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Nurses' MEDLINE Usage and Research Utilization

P.L. Prin and M.E. Mills
A Department of Nursing Administration, Education, Health Policy and Informatics, University of Maryland at Baltimore, Baltimore, MD

This eploratory study in the field of nursing informatics examined the usage of information technology, namely on-line access to MEDLINE in clinical setting, by a convenience sample of 121 nurses from a large university hospital. A descriptive correlational design was used. Guided by the conceptual frameword of Nurse-Computer Interaction and based on variables set forth in the Theroy of Reasoned Action, the study tested hypotheses regarding attitudinal and normative influences on reported use of on-line bibliographic retrieval systems. It was also hypothesized that using MEDLINE coild increase and improve nurses' adoption of nursing research findings.

Multiple regression analyses were conducted on nurses' responses to survey questions to test hypotheses-that those who register more favorable attitudes towards nursing research would have a higher reported use of the MEDLINE system. Findings were significant and supported the hypothesis that nurses' attitudes towareds research influenced MEDLINE usage. Findings also indicated that MEDLINE usage was significantly related to nurses' research utilization.

Introduction

A fundamental concern in the field of nursing informatics is to increase the understanding of how nurses access and utilize information in their clinical practice settings. What information is needed; how do nurses answer questions arising from clinical problems; can research findings facilitate nurses' problem-solving; can information technology assist nurses in providing quality care? Answers to these and other questions are necessary as nurses strive to provide quality care in health care environments where managed care and cost constraints have begun to influence everyday practice decisions. Nursing research and timely adoption of nursing research findings in practice settings can advance nursing knowledge and foster quality care. Researchers in the field of nursing informatics have designed and developed nursing information systems which have provided nursing professionals with necessary tools for practice in today's health care environment.

The field of nursing informatics though, has not yet demonstrated, through research studies, the value of information technology, namely computerized bibliographic retrieval systems such as MEDLINE, which contain nursing references, for facilitating the adoption of nursing research findings. The cost of providing access to external databases and other software applications must be justified in terms of use and usefulness for today's health care providers.

This study examined the determinants of use and self-reported usage of an on-line bibliographic retrieval system, specifically MEDLINE, and the relationship between adoption of nursing research findings, nurses' attitudes nursing research, and nurses' self-reported usage of MEDLINE.

Background

With the rapid explosion of nursing knowledge worldwide, the amount of data nurses use and process in the delivery of care is extensive and often unmanageable[1]. Despite increasing numbers of information systems with improved capabilities, advanced clinical nursing information systems are still not widely available to access research findings from computerized bibliographic systems, such as MEDLINE, in the clinical worksetting.

At present, there is no empirical evidence to suggest that providing nurses with access to computerized bibliographic retrieval systems in the workplace would be cost-effective or beneficial for research utilization, and many questions remain unanswered. Do nurses use the literature to answer questions arising from clinical problems? Does the financial cost of providing access to computerized bibliographic retrieval systems such as MEDLINE provide a return on investment both to the institution and to the individual nurse?

Usage of computer-based information retrieval studies involving nurses as subjects have not been previously reported in the literature, rather authors have focused on general use of the computer by nurses. Chapman et al.[2] conducted a needs assessment, prior to implementation of a Local Area Network (LAN) for nursing in a large teaching hospital. Thirty seven nurse managers responded to a questionnaire. Only 21% of those who had access to a computer indicated that they used infrequently. Almost all respondents used the computer for word processing only. Staggers[3] found that 14.5% (n=110) thought there was no time at work to use a computer, and 12.7% stated that clerks do all computer interactions at work.

The purpose of the study was to examine whether nurses' attitudes towards nursing research impact on their use of a computerized bibliographic retrieval system, namely MEDLINE, and whether such usage resulted in improved research utilization. The study was developed and guided with selected variables from the Theory of Reasoned Action[4] which formed a link with elements set forth in the Nurse-Computer Interaction Model of Staggers and Parks[5]. In the Nurse-Computer Interaction Model, nurse-computer interaction is conceptualized as a task-based information exchange. Nurses interact with computers for information retrieval tasks. It was hypothesized that these interactions would be influenced by attitudes of the individual subjects.

Study variables included in the study were attitudes towards research, MEDLINE usage as self-reported by practicing nurses, and nurses' research utilization. Research questions proposed for the study included: Is there a relationship between nurses' attitudes towards nursing research and their self-reported usage of computerized bibliographic retrieval systems, namely MEDLINE? and is there a relationship between the use of MEDLINE and nurses' adoption of nursing research findings?

The research hypothesis related to research question 1 stated: nurses who express more favorable attitudes towards nursing research will report stronger use of MEDLINE than will nurses who express less favorable attitudes. The research hypothesis related to research question 2 stated: the use of computerized bibliographic systems, as reported by practicing nurses, is positively related to adoption on nursing research findings.

Research methods

The study employed a descriptive correlational design. Initially, permission was sought and received by both the Institutional Review Board of the hospital and the Department of Nursing. A convenience sample was selected of 300 female clinical nurses working in a variety of medical-surgical units at a large, northeastern university medical center where access to

MEDLINE was available to nurses at their clinical workstations. Of these, completed and usable questionnaire responses were received from 121 clinical nurses working in various inpatient and outpatient specialty areas. This represented a 40% response rate.

Several instruments from the literature were selected for the study. Nurses' attitudes towards research was measured with a 21 item Likert scale developed by Champion and Leach[6] which measured feelings nurses have about nursing research. Potential scores for the instrument ranged from 21-105. Lower scores on the scale indicated a less positive attitude towards research and higher scores indicated a more positive attitude towards research. MEDLINE usage was measured by asking nurses to self report how often they used MEDLINE to access research findings at their clinical workplace in terms of number of times per month. Choices included: 0, 1-2 per month, 3-5 per month, 6-10 per month and greater than 10 per month. Research utilization was defined as the use of the methods and products of research in nursing practice. A 10 item scale developed by Champion and Leach[6] to measure research utilization was used to measure the degree to which a nurse feels she incorporated nursing research findings into practice. During pilot testing, it was determined that one item contributed to low reliability for the scale. As a result, the range for the scale for this sample went from 9-45 with the deletion of that one item.

Content validity was assessed for all measures by three nursing informatics experts and deemed adequate. Internal consistency reliability, as measured by Cronbach alpha, for the attitude towards nursing research scale was .955. Cronbach's alpha was .942 for the research utilization scale in this study sample.

Results

Data was analyzed using the SPSS-PC statistical package. Descriptive statistics were obtained to describe the sample and study variables. Frequencies and percentages were obtained to describe nominal-level variables, and measures of central tendency and dispersion were calculated for interval-level variables. In the sample, nurses had an average age of 34.3, but ages ranged from 22 to 56. Most of the sample (65%) were 37 years or younger. While the participant's average employment experience at the institution of 7.8 years, more than one third of the subjects had worked at the institution for less than three years.

For the sample, nurses' attitudes towards research scores ranged from 44 to 103 (possible range 21-105) with a mean score of 78.90 (std. dev. 11.85). The nurses' research utilization mean score was 30.43 (std. dev. 7.10). Nurses' overall MEDLINE usage was low in the sample. Table 1 presents the descriptive statistics for the usage variable.

Table 1
Descriptive Statistics for MEDLINE Usage (n=121)

Value	Frequency	Percent	CumPercent
0	105	86.8	86.8
1-2 month	11	9.1	95.9
3-5 month	4	3.3	99.2
6-10month	1	8	100.0
Total	121	100.0	100.0

	Mean	SD	Range	Skewness	z
Usage	1.18	.52	3.00	3.188	14.49

In the study 105 (86.8%) reported that they never used the computer workstation to access MEDLINE for nursing research findings which may have importance in their clinical practice. Eleven nurses reported that they accessed MEDLINE 1-2 times per month. Four nurses responded that they used it 3-5 times per month, while only one nurse indicated that she used MEDLINE 6-10 times per month.
The Pearson r statistic was used to determine bivariate correlations among study variables in a correlational matrix and possible multicollinearity. MEDLINE usage was significantly correlated with research utilization (r=.2526, p<.01). Nurses who self-reported increased usage of the MEDLINE system tended to have higher scores for research utilization. Research utilization was significantly correlated with attitudes towards nursing research (r= .5793, p<.001).

To answer the research questions, regression analysis was performed to determine whether a relationship existed between the predictor and criterion variables. Residuals were analyzed to determine multivariate normality by using residual scatterplots and significance testing for criterion outliers, and by examining Mahalanobis distance and Cook's distance for predictor outliers. All 121 cases were retained for the analyses.

Attitudes towards nursing research emerged as a significant predictor of MEDLINE usage. There was a significant F finding (F=9.12, p=.0032) supporting the research hypothesis that positive attitudes towards nursing research would influence MEDLINE usage. Discriminant analysis was also used to compare the relative influence of an independent variable on whether an individual used MEDLINE. For the analysis, MEDLINE usage was recoded. Those who did not use MEDLINE were placed in Group 1. Group 2 consisted of those individuals who reported use of MEDLINE. Results on the univariate tests, looking at whether there were differences with individuals, indicated that attitudes towards nursing research was significant. Discriminant analysis revealed a significant difference (Lambda= .8947; chi square= 11.74; df=3, signi.= 0083) as to whether nurses used MEDLINE based on their attitudes towards research. The overall percent of "grouped" cases correctly classified was 71.56%.

To assess the relationship between MEDLINE usage and research utilization, regression techniques were used. During regression, MEDLINE usage emerged as a significant predictor but accounted for only 6% of the variance (F= 7.39, p=.0076). Nurses with higher reported MEDLINE usage rates had higher research utilization scores. At first glance, the overall explained variance seems rather small. However, the explained variance was limited by the intercorrelations between the variables which reduces the overall R in regression analysis.[7] The regression assumptions may have been violated according to the Mahalanobis distance which ranged from .1438 to 12.38 (critical value = 1.98); therefore the results for the accuracy of the analysis are interpreted cautiously. Although a power analysis was conducted prior to implementation of the study to ascertain an adequate sample size, a post-hoc power analysis was also conducted using effect size, l values and R^2 from the data analyses. Based on the study findings and the actual sample size of 121 subjects, adequate power was achieved.

During data analysis, it was determined that data distribution for the MEDLINE usage variable was skewed according to measures of central tendency. Usage data was transformed but remained significantly skewed and could not be normalized. The regression assumptions may have been violated so these findings must be interpreted with caution.

Discussion

The advent of computerization within today's health care environment has had a significant impact on refining both nursing research and clinical practice. The research findings indicated

that nurses generally did not use the MEDLINE system at their clinical workstations yet there was a relationship between MEDLINE usage and nurses' research utilization. In addition, nurses' attitudes towards research was a significant predictor of MEDLINE usage. This is congruent with results reported by Rizzuto et al.[8] who analyzed predictors of nurses' involvement in research activities and found that positive research attitudes predicted past and current participation in research activities.

Subjects in the study were encouraged to provide comments to the investigator about the study. A majority of comments regarding the study related to use of the MEDLINE system. Nurses commented that they were generally too busy with patient care to use the computer. Opportunities were few for nurses to access the computer and view research findings. Lack of printing capabilities on individual units also hampered nurses' efforts to use the computer.

Usage of MEDLINE studies involving nurses as subjects have not been previously reported in the literature. Consequently, this study provided a snapshot of nurses' use of MEDLINE in the clinical setting but no comparison data are available as to whether this usage rate is abnormally low. Hersch and Hickam[9] reported that most studies of computer-based information retrieval systems conducted with physicians or medical students as subjects in clinical settings have revealed a use rate of only one to six times per month.

Conclusions

This study represented a beginning work in the study of nurses using computerized bibliographic retrieval systems. The usefulness of such computer applications had not been previously examined with a sample of professional nurses. The value of having MEDLINE available to professional nurses in their clinical worksetting has not been explored previously yet efforts to foster nursing knowledge have been promoted in the literature. Adoption of nursing research findings, knowledge of new practices, ideas and technology is mandatory of all nurses to stay professionally competent.

MEDLINE is one type of modality which should be explored further by the nursing profession in an effort to improve the timely transfer of research findings into clinical practice.

Nurses' attitudes towards research were found to be a strong predictor of nurses' research activities. This relationship needs to be explored further in other settings with different samples of professional nurses.

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