge and behavior related to the disease process. Nurse participants described a multidisciplinary team that not only coordinates educational interventions but also decided upon the content of informational materials. The teams try to build a "model of recovery pathway" for each patient, with content guided by 1) the desired health outcome; 2) the amount of information that can be covered within the allotted time for patient teaching; 3) the availability and accessibility of the information on the unit; and 4) the personal interest of the person responsible for the teaching.

Ultimately, all hospital departments can become involved in a single patient's care: "dietary, pharmacy, cardiac rehab, and obviously the doctors and nurses on the units" are all integral to patient education in the clinical setting. Librarians, unfortunately, were not mentioned by participants as an integral part of this care team. This poses a tremendous opportunity for librarians to partner with clinical nurses to provide consumer health information at the bedside. While it is generally acknowledged that nursing education and practice do not value information seeking, the availability of a librarian can help overcome this gap. Additionally partnering more closely with nurses also gets librarians closer to the bedside. We often see health consumers at a different point in the health management cycle, not only at the point of unit transfer or discharge but also during the course of daily life.

The clinical nurses participating in the study perceived the diversity and variety of web-based information and formats to be distinct advantages, but face considerable barriers to web-based searching on the unit, including a lack of time, lack of experience, organization barriers and others. Research participants perceived and valued patient education

in clinical practice as a complex range of planned and ongoing activities requiring constant coordination and mediation through multiple communication challenges. Positive past experiences with searching information give nurses confidence about their abilities to find patient-focused instructions or information on the web.

Limitations of the research included the small and homogenous sample. Still, generalization of findings are fruitful for providing health sciences librarians a picture of information seeking and the accompanying issues in the clinical nursing practices of participants. Additionally, while the high level of subjectivity inherent in qualitative exploratory studies may weaken results as well, multiple coders were used; further, the use of a topical guideline during observations resulted in more systematic considerations and interpretation of the data.

CONCLUSION

Information searching is the interaction between and among information users and computer-based information systems. Information seeking is becoming an important part of the knowledge work of nurses. Information seeking and searching intersects with the field of human computer interaction (HCI), which focuses on all aspects of human - computer interactions. Users of an information system are understood as "actors" in situations, with a set of skills and shared practices based on work experiences with others [41, 42]. With perspective, it is clear that designing better tools and developing information searching strategies that support, extend, and transform practices, begins by asking: Who are the users? What are the tasks? What is the interplay between the technology and the organization of the task? This study contributed fundamental data and information to the rationales nurses use in information seeking tasks. In addition it provides empirical evidences related to the barriers and benefits of information seeking in the context of patient education needs in inpatient clinical settings.

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