Quality filtering of the clinical literature by librarians and physicians*

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A study was conducted at the University of Pittsburgh to determine
the effectiveness of the selection process by clinical medical librarians
and to identify the criteria used by librarians and physicians to select
relevant articles. The study analyzed the similarity between librarian
and physician selections, the decision-making processes used by
librarians and physicians, and the utility of librarian selections versus
those of physicians. No significant difference in utility between
librarian and physician selection was found, suggesting that
librarians can recognize and select useful articles as effectively as
physicians. Both librarians and physicians based selection decisions
primarily on article title, abstract, and journal title. Librarians were
more likely to focus on Medical Subject Headings (MeSH)†
descriptors, while physicians focused on clinical applicability or
similarity to a specific case. Journal selection data indicate that the
principle internal medicine journals were the most frequently
selected sources. The study demonstrates that librarians can
effectively serve a quality filtering function in the clinical
environment, and they should consider extending quality filtering
activities to other arenas.

Librarians traditionally have been involved in the filtering and evaluation of information. This role is assumed in collection development, reference services, database selection for mediated searching, and selective dissemination of information. In clinical medical library (CML) programs, quality filtering of the literature is essential, because the librarian strives to meet the patient care needs of the medical team in a timely manner. The clinical librarian's success in quality filtering needs to be examined, through evaluation of their citation and article selections and analysis of their decision-making processes.

Falk Library of the Health Sciences at the University of Pittsburgh conducted a four-month study (December 1990–March 1991) to determine the effectiveness of the clinical medical librarians' article selection process and to identify criteria used by librarians and physicians in selecting articles related to patient care

issues. The study sought to assess (1) similarities between librarian and physician selections, (2) the decision-making criteria used by librarians and physicians in the selection process, and (3) the utility of articles selected by librarians compared to those selected by physicians.

LITERATURE REVIEW

Previous studies have assessed satisfaction with or effectiveness of CML programs as well as the impact of searching conducted in support of patient care. In 1976, Staudt at Washington University School of Medicine determined that 85% of CML searches were judged adequate and that 25% of retrieved articles were "on target" [1]. Both Greenberg and Schnall designed evaluation studies for clinical librarian services [2-3]. In 1981, Scura measured the impact of CML services on actual case management and diagnostic thinking, estimating that patient management was affected in 20% of the cases and that diagnostic thinking was influenced in even more cases [4]. King further developed the patient care/diagnostic utility concept in 1987 [5], and, in 1989, he called for librarians to go beyond simply providing routine printouts "to establish true mediation between the busy health professional and the accumulated knowledge" [6]. The librarian, King asserted, should assist the health professional by providing "added value" to online searches, identifying articles perceived to be the best and eliminating the worst. In the Demas study of medical school faculty attitudes toward a CML program in institutions where this service is not available, physicians said the final judgment of relevancy should be reserved for the clinician alone [7].

Another body of literature focuses on quality filtering of the medical and scientific literature. The general concept of quality filtering was first proposed by Etzioni in 1971 [8]. In 1975, Pao proposed a system identifying the most frequently cited articles from a core list of previously identified review articles and core textbooks, based on the assumption that these select articles were "likely to be the most significant, controversial, or representative works published in the period examined" [9]. Shirley and Gilman proposed the use of document data management techniques for quality filtering by identifying the presence or absence of numeric relationships and displays [10]. In 1989, Neill discussed the information analyst's ability to filter the medical literature using validity criteria [11], and Moore described filtering, evaluation, and critical appraisal skills taught to medical students at Texas Tech School of Medicine [12].

PURPOSE OF THE STUDY

The Falk Library study approached the concept of quality filtering from a different perspective. The idea was to isolate and evaluate the results of quality filtering by analyzing different components of the process. Clinical library services involve the conduct of numerous mediated searches on a daily basis and the rapid delivery of information. However, the real distinction between CML and other library searches is the "mediated selection" made by the librarian after the search is completed. It is this factor—the librarian rather than the physician choosing the article—that must be examined in order to provide data on the effectiveness of quality filtering. Issues relating to future practice in medical libraries and to clinical librarianship demand answers for several questions. Can librarians effectively substitute for physicians as selectors of useful medical literature? What is required of librarians for them to act as effective "mediated selectors"? Do physician evaluations of article utility indicate effective selection by the librarian as compared to selection by the physician?

METHODOLOGY

The CML program at the Falk Library has provided services to the department of medicine since 1988. The clinical librarian attends"Morning Report," Monday through Friday, on the General Internal Medicine Service of Presbyterian University Hospital. One attending physician, the chief resident, and eight medical residents participate. The librarian responds to information needs generated during Report by doing manual (i.e., textbook of article files or cited journal articles) or computerized searches. As might be expected, MEDLINE‡ is utilized to respond to the majority of requests received at Report. Immediately after Report, the clinical librarian executes the requested searches, analyzes the retrieved material, and selects the articles judged to be most relevant. The turnaround time to complete searches and choose and copy articles is typically four to seven hours. One librarian has primary responsibility for attending Report and providing services, with two other librarians substituting on occasion.

The study included search requests generated by the residents during Report from December 1990 through March 1991. Data were collected on both searches and citations. The study methodology was incorporated into the normal Report process.

For the duration of the study, each search was downloaded, and two copies were printed, one for the librarian and one for the requesting physician. Each reviewed the printout and selected up to nine articles to be copied. Neither was aware of the other's selections. Retrieval formats for all searches were standardized to include author, title, source, descriptors,

‡ MEDLINE is a registered trademark of the National Library of Medicine.

author affiliation, and abstract. When selecting articles, both the physician and the librarian indicated the reason for the selection on a form developed for that purpose. The reasons included both objective and cognitive criteria. The objective criteria consisted of the fields printed for each citation and document length. The cognitive criteria listed on the form included similarity to case, clinical applicability, educational value, and "looks interesting." The criteria were rated as having major relevance, some relevance, or no relevance in the selection of a given citation.

All articles selected, whether by the physician or the librarian, were copied and given to the physician. Articles were not identified as to who selected them, although the physicians probably remembered some of the citations they had requested. An evaluation form was attached to all articles copied for the physicians, who were asked to rate the utility of every article read or scanned, using a scale ranging from not useful (1) to extremely useful (5). The article evaluation forms were returned to the librarian.

RESULTS

Three librarians and twenty-four physicians participated in the study. Of the 133 MEDLINE searches conducted for the CML program between December 1990 and March 1991, 76 were included in the study. The 76 searches yielded 2,316 citations, all of which were reviewed independently by physicians and librarians. A total of 452 citations was selected, and these articles were copied. Most of the articles were copied from journals held by Falk Library, and a small percentage required interlibrary loans via fax. Of the 452 articles copied and provided to the residents, 278 evaluations (62%) were returned.

Similarities between librarian and physician selections

Approximately thirty citations were printed for each search. On the average, the physicians chose 3.7 citations from each search, while the librarians chose 3.4 citations. An average of 2.0 citations per search were selected by both groups. The overlap between librarian and physician selections was 30% (136) of the total citations selected. The physician chose 44% of the citations chosen by the librarian, and the librarian chose 49% of the citations chosen by the physician.

Reasons for selection

The article title, abstract, and journal title were the descriptor fields most often identified as being of major or some relevance in the selection decision by both librarians and physicians. The relative importance of

selection criteria to physicians and librarians is illustrated by a scatter plot of the five reasons most frequently identified as being of major or some relevance (Figure 1). Points appearing below the diagonal were selected more often by librarians and those above the diagonal more often by physicians. The scatter plot shows that descriptors more often received the attention of librarians, whereas cognitive criteria were listed more often by physicians. The librarians' focus on utility for patient care and sensitivity to physicians' time constraints appears to have influenced their infrequent choice of the "looks interesting" and "educational value" criteria. Lack of subject expertise and of precise details of the specific case were probable factors in the librarians rarely citing "clinical applicability" or "similarity to case."

The data show that author, author affiliation, and document length were of little importance in article selection. Document type was of approximately equal significance to both librarians (11%) and physicians (10%) in the selection decision process. Table 1 shows the frequency with which each reason was selected by both librarians and physicians.

Evaluation of librarian and physician selections

Of the 452 articles photocopied, 278 (62%) were evaluated by the residents on a scale of 1 (not useful) to 5 (extremely useful). The overall median evaluation was 4, with an average evaluation of 3.45. Articles selected by both librarian and physician received the highest evaluation scores, with a median of 4 and an average of 3.85 (Figure 2). Articles selected only by the librarian or only by the physician had a median score of 3. The average evaluation for articles selected only by the librarian (3.21) was slightly lower than the average for those selected only by the physician (3.26).

The Kruskal-Wallis one-way analysis of variance was applied to compare the evaluation scores for the librarian-only and the physician-only selections. No significant difference was found. The evaluation data demonstrate that

■ librarian selections are comparable in utility to those of physicians, as rated by the physicians, and
■ when both librarian and physician independently identify a citation as relevant, the article is likely to receive a higher utility rating than those chosen by only one reviewer.

Journal selection data

The *Annals of Internal Medicine* and the *American Journal of Medicine* were the sources most frequently selected by physicians and librarians independently. The top two sources of citations selected jointly were the *American Journal of Medicine* and the *New England*

Figure 1
Reasons for selection
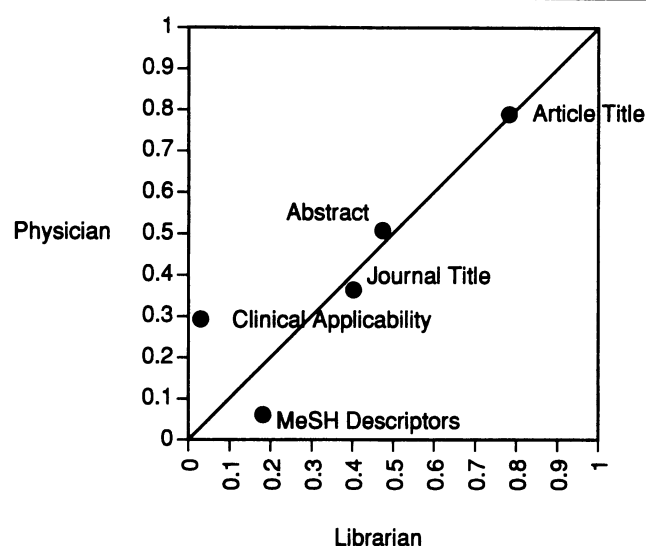
Journal of Medicine. The third most frequently selected journal was the New England Journal of Medicine, by librarians, and Chest, by physicians. In joint selections, the Archives of Internal Medicine and Chest tied for third and fourth. The rankings for the most frequently selected journals are shown in Table 2.

While a review of the data does not reveal a clear top five list of sources across all categories of reviewers, the principal internal medicine journals were among the sources selected most frequently. Interestingly, seven journals account for 20% of citations, forty-one journals account for 50%, and seventy-eight journals account for 66%.

Table 1
Frequency of reasons for selection

Reason for Selection	Librarian (n = 308)		Physician (n = 280)	
	Cita-tions	(%)	Cita-tions	(%)
Article title	241	(768)	221	(79)
Abstract	146	(47)	142	(51)
Journal title	124	(40)	102	(36)
Descriptors (MeSH)	56	(18)	17	(6)
Document type	34	(11)	27	(10)
Similar to case	9	(3)	47	(17)
Clinical applicability	9	(3)	81	(29)
Educational	9	(3)	53	(19)
Looked interesting	3	(1)	42	(15)
Other	6	(2)	3	(1)
Author	3	(1)	6	(2)
Author affiliation	3	(1)	6	(2)
Document length	3	(1)	8	(3)

Of the 452 total citations selected, more than 334 (73%) were published between 1987 and 1990. The high percentage of articles from the recent literature reflects the fact that the librarians did not search the older MEDLINE files unless the requested information could not be found in the current files. This practice also reflects the librarians' awareness of the clinicians' stated preference for recent studies. Very few 1991 articles were selected, as most of this literature was not indexed before the study concluded in March 1991.

DISCUSSION AND CONCLUSION

The most significant finding is that librarians can recognize and select clinically useful articles as effectively as physicians. The data demonstrate that it may be appropriate for medical librarians to expand their quality filtering activities beyond CML programs to encompass searches required for the research, administrative, and educational projects of library users. Although some libraries routinely provide quality filtering services, search results typically are passed on to patrons with little or no mediated selection.

These results should encourage librarians to be confident of their ability to provide quality filtering services effectively. The data also have important implications for the continuation of CML services. In spite of the recent dramatic increase in end-user searching, the medical librarian still has a vital role to play in clinical situations where physicians either are unable or unwilling to do their own searches or where they lack the time to select and retrieve relevant articles. The higher utility rankings assigned to articles selected by both physician and librarian suggest that the two jointly provide the "added value" to which King referred [13]. Incorporating parallel selection into the CML process, while highly desirable, probably is precluded by the need for quick results. The higher ratings for articles selected by both, added to the low 30% overlap between physician and librarian selections, indicate that the searches always should be given to the physician. In the authors' experience on a CML service, physicians indicate a strong preference for having the articles provided to them rather than participating in the selection process. This can be interpreted either as satisfaction with the quality of the clinical library service or as a general unwillingness to spend the time required to come to the library and review the printout or, perhaps, a combination of both.

The value of the data on reasons for article selection has not been established clearly. Not surprisingly, both librarians and physicians based selection decisions primarily on article title, abstract, and journal

Figure 2
Evaluation of selected articles
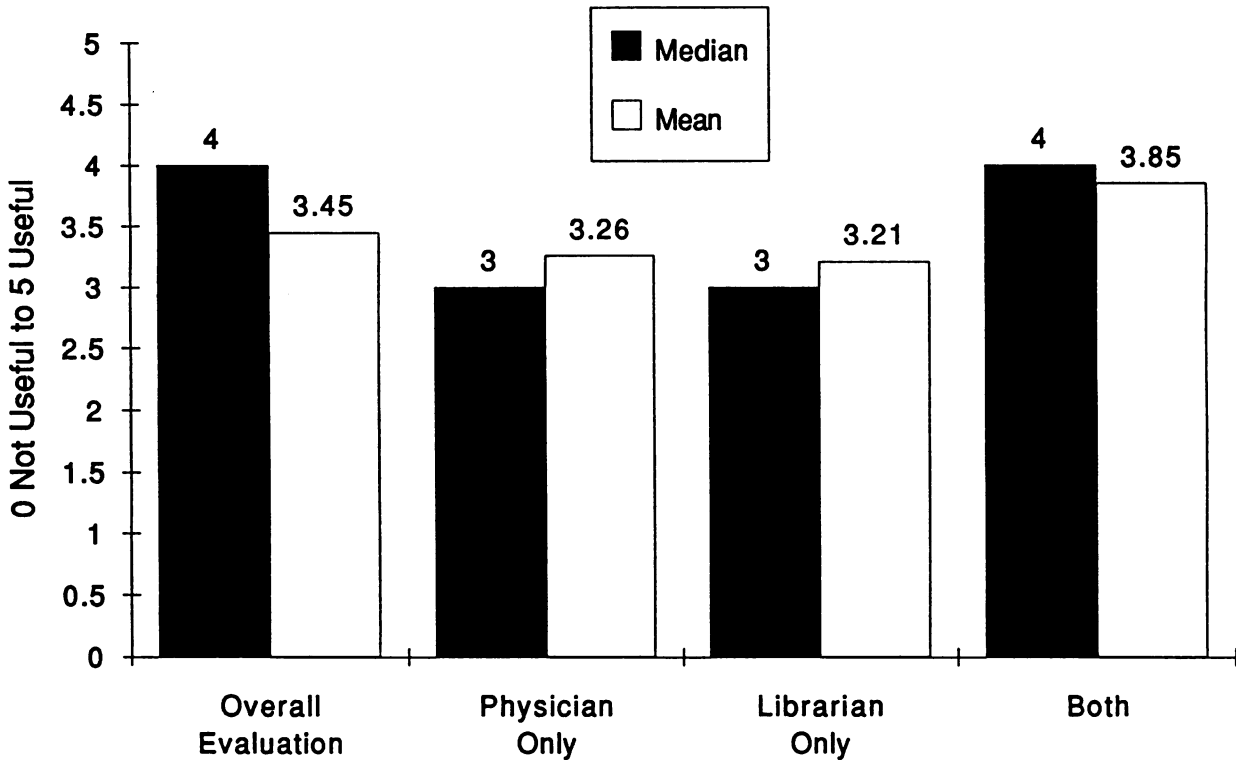
Table 2
Most frequently selected journals

	By anyone		By librarian		By physician		By both
	Citations 452	(%) (100)	Citations 308	(%) (68)	Citations 280	(%) (61)	Citations 136
Annals of Internal Medicine	25	(6)	17	(6)	12	(4)	4
American Journal of Medicine	18	(4)	13	(4)	12	(4)	7
Chest	12	(3)	8	(3)	10	(4)	6
New England Journal of Medicine	12	(3)	10	(3)	9	(3)	7
Archives of Internal Medicine	9	(2)	7	(2)	8	(3)	6
Lancet	8	(2)	7	(2)	3	(1)	2
Postgraduate Medicine	8	(2)	7	(2)	3	(1)	2
American Journal of Medical Sciences	6	(1)	3	(1)	4	(1)	1
JAMA	6	(1)	4	(1)	4	(1)	2
Southern Medical Journal	6	(1)	6	(2)	2	(1)	2
American Family Physician	5	(1)	3	(1)	2	(1)	0
American Heart Journal	5	(1)	3	(1)	3	(1)	1
Arthritis and Rheumatism	5	(1)	3	(1)	3	(1)	1
British Medical Journal	5	(1)	3	(1)	2	(1)	0
Clinical Cardiology	5	(1)	5	(2)	4	(1)	4
Journal of Rheumatology	5	(1)	5	(2)	0	(0)	0
Neurologic Clinics	5	(1)	4	(1)	3	(1)	2
Stroke	5	(1)	3	(1)	3	(1)	1
American Journal of Surgery	4	(1)	2	(1)	3	(1)	1
Drugs	4	(1)	4	(1)	2	(1)	2
Journal of the American College of Cardiology	4	(1)	2	(1)	4	(1)	2
Journal of Clinical Oncology	4	(1)	3	(1)	3	(1)	2

title. That the librarians placed greater emphasis on descriptors than the physicians probably can be attributed to the librarians' greater understanding of the MeSH terms and the indexing process. Similarly, it is logical that the physicians' knowledge base would result in a higher selection of citations that appeared similar to the specific case or seemed likely to contain clinically applicable information.

To help clarify the selection process, a list consisting of eight objective criteria and four cognitive criteria was developed through discussions among the CML librarians and the chief residents. It is not clear if the skills or processes necessary for effective mediated selection are included in this list, or if a librarian uses other, perhaps less measurable methods of determining relevant or useful articles. Perhaps the cumulative knowledge gained through the execution of thousands of mediated searches and feedback received on a sizable number of those searches fosters the ability to recognize relevance or utility.

It is evident that a field study of this type involves certain service-based risks. During the four months of the study, CML requests decreased 57% from the same four-month period of the previous year. To be sure that this decrease was related to the study, requests generated in the four months prior to the study were compared to the same period for 1989. This analysis indicated that forty-three more searches were done in 1990 than in 1989, an increase of 17%. In the four months following the study (April–July 1991), CML activity returned to a normal volume, increasing 89% over the study baseline. Thus, factors unrelated to the study did not appear to play a role in CML volume.

Of the 133 MEDLINE searches conducted for the CML program between December 1990 and March 1991, only seventy-six (57%) were included in the study, reflecting a problem with compliance. The residents occasionally failed to come to the library to review the printout and to make their selections. More frequently, they would pick up the printout and copy one or two articles themselves and not follow through with the process. Physicians who had experience with the usual CML service had the greatest difficulty accepting the more cumbersome process required by the study. Another factor contributing to the low 57% inclusion level was the elimination of searches requested on Fridays so that the librarian could complete the CML process by 5:00 P.M.

It appears that the time required for the residents to visit the library, review the printout, and select and evaluate articles significantly reduced CML activity. Therefore, even though the articles receiving the highest evaluations tended to be those selected by both librarian and physician, having both select on a routine basis probably would not be practical. Ensuring that the physicians receive the printout of all search results along with the articles chosen by the librarian may be a realistic compromise. Additional research is needed to clarify the process of effective mediated selection. In any case, regardless of how librarians achieve effective quality filtering, they clearly are capable of assuming this role to create a more responsive and dynamic mode of library service.

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