

Ways of searching for scientific information

Os caminhos na busca da informação científica

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INTRODUCTION

Medical literature is growing exponentially. It is estimated that the volume of information published in any specific area duplicates every four years [1]. Thus, it becomes very difficult for the doctor to accompany the progress of knowledge, even within his own specialty.

This avalanche of knowledge needs to be sorted and evaluated with criteria, and for this it is necessary to define strategies for searching, filtering, organizing and analyzing the information. The search strategy can be defined as a technique or steps that enable the retrieval of stored information which answer formulated questions or prove hypotheses [2]. According to Bates [3], the planning and execution of a search strategy is the art of choosing where, when and how to investigate the source of information with criteria to achieve the specific objectives. This technique, frequently, must restrict the information considered or, in other situations, increase it to obtain the most relevant information.

The gigantic quantity of information has been a problem for medical schools, leading to important changes in the teaching-learning process, including the restructuring of the curriculum. In the bigger medical schools of the world and of our country, the focus is on 'learn to learn', in an educational proposal which favors the investigative attitude, critical autonomy and creative research. This is a philosophy that should not only be part of the reality of the professionals being educated, as there are important changes incorporated in education, but also in research and in assistance, which is essential for modern medicine. The bibliographic review is important not only in the writing of an article, preparation of classes and development of a research protocol, but also it is essential for the improvement of the updated professional.

In this scenario, the expression 'information literacy' becomes more and more important, whose

concept is linked to a series of abilities which include locating and the use of information for problem solving and decision making [4,5]. This includes both the search for information, and making use of it to make decisions and to solve problems, utilizing good criteria.

Within this context, I introduce this article, which aims to discuss some tools in the recovery of medical information, particularly related to cardiac surgery.

REVIEW OF THE LITERATURE

The precise review of the literature is one of the main points in the elaboration of scientific works, and should be present in all its phases. Thus, necessarily, it should be performed before the project itself in the design phase of the study, as it is fundamental in the elaboration of the hypothesis. In this phase, the bibliographic review is important for the placing of the study within the historic timetable of events, emphasizing originality and controversial aspects. With this, a waste of time and resources is avoided on research whose results have already been published.

Additionally, methodological support for the execution of the project is obtained, defining more precisely the techniques that will be used, thus facilitating the planning of the research.

In the writing phase of the work, the bibliographic references constitute necessary elements for argumentation, giving credit to ideas and previous findings of other investigators, and establishing links between the obtained results and existing research.

To perform a review of the literature you should remember some aspects which will be included in the search strategy: definition of the theme, determination of the relevant parameters such as type of production, research period, restrictions, limits and reference sources.

In the definition of the theme, the specificity of the issue and the correct choice of key words or

descriptors are decisive for an adequate search of publications. Many researchers are unaware of the existence of DeCS (*Descritores em Ciências da Saúde* - Descriptors in Health Sciences) and MeSH (Medical subjects Headings), vocabulary that links descriptors used for the indexing of the articles in the principal national and international databases. This vocabulary is available for consultation in a printed form, in the majority of medical libraries. DeCS can be accessed on the Internet (<http://decs.bvs.br>), in Portuguese, English and Spanish, providing a single consistent means of recovering information independently of the language. Similarly, MeSH is available at the site of the National Library of Medicine (www.nlm.nih.gov/mesh). This list is dynamic, in a constant state of growth and mutation. BIREME – Latin American and Caribbean Center of Medical Science Information (Centro Latino-Americano e do Caribe de Informação em Ciências da Saúde) – registers yearly more than 1000 interactions of DeCS, including alterations, substitutions and the creation of new terms or areas.

In relation to the period included in the bibliographic research, although there is a tendency to only use the most recent articles, published within the last five years, you should consider the recentness and rarity of the theme. Thus, when investigating about robotics in surgery, there is no sense in looking for articles in the databases published in the 1960s, 1970s or 1980s.

The bibliographic review can be achieved utilizing as its source: articles, textbooks, theses, CDs, among others. We can also crosscheck references, that is, from a good article, check the consulted bibliography and select other articles of interest.

However, the databases are our greatest allies when searching for bibliographic references. For Lopes [2] the choice of where to look, identifying which database is better qualified to answer specific questions, depends on a series of factors that relate to the subject, period covered by the database, types of indexed documents, etc.

The databases can be presented as a printed version, on CD or online on the Internet. This last format has as its main advantage as the facility of access, both in relation to place and time. Other advantages include the constant updating, the existence of links with related articles and with sites of complete journals, as well as the possibility of reading only the summaries, which assists in the selection of articles.

MAIN DATABASES

There are databases which have a statistical-epidemiological focus, such as WHOLIS of the World Health Organization (WHO) (www.bireme.br), and scientific, such as MEDLINE, of the National Library

of Medicine, available on a site called PubMed (www.nlm.nih.gov/pubmed). WHOLIS is an information system of the library of the WHO. It is a bibliographic database which contains publications from the headquarters and regional agencies of the WHO, articles from periodicals, technical and political documents and publications of the WHO in collaboration with other editors and international organizations.

Among the scientific databases, Medline is, without doubt, the best known, indexing more than 4,500 journals, 53 of which are Latin American and only 14 Brazilian. On the main menu of the simplified search, the researcher inputs the key words and when the search result is presented in the form of a list of works, there is a link to the abstract and another link “Related Articles”. This second link performs another search on the basis of articles similar to the indicated article. Apart from the key words, the name of the authors who usually publish articles about the theme to be researched can be utilized. This represents the simplest form of inquiry on the Medline database.

However, in a more refined and logically more efficient investigation, which is still used by few, the researcher can click on ‘limits’ where the language, the period of research, the type of article (clinical trials, editorials, guidelines, metanalysis, review articles, etc) age ranges, gender, etc can be specified. On the main menu of PubMed there is also the possibility of selecting ‘Clinical Queries’. Using these filters the investigator can indicate the category of article of interest and the therapy, diagnosis, etiology and prognosis, as well as to define if the emphasis of sensitivity or specificity should be given.

As there are few national journals indexed to Medline, consulting the regional databases such as LILACS – Latin America and the Caribbean Literature on Health Sciences (Literatura Latino Americana e do Caribe em Ciências da Saúde) – (www.bireme.br) is frequently indispensable. This database is organized by BIREME, which includes around 670 journals, as well as theses and books. The RBCCV is indexed to LILACS since this database was created in 1982.

To access databases of correlated areas such as Biological Abstracts can also be very useful, providing, for example, important data about anatomy and physiology of animals used in experimentation, not always available in medical article.

The Web of World Science (WoS) is a database produced by the Institute for Scientific Information (ISI) with information about published articles, from 1945 on, of more than 8,400 specialized periodicals, from all areas of knowledge (Sciences, Human and Social Sciences, Arts and Humanities). For each article, the abstract, the references and the citations can be obtained. The information about the articles can be retrieved using the author’s name, the name of

the periodical, the institution and by key words. The Science Citation Index, which is part of the Web of Science, offers evaluation of the impact of the publication in the world, providing details such as the number of times that other authors cited the article.

Access to the latter databases, Biological Abstracts and Web of Science, is not free, however, CAPES have been making these and other databases available on their site (www.periodicos.capes.gov.br) for further education and research institutions around the country.

The National Guideline clearinghouse (www.guideline.gov), maintained by the Agency for Health Care Policy and Research in partnership with the American Medical Association and the American Association of Health Plans, also have a good site for whom is looking for clinical practice guidelines based on scientific evidence. In our area, the Brazilian Medical Association in a project with the Federal Council of Medicine, denominated as the Directives Project, has also been developing, together with specialist societies, national directives for medial practice essentially based on scientific evidence (http://www.amb.org.br/inst_projeto_diretrizes.php3).

ELECTRONIC LIBRARIES

Databases, generally, only give the reference or bibliographic indication, or when there are many, the abstract is obtained. The next step is to localize the printed journals in libraries through a request of a Xerox or by accessing the online issue of the journals.

There are several electronic libraries which bring together journals available online.

The CAPES portal (www.periodicos.capes.gov), as well as the databases previously mentioned, offers access to complete texts of more than 2,400 national and international journals. The access to the portal is free, restricted to professors, researchers, students and employees of 97 further education and research institutions across the country, from any terminal connected to the internet in the participating institutions.

SciELO (Scientific Electronic Library Online) is an electronic library that covers a selected collection of 106 Brazilian scientific periodicals, which includes the RBCCV (www.scielo.br/rbccv), the Brazilian Archives of Cardiology (www.scielo.br/abc), and the Acta Brazilian Surgery (www.scielo.br/acb). This is the result of a partnership between FAPESP and BIREME, which aims to increase the visibility and accessibility of the national scientific production, inside the country and abroad. This was an important initiative as, currently, only a small part of this literature is referenced in international databases. On this site, the complete texts of the articles are available free of charge. The RBCCV, aiming to strengthen the publicity

of the published works together with the international scientific community, decided to make the articles available in English on the SciELO site from the start of 2003. Thus, researchers from other countries can access the articles in our journal, without encountering the obstacle of the language. With this objective, a link was also included on the CTSnet site to our journal (www.ctsnet.org/journals/ctjournals.cfm), which appears side by side of the best journals of the specialty published around the world.

The Electronic Library Probe (Programa Biblioteca Eletrônica) – ProBE (www.probe.br) was created in 1999, with the objective of making complete texts of international scientific journals necessary for the qualification and modernization of professionals in research available in an agile and up-to-date form.

This was the result of an international cooperation group which brought together FAPESP, BIREME and the principal universities of the state of São Paulo such as USP, UNICAMP, UNESP, Unifesp and some educational and research institutions such as Dante Pazzanese Heart Institute. Unhappily, access is only available to participating institutions. More than 2,000 articles from Elsevier, Academic Press and High Wire Press are made available in ProBE including the American Journal of Cardiology, Cardiovascular Research, European Journal of Cardiothoracic Surgery, among others. The number of downloads of texts reaches 1,000 monthly [6].

Many specialized publications are found on Internet, some of which are linked to medical societies and are only available to associates and/or subscribers. These include The Annals of Thoracic Surgery, The Journal of Thoracic and Cardiovascular Surgery, European Journal of Cardiothoracic Surgery, which can be accessed from the CTSnet site (www.ctsnet.org/journals). Other journals, such as the British Medical Journal (www.bmj.com), have free access.

In 2001, researchers from 158 countries decided to demand that journals maintained online by societies, should have free access after six months of publication. That is, the journals would be sold normally during the first six months. Thus, a wide-ranging world online library would be created, making the knowledge acquired in more privileged centers available to anybody. Many researchers from Brazilian universities signed the open letter delivered to the main journals. The group of scientists who signed the letter undertook to boycott organizations which did not agree with this idea, sending articles for publication only to journals participating in the project [7].

FINAL CONSIDERATIONS

In 1996, the then president of the Society of Thoracic Surgeons, Robert L. Replage, stated “I have

seen the future and it is on the Internet” [8]. He was correct, the Internet without any doubt revolutionized the form of communications in our society and became an important tool for all professionals. In Brazil, there are more users with access to the Internet than in countries such as France, Australia and China. According to Aires & Aluisio [9], the perspective is that, until the end of 2003, 36 millions of Brazilians will have access to the Internet.

However, this extensive access and visibility that the Internet offers deserves some caution; there are millions of sites containing information of all types and obviously with different degrees of credibility. Particularly bibliographic material obtained from sites without ties with medical societies or governmental organizations should be submitted to careful analysis. There are some aspects that should be analyzed in each work, even those obtained in journals with recognized inspection, such as the study design, sample size, the employed methodology, clarity of the results, coherence of the conclusions, possible conflicts of interests, among others.

In conclusion, we would like to stress the responsibility of the author to cite other publications, according to Umberto Eco, “to cite is like witnessing a process; we need to always be in conditions to resume the testimony and demonstrate its reliability. For this, the bibliographic reference should be exact and precise as well as verifiable for all.”

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