The use of online information resources by nurses*†

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Purpose: Based on the results of an informal needs assessment, the Usage of Online Information Resources by Nurses Project was designed to provide clinical nurses with accurate medical information at the point of care by introducing them to existing online library resources through instructional classes. Actual usage of the resources was then monitored for a set period of time.

Methods: A two-hour hands-on class was developed for interested nurses. Participants were instructed in the content and use of several different online resources. A special Web page was designed for this project serving as an access point to the resources. Using a password system and WebTrends™ software, individual participant's usage of the resources was monitored for a thirty-day period following the class. At the end of the thirty days, usage results were tabulated, and participants were sent general evaluation forms.

Results: Eight participants accessed the project page thirty-nine times in a thirty-day period. The most accessed resource was Primary Care Online (PCO), accessed thirty-three times. PCO was followed by MD Consult (17), Ovid (8), NLM resources (5), and electronic journals (1). The individual with the highest usage accessed the project page thirteen times.

Conclusions: Practicing clinical nurses will use online medical information resources if they are first introduced to them and taught how to access and use them. Health sciences librarians can play an important role in providing instruction to this often overlooked population.

BACKGROUND

The Health Sciences Library System (HSLS) and the Center for Biomedical Informatics (CBMI) at the University of Pittsburgh offer a joint training program in health sciences librarianship and medical informatics. This initiative is a component of the medical informatics training program at CBMI. It is a year-long educational opportunity for individuals who have earned a master of library and information science degree and who have special interests or experiences in health sciences librarianship and medical informatics. One of the requirements of this experience is completion of a project of interest to both the library and informatics communities. The Usage of Online Information Resources by Nurses Project was completed as a part of the trainee experience.

The HSLS offers library resources to the University of Pittsburgh Schools of the Health Sciences and to the UPMC Health System (UPMC HS). At the time of this project, UPMC HS consisted of fifteen hospitals across western Pennsylvania, including two tertiary care hospitals. HSLS consists of the Falk Library of the Health Sciences, the Western Psychiatric Institute & Clinic Li-

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brary, the James Frazer Hillman Health Sciences Library at UPMC Shadyside, and the Hopwood Library: A Health Resource Center for Patients and Families, UPMC Shadyside.

INTRODUCTION

With the exponential growth of medical resources available online, health sciences libraries are better able to reach practicing clinicians at the point of care. At UPMC HS hospitals that contract with HSLS, online resources are available from all computers in the hospital. With resources now available on the inpatient units, librarians have the opportunity to focus on the information needs of practicing nurses, who represent a large segment of the clinical patron base. As greater emphasis is placed on evidence-based practice, it is important to remember that nurses are integral to the delivery of health care and are directly accountable for their practice [1]. Several articles have been published regarding the need for nurses to have access to library resources, to increase their knowledge, and to improve their computer skills [2–6]. It is also interesting to note that many of these articles relate to nurses in the United Kingdom. Little has been published in the library literature [7] on projects where the focus is to provide instruction or information to nurses working on the clinical unit.

The goal of this project was to increase awareness among UPMC HS nurses of the library's online resources, HSL Online. It was designed to monitor the activities of nurses who had been taught to use selected online resources. The project objective was to answer the question, ''If nurses are taught and enabled to use HSL Online resources, will they use them?''

METHODS

Participant recruitment and demographics

Participants from the two tertiary care hospitals were recruited through presentations at hospital management and nursing meetings and by flyers posted on the nursing units. The goal was to recruit twenty nurses from each hospital to participate in the project.

Sixteen nurses expressed interest in the project, nine staff nurses and seven primary nurse care coordinators (PNCC). A PNCC is responsible for facilitating the assessment, planning, and initiation of ongoing patient and family needs across a continuum from pre-admission to acute and community care for twenty to thirty patients; generally, each unit has one PNCC. The staff nurse's primary responsibility is patient care for a daily assignment of up to nine patients.

Eight nurses, from a variety of medical specialties, participated in the project. Four were PNCCs, and four were staff nurses. The average age of the participants was thirty-two years (range 23–45). They had worked an average of ten years (range 4–26) in the nursing profession. All eight participants were women. Seven earned bachelor of science degrees in nursing and one a nursing diploma from a two-year program. During the project, two were enrolled in graduate nursing programs. Of the eight who did not participate, two respondents withdrew due to scheduling conflicts, five were scheduled for a class and did not attend, and one expressed interest after all classes had been taught.

Prior to taking the class, each nurse completed the published and validated Staggers Nursing Computer Experience Questionnaire (SNCEQ) [8]. This questionnaire provided a representation of the group's computer literacy. A high score of 162 and a low of 60 were obtained. The average score was a 102 out of 308, representing a low-moderate experience score [9]. Most nurse participants were proficient in the use of email and hospital information systems. With the exception of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the participants had never used HSLS online information resources.

Information gathering and needs assessment

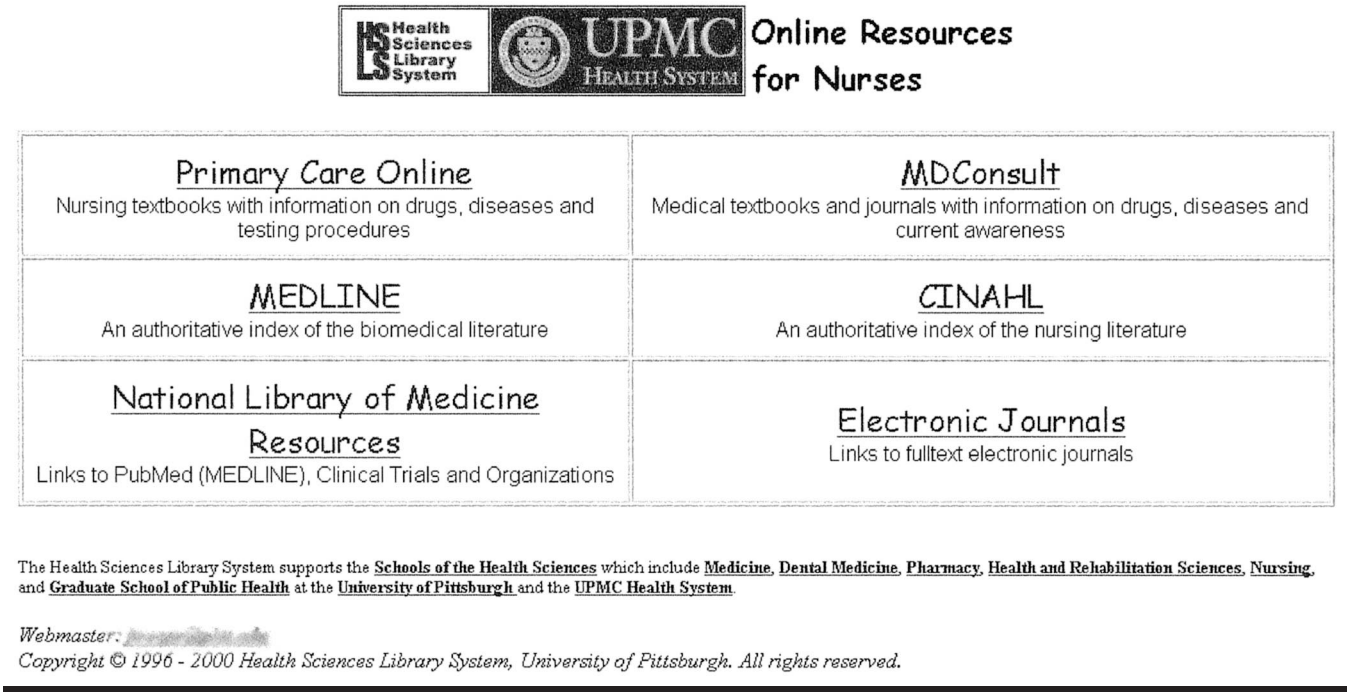
An informal needs assessment was performed to determine which resources should be taught in the class. Individual meetings were held with six of the original respondents. The meetings, which lasted thirty minutes, consisted of open-ended questions designed to elicit the nurse's information needs. An additional three participants described their needs in a narrative form via email. The information from these communications was used to help develop the class curriculum. The main topics of interest expressed by the nurses were: drug information, disease information, diagnostic test information, literature searching, support group information, and clinical trial information.

Class design and instruction

As a result of the needs assessment, several online resources were selected for inclusion on a Web page designed for the class (Figure 1). Due to the fast-paced environment of nursing units, the Web page was purposely designed for quick download and easy navigation. The resources linked from the page were Primary Care Online (now part of the Books@Ovid resource), which consisted of the full text of four nursing textbooks; MD Consult; Ovid MEDLINE; Ovid CINAHL; National Library of Medicine (NLM) resources; and HSLS electronic journals.

Four two-hour instructional classes were taught, two in the hospital and two in the library's computer instruction rooms. Each participant was required to attend one session. Class sizes ranged from one to three students. Based on the findings of the needs assessment, specific aspects of each information resource were covered. In ''Primary Care Online,'' participants were taught to find drug, disease, and laboratory information. In ''MDConsult,'' the focus was on drug and disease information, as well as the updates section. Basic literature searching was taught in ''Ovid MEDLINE and CINAHL.'' The NLM resources demonstrated were PubMed, Clinicaltrials.gov, and DIRLINE. Handouts distributed in class included resource overviews and general HSLS information.

Figure 1
Project Web page



Technical information

At the time of the project, the hospital units had personal computers (PCs) with Internet access. The standard browser was Internet Explorer 5.0. There was at least one PC per unit at the main nursing station, and PNCCs typically had separate office spaces with their own computers.

To be able to answer the original objective, electronic monitoring of each participant's Web activity was essential. Each participant was given a user name and password during the class. The project Web page was password protected, which made monitoring feasible. To create a usage log, the Online Nursing Resources Web page and individual links on it, pointed to its own proxy server (EZProxy). The WebTrends™ software package was used to read the proxy server log file. The raw proxy file data was also consulted for verification and additional data.

When the uniform resource locator (URL) of the Online Nursing Resources page was typed in the address box, a prompt asking for a network password would appear. Access to the page was only then allowed with successful user name and password entry.

With assistance from the systems and electronic resources librarians, a single log-in system was developed. Once the participants logged into the project page, they were also simultaneously logged into the individual resources on the page. With the single log in, the users were then automatically logged into MD Consult and the Ovid System. WebTrends software was used to create usage reports. The analysis reflected the users who logged in and what resources they accessed. Each participant's user name was anonymous and was tracked by the user's position as a staff nurse or PNCC.

Data collection

Each participant's user name was ''live'' for thirty days following her class. This parameter was important for data collection, because, with classes scheduled over a four-week period, some participant's thirty days would expire well before others. Because classes were being taught during the data collection period, the potential for extraneous data in the log file existed. To eliminate this problem, an identical Web page with its own separate proxy server was set up for use during the classes. This allowed participants to be taught from a page that functioned exactly as the project page. The participants were instructed to use the project page once outside the classroom.

RESULTS

The results of the study are fairly straightforward (Figure 2). The usage statistics were obtained from the WebTrends report and then verified by the proxy server log file. The log file itself proved to be too cumbersome to analyze for specific details. When printed, the log file was more than 400 pages long. To examine particulars, such as search terms entered and resources searched, a Perl program was written to extract pertinent data. The resulting forty pages of data were then analyzed for richer data than the WebTrends report could supply.

Figure 2
Usage of online nursing resources

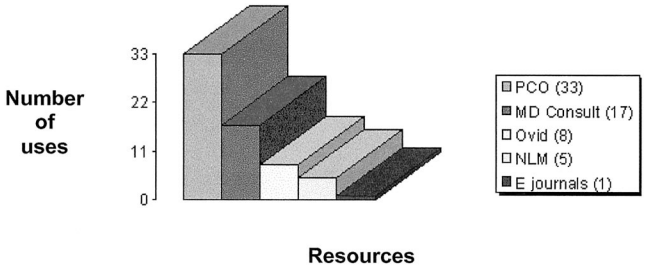
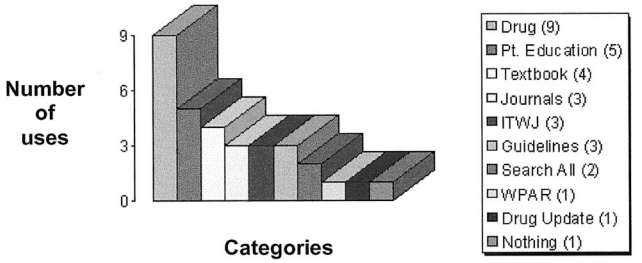


Figure 3
MD Consult usage by nurses



Participant data

The highest number of log ins to the project page was by a staff nurse. This nurse logged into the project page a total of thirteen times during the thirty-day data collection period. A staff nurse also had the least amount of log ins, with one.

As a group, the PNCCs (n = 4) logged in thirteen times. The staff nurses (n = 4) logged in twenty-six times, twice as often as the PNCCs. Due to the small sample size, real significance of these values cannot be determined.

Resource data

The most frequently used resource was Primary Care Online (PCO). It was accessed thirty-three times during the data collection period. Because HSLS's access to PCO is limited to one institutional ID, the log could not distinguish which titles the participants used once in PCO.

The second most frequently accessed resource was MD Consult. It was accessed seventeen times. This resource has many different types of information for the medical professional, including standard textbook and journal searching to special updates sections for the latest news in medicine. With the individual log in set up for this resource, the log file provided information about which type of resource the participants used while in MD Consult. According to the file, participants took advantage of the various offerings and used many of the information sources contained in this resource (Figure 3). *Mosby's GenRx®*, tenth edition, was the most often used offering in MD Consult (accessed 9 times). After drug information, patient-education materials were the most sought after (5), followed by reference book searching (4), journals section (3), In this Week's Journals (3), and the Practice Guidelines section (3). Rounding out the results were two ''search all'' queries, followed by one viewing each of What Patients Are Reading and Drug Updates. In one instance, it appears the resource was accessed and nothing was searched or viewed.

OVID was the third most frequently used resource. It was accessed a total of eight times, seven into MEDLINE and one into CINAHL. However, this number was misleading. Five of the eight sessions showed participants exiting the resource without entering any search terms. Search terms were entered in only three of the eight sessions. In these three sessions, the searches went only as far as the Medical Subject Heading tree or Scope Note display before the searches were aborted.

The NLM resources followed OVID in number of times accessed. These resources were accessed five times. Of these five times, several different resources were viewed. The most often used resource for this link was MEDLINEplus, which was accessed four times. Not much time was spent on this resource in class, it was just mentioned as a good comprehensive resource geared toward consumers. Three times, the participants used the Choose a Topic by Category link, and one used the Choose a Topic by Letter search method. During two of these four searches, a PubMed search was launched using the provided link, and, for one of the four, a Clinicaltrials.gov search was also launched. Also accessed in one of the searches were the Genome and Taxonomy databases. In the fifth session, the participant went to the Loansome Doc page and exited.

The least-accessed resource was the HSL Online Electronic Journal Collection. It was linked to one time. The data in the log file show that no journal was viewed, just that the page was opened and then closed.

FOLLOW UP EVALUATION

A few days prior to the password's expiration, an email message was sent to each of the participants alerting them that their passwords would no longer allow them access to the project Web page. In the same email, they were instructed how to access the resources from the main library Web page. Also, shortly after their passwords expired, participants were emailed an evaluation questionnaire (Appendix). Five of the eight participants returned their surveys. Valuable information was gained from those who responded. Most comments were positive. One PNCC said, ''Thanks for passing along the information. It has been very useful.'' Another stated, ''Thank you for the opportunity to participate in the study and learn what resources are available.'' The staff nurse with the highest usage stated, ''I think the Website has a place in this health system. As we approach a paperless workplace, this program is the frontier of nursing's database for ref-

erence material. Thanks.'' Other comments addressed the time limitation factor. A staff nurse said, ''I used it when I was not busy. If it was really hectic, I did not use it.'' A PNCC also addressed time in two comments, ''I haven't gotten a chance to use MD Consult enough—not enough time yet.'' and ''A little trouble navigating, but I think it will improve with time.''

LIMITATIONS

The small sample size made it difficult to make concrete statements about the use of online library resources by practicing nurses. The size created problems with making data comparisons, but this was not the only confounding variable. In the sample, four staff nurses and four PNCCs were recruited. However, during the data collection, one of the staff nurses worked as a PNCC on her unit to help fill a vacant position. Also, at least two of the PNCCs were on vacation during half of their data collection time. These variables made it difficult to draw comparisons between the two types of nurses.

Furthermore, the staff nurse with the highest usage independently publishes a unit newsletter for her colleagues. It contains staff news as well as articles on medical topics. She may be considered to have a higher need for these resources than the average staff nurse. She also often remotely accessed the resources on her days off.

Another problem during the execution of the study surfaced as a result of the follow-up questionnaire. One of the respondents indicated that she found the resources particularly useful on her ''on call'' Saturday. However, the log file did not show her using the resources on a Saturday. There could be many explanations for this, a positive one is that her on call day took place after her password expired, and she accessed the resources from the library Web page. In hindsight, having the participants keep a log of when, why, and what kind of information they sought would have been useful for data interpretation. It could have helped explain why they aborted MEDLINE searches or why they looked in many different resources during one log-in session. It also could have helped clarify log file discrepancies. The questionnaire also lacked a question asking the participants if they would continue to use the resources in the future.

DISCUSSION AND ANALYSIS

Overall, the usage statistics represent a positive outcome for this small, preliminary study. According to the log file, each participant accessed the project page at least one time. The follow-up comments reveal a positive attitude and an appreciation of the resources.

Discussion of the compounding variables is important, because they can be looked at positively. One cannot be certain, but a safe assumption regarding the vacationing nurses would be their use of the resources would have increased had they been at work during the entire data collection period.

The participant who was classified as a staff nurse but filled in as a PNCC highlights the flexibility of the nursing profession and the increasing need for reliable, accurate information available at the point of care. Similarly, the staff nurse who independently produces a newsletter for her colleagues is a perfect candidate for library resources. She made additional library requests during the project, including an inquiry about proper citation formats for her publication. She may not represent the norm, but, as a valuable resource to her peers, she definitely is in need of library resources and assistance. The nurses also appreciated the opportunity to take a class that was specifically geared toward the nursing profession. One PNCC said, ''It's nice to have something that's made for us to use.'' These examples complement the data from the log files and highlight the need for librarian outreach to clinical nurses.

It is also notable that two resources that were not directly taught were used often: MEDLINEplus and patient-education materials. Nurses are most often the clinicians who inform and instruct patients about medical topics. It seems practical that they would want to access consumer-focused medical information and patient-education materials.

CONCLUSION

''If nurses are taught and enabled to use HSL online resources, will they use them?'' The data obtained shows that nurses will indeed use online resources once they are made available. Based on the data and the nurses' comments, one could speculate that larger scale library outreach programs oriented toward nurses would be beneficial.

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APPENDIX

Follow up evaluation

1. Did you use the resources you learned about in class?
2. If yes, which one(s) did you find most useful?
3. If no, why not?
4. Did you use some that you found not useful? Why was that?
5. Did you have any trouble using any of the resources?
6. If you used the National Library of Medicine resources, which ones did you use?

[ ] PubMed
[ ] DIRLINE
[ ] ClinicalTrials.gov
[ ] I did not use NLM resources

7. Did you ever use the system from home?
8. How many hours a week do you work?
9. Do you work shifts? Weekends?
10. Did you work your regular hours during the time data was collected?
11. Did you find your workflow had an effect on your usage of the system? If you were busy or slow, were you less inclined to use it? More inclined?
12. Did you have any difficulty with the technology involved? (PC, network connection, password, etc.) Do you have any additional comments on the usage or non-usage of the resources? Please feel free to comment.