

## ORIGINAL RESEARCH

# Nursing faculty and student experiences with information literacy: A pilot study

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## Abstract

**Background:** A nursing workforce equipped with information literacy skills is vital to patient care delivery based on evidence. Nursing faculty must educate and prepare nursing students at all levels with these skills. Information literacy skills development in nursing programs is often addressed irregularly and in many cases libraries are charged with teaching these skills. This manuscript described the information literacy experiences of nursing students and faculty at a teaching university in the Southeastern United States. Research questions include 1) What do nursing faculty and nursing students know about using online information sources? 2) Do nursing faculty and nursing students use reliable online information sources on a regular basis? and 3) What types of technology do nursing faculty and students encounter and use in the classroom and clinical setting?

**Methods:** A descriptive study was conducted to determine nursing faculty and nursing students' experiences involving information literacy in the classroom and clinical setting. All nursing students and faculty were invited to participate and were provided with details about the study purpose and survey via email. Participation was strictly anonymous and voluntary. Data collection was conducted using an online survey that consisted of 20 multiple choice questions, 6 of which contained follow-up questions.

**Results:** Sixty-six participants responded to the online survey. Fifteen (22.8%) were faculty and fifty-one (77.3%) were students. Data analysis reveals that most participants rate information literacy abilities that correlated with patient care as very valuable (59%, n = 39) or valuable (41%, n = 26). Additional results including participants' responses to questions regarding information informing nursing practice, personal computer and information literacy skills, and barriers to accessing evidence-based information in the clinical setting were reported.

**Conclusions:** Healthcare providers recognize the need for information literacy skills in the clinical setting but often lack the skills associated with locating, accessing, evaluating, and applying information needed for evidence-based practice. By understanding nursing faculty and students' experiences with information literacy, learning activities can be designed and implemented that meet the needs of the study population.

## Key words

Information literacy, Nursing programs, Informatics, Technology, Evidence-based information

# 1 Introduction

The amount of information that nurses must manage continues to expand at a rapid rate. Leading nursing organizations support and encourage nurses to integrate evidence-based information (often found in nursing literature) into their day-to-day practice<sup>[1]</sup>. However, it has been reported that nurses under use nursing literature for this purpose<sup>[2]</sup>. Many workforce nurses do not possess the knowledge or skill sets necessary to effectively use literature-based research evidence to guide their practice<sup>[3]</sup>. The nursing workforce must possess information literacy skills that enable them to access and use evidence, efficiently and effectively<sup>[4]</sup>. Faculty must consider how to teach nursing students the necessary information technology and literacy skills they will need in their professional practice<sup>[5]</sup>.

Information literacy is defined as the process of recognizing when new information is needed, then locating, evaluating, and using the found information effectively<sup>[6]</sup>. It is somewhat ambiguous as a concept and many suggest that it is closely connected to critical thinking<sup>[7, 8]</sup>. Effective information literacy skills influence a wide range of knowledge-based behavior in the healthcare setting. Though our understanding of information literacy within the workplace continues to emerge<sup>[9]</sup>, a relationship between information literacy and evidence-based practice exists. Information literacy skills are used when gaining answers to clinical questions. These skills are considered a prerequisite to evidence-based practice (EBP)<sup>[10]</sup> and are foundational to being a lifelong learner.<sup>[6]</sup> In fact, the ability of the practicing nurse to evaluate information informs decision making within the clinical setting and supports the application of evidence to clinical care<sup>[11]</sup>. Information literacy is one of the most important skills to be gained through nursing education<sup>[12]</sup>. Each phase in the information literacy process (finding, retrieving, analyzing, and using information)<sup>[6]</sup>, is unique in focus and requires a specific skill set for the person engaged in the process. A need exists for nursing education interventions that target these skill sets and equip students to use research evidence in their nursing practice.

Unfortunately, many (if not most) nurses do not possess adequate information literacy skills<sup>[3, 13]</sup>. For practice-related questions, nurses are not using the most up-to-date resources, instead using sources of general and less-credible information<sup>[13, 14]</sup>. Nurses tend to seek information from their colleagues and draw on their past experiences instead of looking to journals and primary data sources for information relevant to their clinical practice questions<sup>[14]</sup>.

The purpose of this non-experimental descriptive exploratory study was to examine the experiences of student nurses and faculty relative to information literacy, adding descriptive evidence drawn from the realities of a nursing-education learning environment. The research questions that guided this study were: 1) *What do nursing faculty and nursing students know about using online information literacy sources?* 2) *Do nursing faculty and nursing students use reliable online information sources on a regular basis?* 3) *What types of technology do nursing faculty and students encounter and use in the classroom and clinical setting?*

## Review of literature

Empirical evidence to support the benefit of using evidence in practice exists. However, there is limited research in the area of information literacy programs within nursing. Furthermore, the programs reported in the literature vary in terms of content discussed, program delivery, and reported outcomes. The IOM recommends that nurses practice to the fullest extent of their education and training<sup>[15]</sup>. The IOM further advocates for nurses to make use of health information technology in an effort to collect, synthesize, and examine quality data about nursing care<sup>[15]</sup>.

It has long been recognized that the use of evidence-based resources and information can result in improved patient care outcomes<sup>[16]</sup>. Nurses need skills to search evidence-based resources and apply that evidence to the care of their patients. It has been verified that healthcare professionals will use online evidence-based information sources in the clinical setting after being taught how to use them<sup>[17-19]</sup>. Studies have indicated that with increased exposure and knowledge, nurses' perceptions of their abilities to seek information improve<sup>[2, 4, 11, 20-22]</sup>. In addition, studies have revealed that healthcare providers using the professional literature receive better answers to their questions<sup>[23]</sup>, they have higher levels of satisfaction<sup>[24]</sup>, and health care institutions benefit from decreases in patient length of stays and cost<sup>[25]</sup>.

The changing nature of healthcare demands that nurses incorporate evidence-based approaches to nursing care<sup>[15]</sup>. Nursing students must develop information literacy skills in an effort to improve practice and further develop nursing knowledge<sup>[2]</sup>. As a result, nursing faculty must educate and equip nursing students at all levels to find and effectively use the evidence that can guide their practice. However, some faculty may not be prepared to teach these skills to nursing students. Nursing faculty often lack understanding in the areas of informatics and computer skills<sup>[5]</sup>.

Information literacy skills development in nursing programs has been addressed irregularly. In many cases librarians are charged with the responsibility of teaching these skills to students<sup>[4]</sup>. McNeil *et al.*<sup>[5]</sup> surveyed baccalaureate nursing programs and found a lack of understanding about information literacy and computer literacy, both of which are foundational to acquiring knowledge<sup>[26]</sup>. Many of the nursing schools surveyed<sup>[5]</sup> had no plans to offer educational activities for teaching information technology skills in the future. Recent recommendations<sup>[27]</sup> called for a need to reframe educational paradigms that address the need for lifelong learning in healthcare professions, while equipping graduates with the competencies to facilitate their success. Their definition of lifelong learning included competencies to develop "... an understanding of evidence-based healthcare and critical appraisal, [as well as] familiarity with informatics and literature search and retrieval strategies...."<sup>[27]</sup>

## 2 Subjects and methods

A non-experimental descriptive exploratory study was conducted to determine nursing faculty and student experiences involving information literacy in the classroom and clinical setting. An investigator-developed self-report 20-item survey was used to collect data on the information literacy experiences and computer skills of nursing students and faculty. Although, as noted above, librarians are often the default and sometimes only source of education on information literacy for nursing students, this study focused specifically on nursing students and nursing faculty in an effort to gain insight into perspectives from this group.

Permission to conduct this study was solicited from the associated University Institutional Review Board prior to implementation. Information about the purpose of the study, as well as confidentiality issues were addressed within the consent statement. Willingness to complete the survey implied informed consent for each participant.

Recruitment of participants began by contacting all enrolled nursing students and faculty at a university in the Southeastern United States via email. Those students and faculty were given details about the study purpose and survey. Potential participants were informed that their participation was strictly voluntary and anonymous. The potential study population consisted of 30 faculty members with a master's degree or higher in nursing and 89 Associate Degree (AD), 101 Baccalaureate in Nursing Science (BSN), and 33 Masters of Science (MSN) students.

An online survey was developed by the research team and judged to have face validity based on literature evidence and comparison to a previously validated instrument. The investigator-developed survey was influenced by a review of literature addressing information literacy skills in nursing. The research questions served as a framework for the development of the instrument. An effort was made to make questions relevant to faculty and student participants in nursing, while endeavouring to reduce respondent burden by decreasing the amount of questions in the survey. The survey was conducted to gather information regarding nursing faculty and nursing students' experiences involving information literacy in the classroom and clinical setting.

Data were collected via online survey using the Class Climate® software. The survey consisted of 20 multiple-choice questions. The survey was composed of the following question foci: demographic (n = 3), accessing reliable information to inform nursing practice (n = 6), personal computer and information literacy skills (n = 2), opinions on the value of information literacy to patient care (n = 1), the use of electronic communication and documentation in the clinical setting (n = 3), barriers to accessing evidence-based information in the clinical setting (n = 3), and the use of a personal digital

assistant in the clinical setting (n = 1). Six of the questions solicited participants' responses to a follow-up, open-ended question.

Participants accessed the survey by using a link provided in an email soliciting participation from all students and faculty. Each participant was asked to mark the answers reflective of their individual experiences and submit the survey electronically when finished. Email addresses of the potential participants were not stored in any way. No other contact was made with participants.

## Analysis

Data from the online survey were imported into Excel and later downloaded into SPSS v. 20™ for further analysis. Data were screened for accuracy, missing values, and coding errors. Missing data when some participants did not respond to every question resulted in variations in sample size for individual questions. Frequency distributions, percentages, and univariate statistics were calculated for each question. Responses of groups and subgroups were compared using cross-tabulations when the sample size was large enough.

## Ethics

Permission to conduct this study was solicited from two institutional review boards prior to implementation. Information about the purpose of the study, as well as confidentiality issues were addressed with participants prior to accessing the online survey. Willingness to access and begin the online survey implied consent by the participant. Participation was voluntary and strictly anonymous.

## 3 Results

This study focused exclusively on experiences of student nurses and faculty with information literacy. The overall response rate to the electronically distributed questionnaires was 26% (n = 66), including responses from 15 faculty members (22.7%) and 51 nursing students (77.3%). Faculty members responding to the survey had been licensed from 5 to greater than 20 years, while the majority of students (n = 51) who responded 42 (82%) were not licensed as an LPN, RN, or nurse practitioner. Of the 66 who responded, 42 (82%) were currently nursing students (see Table 1).

**Table 1.** Sample Information. Total Participants: N = 66 (100%)

Demographic Characteristic	n (%)
<b>Academic Status</b>	
ADN Student	3 (5%)
BSN Student	43 (65%)
MSN Student	5 (8%)
MSN Prepared Faculty	11 (17%)
PhD Prepared Faculty	4 (6%)
<b>Years Licensed as a RN, LPN, or NP</b>	
Currently a Nursing Student	42 (64%)
<1 Year	2 (3%)
1-5 Years	2 (3%)
6-10 Years	4 (6%)
11-15 Years	2 (3%)
16-20 Years	2 (3%)
> 20 Years	12 (18%)

### Evidence-based resources

Participants were first asked to respond to where they found information about up-to-date evidence-based practices. A large majority of respondents (88%, n = 58) said they referred to nursing textbooks to find out about up-to-date evidence-based practices. Less than half the respondents (45%, n = 29) reported accessing professional nursing websites on the Internet (see Figure 1).

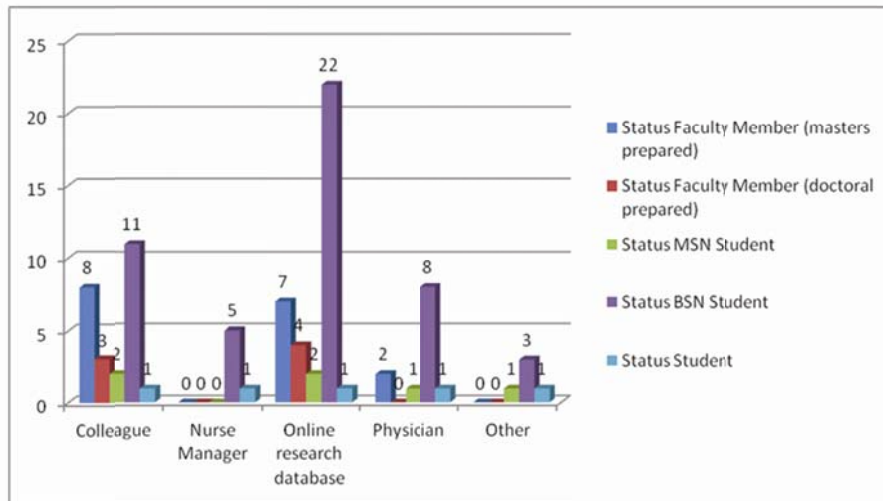


Figure 1. Sources of Up-to-Date Evidence-Based Information

### Accessing databases to support nursing care

Results include participant responses relating to: personal opinions regarding the need to access information resources to provide care; access of professional nursing websites for information; barriers experienced while accessing online databases for information; access to online information resources during clinical hours; evidence-based practice information sought; familiarity of online databases; databases accessed; and frequency of databases accessed. Study findings related to accessing resources to support evidence-based nursing care are summarized in Table 2, Accessing Resources to Support Evidence-Based Care.

Table 2. Accessing Resources to Support Evidence-Based Care

Question Focus	Responses Total n	Faculty		Students		
		Doctorate-Prepared n (%)	Masters-Prepared n (%)	MSN n (%)	BSN n (%)	ADN n (%)
Feel the need to access information resources to provide care*	63	4 (100%)	7 (64%)	4 (80%)	29 (73%)	2 (67%)
Accesses professional nursing websites*	64	4 (100%)	8 (80%)	4 (80%)	12 (29%)	1 (33%)
Experiences barriers accessing online databases*	62	3 (100%)	6 (60%)	3 (60%)	26 (63%)	1 (33%)
Able to access library retrieval systems & databases during clinical hours*	63	2 (67%)	3 (27%)	2 (50%)	15 (36%)	1 (33%)

\*Indicates data missing from one of the subgroups.

Our survey revealed that respondents particularly valued information literacy abilities that correlated with patient care, with 59% (n = 39) of respondents stating that these abilities were very valuable and 41% (n = 26) saying that these abilities were valuable. A small percentage (13%, n = 8) of respondents used email to communicate information related to direct patient care, while 54% (n = 34) said they used a computer to record information about patients in the clinical setting.

### **Self-reported personal computer and information literacy skills**

Participants rated their computer literacy skills using a scale of 0 (not at all computer literate) to 10 (highly computer literate), and 95% (n = 61) stated that they were computer literate to highly computer literate. Thirty-eight percent (n = 24) reported using point-of-care technologies in the clinical setting, while 11% (n = 7) said they used a personal digital assistant/PDA.

Participants self-reported their ability to evaluate the reliability of information they accessed, using a rating scale of 0 (no ability) to 10 (highly proficient), with 94% (n = 61) of respondents ranking themselves as proficient to highly proficient. Respondents also rated their level of proficiency with information literacy on a scale of 0 (no preparation) to 10 (highly proficient). The vast majority (89%, n = 57) of respondents rated themselves as proficient to highly proficient related to information literacy skills applicable to the nursing workforce.

### **Barriers to accessing online information**

The factor most commonly reported as a barrier for accessing online information was related to lack of time. This was followed by “no computers available to perform these searches” (36%, n = 24). Other reported barriers included “do not know how to access databases” (20%, n = 13), while a small percentage (3%, n = 2) felt that accessing these databases was “not necessary”.

Interestingly, only 37% of respondents (n = 23) reported being able to access library retrieval systems and databases during clinical hours at any of the facilities to which they had been assigned so they could search for information relevant to patient care. Our survey also found that 11% of respondents (n = 7) reported not consulting library retrieval systems and databases to search for information, while 29% (n = 19) said that they did so several times a year, and 27% (n = 18) reported using these systems and databases monthly to weekly. A small percentage (5%, n = 3) reported accessing library retrieval systems and databases on a daily basis.

## **4 Discussion**

Literature upholds the use of EBP techniques when incorporating evidence into decisions made in the clinical setting. Many believe that practice based on evidence is now the expected standard of care in nursing<sup>[15, 28]</sup>. However, administering treatments and interventions that are not scientifically based is not unusual<sup>[29]</sup>. Between 20% and 25% of patients receive unnecessary or harmful treatments; meanwhile, it is estimated that 30% to 40% of patients do not receive care that is known to be effective<sup>[30]</sup>. In addition, today’s nursing students are considered more technologically literate. However, they continue to have challenges recognizing, investigating, and articulating the nature of their information needs<sup>[31]</sup>. In this study, the majority of participants 98% (n = 66) indicated that information literacy skills are valuable or very valuable in the clinical setting, yet 63% (n = 39) faced barriers accessing online information in the clinical setting. While most participants in this study rated themselves as proficient or highly proficient in regard to information literacy skills, a commonly cited barrier to EBP is the lack of information literacy skills<sup>[13, 32, 33]</sup>.

Evidence has shown that self-report measures may not be an accurate predictor of information literacy competencies. Individuals often rate themselves at a higher proficiency than is demonstrated with knowledge level application of information literacy skills<sup>[34]</sup>. Concurrently, a number of hospitals report providing care based on evidence<sup>[35]</sup>. Yet, lack of

information literacy skills has been discussed in the nursing literature as a barrier to delivering evidence-based care <sup>[13, 30, 31]</sup>.

Recommendations of the American Nurses Association (ANA) call for all nurses to be information literate <sup>[36]</sup>. Being information literate requires knowing how to clearly define or describe a subject or concept being examined, use appropriate terminology, formulate a search strategy, use critical thinking skills to assess information collected for value and suitability to the situation and, as a result, convert information into knowledge <sup>[6]</sup>. In consideration to research question 1: despite the majority of participants (89%) in our study ranking their information literacy skills as proficient or highly proficient, 59.1% of participants noted that they encountered barriers when attempting to access online information, only 34.8% were able to access online information retrieval resources during clinical hours, and 20% acknowledged that they lacked the skills and knowledge to access database information resources. These findings correlate to prior evidence <sup>[3, 13]</sup> that members of the nursing workforce may not possess the knowledge and skills necessary to gather and use literature evidence to guide their practice decisions.

It is believed that EBP cannot be applied in the absence of information literacy skills <sup>[37]</sup>. In nursing, EBP is the identification of the best available evidence to inform decisions leading to quality healthcare care <sup>[13]</sup>. In consideration to research question 2, findings from this study revealed that 88% (n = 58) of participants used nursing textbooks as an up-to-date resource for evidence-based practice (EBP), while 38% (n = 25) reported they turned to a colleague, 9% (n = 6) went to a nurse manager, and 14% (n = 9) turn to a physician to garner information to guide their practice. These findings correspond to earlier research that suggests nurses and student nurses are more likely to refer to colleagues and books for questions that arise in the clinical setting <sup>[3]</sup>. This raises questions regarding the individual abilities of nurses to identify the best available evidence, in light of considerations to the currency of textbook resources and accuracy of human information resources. In fact, the ability of the practicing nurse to evaluate information informs decision making within the clinical setting and supports the application of evidence to clinical care <sup>[11]</sup>. Since this research took place on a university campus, it is logical that the educational setting may have biased participant responses. The high percentage of participants referencing textbooks as an up-to-date resource for EBP could be explained as being a result of participants being in an academic setting and having quick access to textbooks.

In this study, 58% (n = 38) of participants used reliable online information resources such as online databases on a regular basis, with 3% (n = 5) accessing online databases daily, and 28% (n = 18) accessing them weekly and another 28% (n = 18) accessing them monthly. In fact, 100% of both faculty and student groups reported consulting a human resource as least once a week. A study by Dee and Stanley (2005) reports 60% of clinical nurses reported consulting a human resource, daily, and 37.5% of nursing students reported consulting a human resource when faced with a clinical question.

Computer literacy is necessary for delivering effective nursing care. Low levels of computer literacy are a critical and rising problem within the United States' healthcare workforce. Research indicates that the current healthcare workforce may not have the minimum information technology competencies needed to execute their work using computerized information systems. Furthermore, new technologies introduced into the workplace can disrupt established practice patterns <sup>[38]</sup>. Ongoing training for nursing staff using new technology is critical to maximizing workforce competence which can affect patient outcomes and safety <sup>[39]</sup>.

Findings related to the third research question underscore the need for providing education and skills related to technology and information resources found in today's clinical setting. Nurses are constantly swamped with information while in the clinical setting. Being equipped to organize and use information can positively affect patient care and clinical decision making <sup>[40]</sup>. Seventy-three percent (n = 46) of participants reported it was necessary to access online information when providing care, yet 13.6% (n = 9) of participants reported not knowing how to access online databases. Further, 37% (n = 23) reported having access to online databases in the clinical setting. In an environment that increasingly relies on information technology, beginning nurses need information skills to practice competently <sup>[41]</sup>.

## Limitations

Generalizations about this study are limited because of the small sample size and by the fact that it was conducted only in one academic setting. As this study was conducted in the southeast, participants from other regions may respond differently. In addition, groups and subgroups of participants were not equally distributed. Many of the questions in the survey asked about access to information in the clinical setting. It should be noted that students and faculty participating in this study typically did not work full time in those environments, possibly limiting their knowledge about the resources offered by the clinical organization.

## 5 Recommendations

Teaching nurses about the application of credible information has proven to be beneficial in the clinical setting<sup>[23]</sup>. Information literacy education, whether in a formal educational or clinical setting, does not guarantee increased aptitude<sup>[35]</sup>. Further investigation by educational programs, faculty, and healthcare agencies is needed to explore and determine the best methods for promoting the use of skills that support evidence-based practice such as information literacy.<sup>[42]</sup>

The findings of this study add to the body of evidence concerning information literacy experiences and perceived competencies for using research evidence in nursing practice. By understanding nursing faculty and student experiences with information literacy, learning activities can be designed and implemented to fit existing needs. Nurse educators might use the findings from this study to guide the development of educational interventions that can target and measure information literacy and information technology skill acquisition to support research utilization for EBP. Educational and healthcare institutions may use the findings of this study to address barriers to research utilization in the clinical setting. Future research drawing comparisons between perceived competencies of end users and actual skill performance for research utilization in nursing practice is suggested by the authors.

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## References

- [1] Institute of Medicine. Crossing the quality chasm: A new health system for the 21st century. Washington, D.C.; 2001.
- [2] Verhey M. Information literacy in an undergraduate nursing curriculum: Development, implementation, and evaluation. *Journal of Nursing Education*. 1999; 38: 252-9. PMID:10512465
- [3] Dee C, & Stanley, E. Information-seeking behavior of nursing students and clinical nurses: implications for health science librarians. *Journal of the Medical Library Association*. 2005; 93: 213-22. PMID:15858624
- [4] Barnard A, Nash, R., & O'Brien, M. Information literacy: developing lifelong skills through nursing education. *Journal of Nursing Education*. 2005; 44: 505-10. PMID:16342632
- [5] McNeil BJ, Elfrink, V., Beyea, S. C., Pierce, S. T., & Bickford, C. J. Computer literacy study: Report of qualitative findings. *Journal of Professional Nursing*. 2006; 22: 52-9. PMID:16459289 <http://dx.doi.org/10.1016/j.profnurs.2005.12.006>
- [6] American Library Association. Information literacy competency standards for higher education. 2011. (Accessed September 6, 2011, at <http://www.ala.org/acrl/ilcomstan>.)
- [7] Saranto K, & Hovenga E.J. Information literacy-what it is about? literature review of the concept and the context. *International Journal of Medical Informatics*. 2004; 73: 503-13. Mid:15171979 <http://dx.doi.org/10.1016/j.ijmedinf.2004.03.002>
- [8] Johnson C, Lindsay, E., & Walter, S. Learning more about how they think: information literacy instruction in a campus-wide critical thinking project. *College and Undergraduate Libraries*. 2008; 15: 1-11. <http://dx.doi.org/10.1080/10691310802177267>
- [9] Lloyd, A. No man (or woman) is an island: Information literacy, affordances and communities of practice. *Australian Library Journal*. 2005; 54: 230-7. <http://dx.doi.org/10.1080/00049670.2005.10721760>



- [10] Shorten, A., Wallace, M., & Crookes, P. Developing information literacy: a key to evidence-based nursing. *International Nursing Review*. 2001; 48.
- [11] Jacobs S, Rosenfeld, P., & Haber, J. Information literacy as the foundation for evidence-based practice in graduate nursing education: a curriculum-integrated approach. *Journal of Professional Nursing*. 2003; 19: 320-8.  
[http://dx.doi.org/10.1016/S8755-7223\(03\)00097-8](http://dx.doi.org/10.1016/S8755-7223(03)00097-8)
- [12] Verhey, M., Levy, J., & Schmidt, R. *Information RN*. Glendale, CA: Cinahl Information Systems; 1998. PMID:PMC2132950
- [13] Pravikoff D.S., Tanner, A.B., & Pierce, S. T. Readiness of U.S. nurses for evidence-based practice. *American Journal of Nursing*. 2005; 105: 40-51. PMID:16138038 <http://dx.doi.org/10.1097/00000446-200509000-00025>
- [14] Estabrooks C.A., O'Leary, K. A., Ricker, K. L., & Humphrey, C. K. The Internet & access to evidence: how are nurses positioned? *Journal of Advanced Nursing*. 2003; 42: 73-81. PMID:12641814 <http://dx.doi.org/10.1046/j.1365-2648.2003.02581.x>
- [15] Institute of Medicine. *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC; 2010.
- [16] Heater B, Becker, A., & Olson, R. Nursing interventions and patient outcomes: a meta-analysis of studies. *Nursing Research*. 1988; 37: 303-7. PMID:3047692 <http://dx.doi.org/10.1097/00006199-198809000-00008>
- [17] Gorman P, Ash, J., & Wykoff, L. Can primary care physicians' questions be answered using the medical journal literature? *Bulletin of the Medical Library Association*. 1994; 82: 140-6. PMID:7772099
- [18] Gruppen L, Rana, G., & Arndt, T. A controlled comparison study of the efficacy of training medical students in evidence-based medicine literature searching skills. *Academic Medicine*. 2005: 940-4. PMID:16186614  
<http://dx.doi.org/10.1097/00001888-200510000-00014>
- [19] Wolzar J. & Worona, P. The use of online information resources by nurses. *Journal of the Medical Library Association*. 2003; 91: 216-21.
- [20] Fox, L., Richter, J., & White, N. A multidimensional evaluation of a nursing information-literacy program. *Bulletin of the Medical Library Association*. 1996; 84: 182-90. PMID:8826621
- [21] Wallace, M., Shorten, A., Crookes, P., McGurk, C., & Brewer, C. Integrating information literacies into an undergraduate nursing programme. *Nurse Education Today*. 1999; 19.
- [22] Dorner, J., Taylor, S., & Hudson-Carlton, K. Faculty-librarian collaboration for nursing information literacy: a tiered approach. *Reference Services Review*. 2001; 29: 132-40. <http://dx.doi.org/10.1108/00907320110394173>
- [23] Westbrook, J.I., Coiera, E. W., & Gosling, A. S. Do online information retrieval systems help experienced clinicians answer clinical questions? *Journal of the American Medical Informatics Association*. 2005; 12: 315-21. PMID:15684126  
<http://dx.doi.org/10.1197/jamia.M1717>
- [24] Dawes, M. On the need for evidence-based general and family practice. *Evidence-based Medicine*. 1996; 1: 68-9.
- [25] Klein, M.S., Ross, F.V., Adams, D.L., & Gilbert, C.M. Effect of online literature searching on length of stay and patient care costs. *Academic Medicine*. 1994; 69: 489-95. PMID:8003169 <http://dx.doi.org/10.1097/00001888-199406000-00017>
- [26] Jutel, A. Beyond evidence-based nursing: tools for practice. *Journal of Nursing Management*. 2008; 16: 417-21. PMID:18405258  
<http://dx.doi.org/10.1111/j.1365-2834.2008.00861.x>
- [27] American Association of Colleges of Nursing, & Association of American Medical Colleges. *Lifelong learning in medicine and nursing: a final report*. Washington, DC; 2010.
- [28] Taylor-Seehafer, M., Abel, E., Tyler, D., & Sonstein, F. C. Integrating evidence-based practice in nurse practitioner education. *Journal of the American Academy of Nurse Practitioners*. 2004; 16: 520-5. PMID:15645996  
<http://dx.doi.org/10.1111/j.1745-7599.2004.tb00431.x>
- [29] Young, K. *Informatics for healthcare professionals*. Philadelphia: F. A. Davis Company; 2000.
- [30] Milne, D., Krishnasamy, M., Johnston, L., & Sanchia, A. Promoting evidence-based care through a clinical research fellowship programme. *Journal of Clinical Nursing*. 2007; 16: 1629-39. PMID:17727584 <http://dx.doi.org/10.1111/j.1365-2702.2007.01748.x>
- [31] Cheek, J., Gillham, D., & Ballantyne, A. Using education to promote research dissemination in nursing. *International Journal of Nursing Education Scholarship*. 2005; 2.
- [32] Ciliska, D. Evidence-based nursing: How far have we come? What's next? *Evidence-based Nursing*. 2006; 9: 38-40. PMID:16615195 <http://dx.doi.org/10.1136/ebn.9.2.38>
- [33] Kohen, M., & Lehman, K. Nurses' perceptions of evidence-based nursing. *Journal of Advanced Nursing*. 2007; 62: 209-15. PMID:18394033 <http://dx.doi.org/10.1111/j.1365-2648.2007.04589.x>
- [34] Ivanitskaya, L., O'Boyle, I., & Casey, A. M. Health information literacy and competencies of information age students: results from the interactive online Research Readiness Self-Assessment (RRSA). *Journal of Medical Internet Research*. 2006; 8: e6. PMID:16867969 <http://dx.doi.org/10.2196/jmir.8.2.e6>
- [35] Hebda, T., & Czar, P. *Handbook of informatics for nurses and healthcare professionals*. 4th ed. Upper Saddle River, NJ: Pearson Prentice Hall; 2009.

- [36] American Nurses Association. Nursing informatics: Scope & standards of practice Silver Spring, MD: Nurses Books; 2008.
- [37] Tanner, A., Pierce, S., & Pravikoff, D. Readiness for evidence-based practice: information literacy needs of nurses in the United States. In: MEDINFO; 2004; Amsterdam: IOS Press; 2004.
- [38] Kaminski, J. The revealing of nursing informatics: exploring the field. British Columbia; 2007: 1-71.
- [39] Wilbright, W., Haun, D., Tomano, T., Krutzfeldt, T., Fontenot, C., & Nolan, T. Computer use in an urban university hospital: technology ahead of literacy. CIN: Computers, Informatics, Nursing. 2006; 24: 37-43.  
<http://dx.doi.org/10.1097/00024665-200601000-00010>
- [40] Zytowski, M. Nursing informatics: the key to unlocking contemporary nursing practice. AACN Clinical Issues: Advanced Practice in Acute & Critical Care. 2003; 14: 271-81. <http://dx.doi.org/10.1097/00044067-200308000-00002>
- [41] Ornes, L., & Gassert, C. Computer competencies in a BSN program. Journal of Nursing Education. 2007; 46: 75-8.  
PMid:17315566
- [42] Fetter, M. Baccalaureate nursing students' information technology competence - agency perspectives. Journal of Professional Nursing. 2009; 25: 42-9.