How to conduct an effective literature search


Summary
The ability to describe and analyse published literature on a topic and develop discussion and argument is central to evidence-based patient care. A literature review is an assessment procedure that is commonly applied in nursing settings. Effective literature searching is a crucial stage in the process of writing a literature review, the significance of which is often overlooked. Although many current textbooks refer to the subject, information is often of insufficient depth to guide an effective search. This article outlines important considerations in the search strategy and recommends practical advice for students to ensure best use of their valuable time. It is suggested that a systematic, organised search of the literature, that uses available resources effectively, is more likely to produce quality work.

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NURSING STANDARD

THE ABILITY to describe and analyse published literature on a topic and develop discussion and argument is central to the delivery of evidence-based patient care, which is the focus of contemporary nursing practice (Abbott 1993, Beyea and Nicoll 1998). Acquiring the skills of synthesis and critical analysis at this level enables nurses to see clearly the symbiotic relationship between theory and practice in nursing (Hendry and Farley 1998).

Writing is perhaps the most challenging yet rewarding aspect of studying at undergraduate level. Northedge (1990) suggested that this is because it requires the student to think and organise his or her thoughts at a deep level. The development of this thought process, and its translation into the written word, are essential components of successful student studies (Northedge 1990).

Increased academic attainment by nurses is necessary if they are to respond to a complex healthcare environment, the need for evidence-based practice, an increasingly aware healthcare consumer and a technological revolution (Treacy and Hyde 1999). However, there is little empirical evidence that supports the benefits of writing skills per se. Improvement in the student’s ability to read and analyse research has reported benefits for research use in practice (McSherry 1997). A qualitative study by Rodgers (2000) suggested that nurses believe that the attainment of higher education improves their ability to think critically and seek out evidence and evaluate it for practice.

Conducting a literature review can be an essential part of a course of study for many nurses. The aim of reviews is not only to measure research knowledge, but also to increase students’ awareness of research through the review process. It requires the student to become familiar with research studies, terminology and methodology.

Carrying out a literature review, therefore, has greater benefits than just success in a course of study. It can be invaluable in contributing to research awareness in nursing (McSherry 1997). The literature review can form the basis of developing standards and guidelines for practice, as well as policies, procedures and innovative care delivery methods such as care pathways (Wall and Proyect 1998).

The purpose of a literature review is to gather information about a particular topic from many
A search of the literature is not just an essential guide to topic refinement; it can also aid topic selection. The help that searching the literature can provide in this area is often overlooked. This is possibly because the process is often perceived as linear—first deciding on a topic, then searching the literature and finally writing the review.

However, the completion of the review does not necessarily follow a clearly defined set of stages. The nurse may need to revisit the search (or search results) many times during the topic selection; likewise, the search may need to be revisited as the review develops.

Choosing a topic

Choosing a topic often poses great difficulty for students and support is vital at this stage. The undergraduate student requires a topic where there is relatively easily accessible literature and where recent empirical work has been undertaken. Preceptors or mentors may be able to give the student useful advice depending on their own area of interest. However, it is useful if the nurse develops an interest area based in his or her own practice.

The difficulty for the student is not so much deciding on a topic as narrowing down the topic to a manageable size, a task that requires skill and guidance. A manual search of the literature can narrow down process or topic selection.

Many students describe their topic in the broadest sense, perhaps unaware of the wealth of research that may exist. An example is the nurse who chooses to examine ‘oncology nursing’. Manual searching will highlight many areas that could be explored and should be conducted before carrying out an electronic search (Polit et al 2001).

Those who use the initial search to identify a topic may gain an advantage over others because it gives the certainty that there is recent and accessible published research on a topic. If an initial search is not carried out there is the danger that students may come up with topics where little research exists. While the latter situation is ideal for the student proposing research and is manageable for an experienced author writing a review, it presents many difficulties for the novice writer.

Choosing an approach to the search

Experienced researchers agree that a structured systematic approach to the search produces the best available evidence for informing and guiding practice (Parahoo 1997). Systematic searches and reviews, however, need resources and experienced reviewers with a good knowledge of research methodologies (Hek et al 2000).

Nevertheless, the general principles of conducting a systematic search and review are useful for even the novice searcher. Hek et al (2000) state that the key principles for guiding a literature search include being systematic, explicit, thorough and rigorous. This means that the search strategy needs to be described in detail (Box 1).

Keeping a record of the search strategy and process is useful for a number of reasons:

- Search strategy/process is explicit.
- Ensures search is thorough/comprehensive.
- Prevents replication and/or omission of references.
- Keeps the searcher focused.
- Establishes rigour in the search process.

O’Connor (1992) outlined two structured approaches that may be taken – the standard approach and the network approach. The standard approach uses an inductive method where the reviewer is ‘looking backwards’ through databases, journals, abstracts and articles and forms a list of potentially pertinent
material. The network method is where a recent paper is identified in one or more relevant journals. Using the reference list, references identified (from the same journal) are traced and further references identified (from the same journal). All citations in the journal are sourced until all relevant citations are identified. Most databases provide this information and this network approach can be a particularly useful way for a student to gain an overview of approaches to the topic under consideration.

Once the literature search has begun it is essential that references are managed in a logical, systematic and easy to retrieve way. This will prevent the student from feeling overwhelmed by the volume of material gathered. There are a number of ways in which students may be encouraged to organise their material, for example, using reference cards or personal computer files.

Several authors support the use of index cards to collect information (Burnard and Morrison 1990, Gould 1994, Hek et al 2002). The cards can contain a summary of the article, title, location, key ideas, personal thoughts, and shelf number of library books for easy retrieval (Gould 1994). Reference management software can also be used to put information in order. The two most commonly used packages are ProCite (www.procite.com/) and EndNote (www.endnote.com/) (Burns and Grove 2001). Some colleges and universities may be able to provide one of these packages at a reduced cost to students. However, the index card system is likely to be more economical to the student and has certain advantages.

One benefit of using index cards is that once relevant articles have been identified from the search they can be catalogued and filed according to physical location. Easily accessible articles may be sourced first, before moving to the next most accessible location. This means that when the articles are due to be retrieved, one visit to a library, section of a library or the database that holds the particular journal, is usually sufficient to fulfil the required collection rather than requiring several visits. Although this card system may initially seem tedious, it saves time in the end because retrieving the articles is more systematic. It also aids the review process because all references are noted correctly and a summary of each article exists.

Once the writing of the review has begun, the cards may be used to sort the material in various ways. One method is to organise the material according to the view expressed in the articles, for example, five articles may express similar views on a topic, while six other articles may express different views. Alternatively, the student may decide to organise the material according to types of article, for example, descriptive articles and research articles can be kept separately. Articles can also be organised according to the main issues or headings related to the topic.

In addition, the information on the index cards can be used to transfer key information on each article quickly and easily to a summary grid. The grid method proposed by Benton and Cormack (1996), Beyea and Nicoll (1998) and Polit et al (2001) is another useful way of categorising the search material. A grid, or summary table as it is also known, can include columns with headings that include: author, type of study, purpose, sample, design, data collection and key findings (Table 1).

The headings used in the grid will depend on the purpose of the literature review and the experience of the researcher. For example, Scott...
and Thompson (2003) used only three headings – ‘study’, ‘participants’ and ‘instruments’ – when they systematically reviewed studies assessing the information needs of post-myocardial infarction patients. These grids can also be categorised according to each aspect of the review topic. Using a grid is not time consuming. It can save time by preventing frequent shuffling through numerous articles to find one that you think might contain the information you need. When the student is trying to organise thoughts and develop the discussion, these grids are a quick and easy guide to the literature.

Establishing a good working relationship with librarians is an integral part of any successful literature search. They are an invaluable learning resource in getting to know the library and learning how to conduct a successful electronic search of the literature. Access to web-based journal databases is provided through college or university library resources or from the comfort of the student’s home if he or she has access to the internet. When using databases, careful consideration must be given to the choice of keywords and, in many instances, librarians – if available – who provide database support and may be able to offer assistance with choice.

Selecting the keywords for database searches

Keywords are the major concepts or variables that are included in the search (Burns and Grove 2001). The use of appropriate keywords is the cornerstone of an effective search. While it may appear a simple task, the selection and development of keywords can be complex, time consuming and difficult for a novice. Before starting to search for literature it is important to consider all the possible keywords, including synonyms and alternative terms, linked to your topic. If all possible keywords are not identified, some literature will be omitted from your review, which may adversely affect its quality.

Truncating is searching using part of a word to source information on similar words (Burns and Grove 2001). The root of the word is used with the appropriate truncation symbol. Various databases use different symbols. Therefore, you will need to find out what symbol is recognised by the database you are accessing, for example, nurs* will find any words or titles containing the word nurse, nurses and nursing. Other possible symbols used by various databases include $ and %.

Boolean (or logical) operators are used for expanding, excluding or joining keywords when conducting a search (Burns and Grove 2001). They refer to a system of using logical thought described by the English mathematician and computer pioneer George Boole (1815-1864) (SearchCIO.com 2005). These operators instruct the search engine to combine the necessary elements. They include the terms ‘AND’, ‘OR’ and ‘NOT’. The term AND can be used to make the search more specific. For example, in some cases students find that the search reveals little relevant literature and, therefore, they may need to expand or widen their literature search to guide their topic, or review the keywords that were used in the search.

A search on Cumulative Index to Nursing and Allied Health Literature (CINAHL) (January 1999-January 2005), using the keywords ‘nurse-patient communication’ revealed 97 references, whereas, when the keywords were changed to ‘communication and nurses’, 3,361 references were identified. One disadvantage in using this method to widen your search is that many of the references may not be relevant to your topic (Bennett 1999).

The term OR can be used to broaden the search, for example, ‘nursing OR nursing care’, whereas NOT is used to exclude words or meanings, for example, ‘general nursing NOT veterinary nursing’.

<table>
<thead>
<tr>
<th>Author and year</th>
<th>Journal</th>
<th>Type of study</th>
<th>Purpose</th>
<th>Sample</th>
<th>Design</th>
<th>Data collection</th>
<th>Key findings</th>
</tr>
</thead>
</table>
The spelling of words, for example, ‘paediatrics’ or ‘pediatrics’, can influence the results of a search – paediatrics will yield mostly UK-based articles whereas pediatrics will result in mainly American articles. Alternative terms should also be considered, for example, the use of the term ‘heart’ as a keyword will not necessarily identify relevant titles containing the term ‘cardiac’. To help identify appropriate keywords most databases provide a thesaurus of keywords that you the researcher may find useful.

Keywords need to be a diverse set of related terms to capture fully all the available literature on a chosen topic (Bennett 1999). Databases will only respond to words that have been provided. Using appropriate keywords will avoid unmanageable reference lists emerging from search databases. An initial search may reveal that the topic is too broad or narrow. For example, a search on ‘lung cancer’ on Medline (1993 to present) identified 18,384 references.

The first stage of keyword development is, therefore, narrowing the focus of the topic. This can be done by searching one particular aspect of the topic, for example, smoking and lung cancer, or population of interest, for example, male population only. The search can also be narrowed to certain periods, for example, 1995-2005, and this can be particularly useful where literature on a topic is abundant. However, one of the disadvantages of narrowing the scope of the search like this is that older seminal studies or relevant reviews may be omitted. It is advisable to talk to your supervisor and a librarian before you make this decision (Burns and Grove 2001, Hart 2001).

**Conducting the literature search**

Sources, such as journal articles, textbooks, reports, newspapers, conference proceedings, theses, dissertations and bibliographic databases (CD-ROM and internet based), are available in most libraries and are essential to the search process. The requirement for undergraduates to source conference proceedings, theses and dissertations varies between institutions. Burns and Grove (2001) suggested that these sources are only required at master’s degree level. It is important, therefore, if providing courses of study, to have local agreement on this issue and to ensure that students are made aware of the expectations.

Selection of the most appropriate databases to use can present a challenge to students. A number of databases are available when searching health-related literature. Commonly used databases include those listed in Box 2. These databases and others can be accessed through the college or university library’s resources or through the internet. However, while access via the college or university library is often free, many databases will charge private users a fee for downloading an article on a personal computer. Some publishers do not provide free access through the college or library so it may be advisable to obtain inter-library loans for this material or pay for each article that is downloaded. Although this is convenient and saves time it can be an expensive option.

The internet is a useful source of many different kinds of information. It can be accessed through search engines or information gateways. Search engines trawl the internet or databases for links with the keywords used. Examples of search engines include those listed in Box 3.

### BOX 2

**Commonly used databases**

- **Cumulative Index to Nursing and Allied Health Literature (CINAHL)** includes references to English and many non-English language nursing journals from 1982. Books, nursing dissertations and selected conference proceedings are also included in this database.
- **MEDLINE/PubMed** is a well-known source of reference for health-related topics. It covers approximately 3,200 journals worldwide. All journals held on this database are deemed to have an international focus and are sufficiently evidence and research-based. This means that the information is generally of a high quality.
- **The Cochrane Library** conducts and disseminates systematic literature reviews on healthcare issues. The reviews are revised as new research results become available and/or as errors are identified. There are four parts to the Cochrane Library: Cochrane Database of Systematic Reviews (CDSR); Cochrane Review Methodology Database (CRMD); Cochrane Register of Controlled Trials (CENTRAL); and the York Database of Abstracts of Reviews of Effectiveness of Health Care (DARE).
- **Synergy** provides access to full text electronic journals by Blackwell Science. It covers all areas of social sciences and humanities and includes sociology, politics and economics.
- **Applied Social Sciences Index and Abstracts (1987 to present)** (ASSIA). This database is useful for all healthcare professionals and social workers. It includes literature on psychology, sociology, medicine, anthropology and some law and politics.
Information gateways contain information on particular topics gathered from various sources. Examples of information gateways are shown in Box 4.

The internet provides easy access to information but if the searcher is not focused and the keywords are unclear, it is possible to spend an interesting afternoon surfing the net with little to show for it at the end of the session. Also, anyone can set up a website. It is important that the information retrieved from the internet is of a certain standard. The Health on the Net Foundation Code of Conduct for medical and health websites (www.hon.ch/HONcode/Conduct.html) or the BIOME evaluation guidelines (www.biome.ac.uk/guidelines/eval) can help students evaluate the literature relevant to their search that they find on the internet.

**Types of information**

Nurses will be presented with a variety of literature that is relevant to their topic. Textbooks are useful because they generally contain an overview of a topic. However, students need to be aware that they can quickly become outdated. Journals on the other hand provide current, up to date literature that allows the searcher to view the current state of a topic in terms of research and development.

Journal articles are ‘peer reviewed’ or ‘non-peer reviewed’. Buchsel (2001) highlighted that the most respected journals are those that are peer reviewed. The process of review ensures that a consistently high quality or standard of material is published, and these papers are likely to be of more benefit to students in the preparation of the review. However, non-peer reviewed papers are informative and must not be overlooked.

Although various categorisations of journal articles exist, students may be encouraged to categorise articles as either review, descriptive or research. Review articles provide detailed accounts of particular topics through summarising and evaluating research and literature relating to a particular topic. These articles also discuss the implications and recommendations for further development of the issues identified in the article.

A descriptive article merely describes a topic with reference to current literature and is not discursive like a review article. A research article includes a report of a completed piece of research relating to a particular phenomenon or topic. Opinion pieces also occur in the literature. These can be editorials or single pages in journals that represent a single person’s opinion and are not deemed as authoritative as other types of articles (Burnard 1996).

Holmes (1996) highlighted the importance of obtaining primary sources in the search: ‘Primary sources, including research studies and statistical reports, are those in which the data are reported by those who gathered the information.’ In contrast, secondary sources are those where the author reports on, or includes, the work of others or previously published data. According to Holmes (1996), the use of secondary sources when reviewing literature can adversely affect the quality of a literature review because it is impossible to ascertain whether the secondary source is accurate or unbiased in its interpretation of other people’s work.

Novice writers may find the use of government publications daunting because it may not be immediately obvious what information is pertinent to the review. Furthermore, database searching is unlikely to yield the necessary sources. Hart (2001) provides a comprehensive chapter on finding official publications and statistics that may be useful to students. In addition, many government departments have websites where information can be easily accessed. Information on these sites is usually up to date and may add to the overall development of the review.
Guidance is available to students on writing a review. The Centre for Reviews and Dissemination (CRD) at York provides research-based information about the effects of interventions used in health and social care (www.york.ac.uk/inst/crd/). CRD Report Number 4 ‘Undertaking systematic reviews of research on effectiveness’ is on this website under ‘Review methods and resources’. It provides a detailed guide to conducting a systematic review. Reviewers often refer to these guidelines, so it will be of benefit to nursing students and can be downloaded.

Similarly, the National Institute for Health and Clinical Excellence (NICE) website (www.nice.org.uk) has a section ‘Developing clinical guidelines’. This contains a technical manual with chapters on ‘identifying evidence’ and ‘reviewing and grading evidence’ that provides crucial guidelines for nursing students and can be easily accessed without cost.

**Conclusion**

The 21st century requires that nurses are not only competent, but also reflective and research aware. The use of research to underpin nursing practice is a common theme in many nursing programmes and this component of programmes is often assessed partially by literature review submission. Students are usually eager to proceed straight to the task of writing, especially if deadlines are looming. However, this article advises spending time on planning and organising an effective search of the literature on a topic. This is a key aspect of the production of a comprehensive and worthwhile literature review. A systematic, thorough and organised review is ultimately likely to produce quality work, which will benefit the student in terms of achieving course aims and developing skills in conducting research and/or developing local policies and procedures. This will ultimately have a positive impact on patient care.

**References**


