How to select publications on occupational health: the usefulness of Medline and the impact factor

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Abstract

Objectives—Publications in the field of occupational health appear in various journals, including those of other medical specialties. This complicates the follow up of literature for specialists in this field. On the basis of Medline and the impact factor, this diversity was assessed, and a cost effective method for selecting the most pertinent journals in the practice of occupational health was proposed.

Methods—A Medline search identified all the articles published in 1998 with occupational diseases or occupational exposures as the main topic. These articles were classified based on the journals in which they appeared. The journals were then compared according to their subject area, the number of articles that were published in the fields studied, and their impact factor.

Results—The search retrieved 2247 articles, published in 577 different journals in 1998. Each journal published between one and 105 articles during this period (mean 3.89). However, only 1.4% of the journals accounted for more than 25% of the total articles published. More than half of the articles were published in journals dealing with general practice or medical specialties other than occupational health. Only 66% of retrieved journals had an impact factor, and more than 80% of the articles were published in journals with an impact factor <2.

Conclusion—Simply following up occupational health journals is not sufficient to meet the requirements of the occupational health professional. Moreover, the use of the impact factor cannot be considered as a reliable research tool to assess follow up. Two lists of eight and 38 journals were thus set up. They permit a literature coverage of 27% and 52% respectively in the specific fields studied, and this seems to be the optimal compromise between time and literature covered. Lastly, practical procedures are suggested to follow up literature and obtain abstracts from selected journals on the internet.

Keywords: occupational health; bibliographic databases; impact factor; Medline

Occupational health covers many basic and clinical research fields. The articles dealing with related topics are therefore published in a wide range of journals, and not only in occupational health journals. Specialists in occupational health, as well as specialised librarians, thus confront a problem when trying to follow up occupational health literature. The same problem is faced by research workers in occupational health when they try to choose the most appropriate vehicles to obtain the wider audience or the maximum impact on people working in the same field of research. Therefore, what should be the criteria of choice for these professionals? The journal's subject area can be valuable, but this criteria is often insufficient.1 The impact factor is a bibliometric tool which assesses the coverage of a journal,2 but it may be subject to some bias. With Medline, we searched all the articles published in 1998, and in which the main topic was either occupational diseases or occupational exposures. The purpose was to compare the methods used to assess the usefulness of journals in the specific field of occupational health, and to develop the optimal strategy to follow up occupational health publications.

Methods

In May 1999, Medline was searched for the articles published in 1998 dealing with occupational diseases or occupational exposures. Medline is the on line and CD-ROM equivalent of Index Medicus, and is produced by the National Library of Medicine in the USA (NLM, Bethesda, MD, USA). It contains more than eight million records from over 3500 biomedical national and international journals, covering the period 1966 to the present, and increases by 324 000 records per year. The medical subject headings (MeSH) terms occupational diseases and occupational exposures were used and explode and focus functions were applied.3 All the articles retrieved were classified by the journals in which they were published, and the journals were compared on the basis of their subject area, the number of articles they published in the field studied, and on their impact factor.

Four subject areas (occupational health, toxicology, environmental health, other specialty, or general practice) were defined. This classification scheme was more precise that the one adopted by the Institute for Scientific Information (ISI) (Philadelphia, USA), in which journals dealing with occupational health, environmental health, and public sciences are grouped into a chapter entitled “public, environmental, and occupational health”. We classified journals according to their principal fields of interest. For example, Occupational Medicine, the American Journal of Industrial Medicine, or Medicina del Lavoro were
classified in occupational health journals, *Toxicology Letters* or *Critical Reviews in Toxicology* were classified in toxicology journals, and *Environmental Health Perspectives* or *Chemosphere* in environmental health journals. In the analysis, we grouped journals dealing with occupational or environmental health and toxicology because those topics are closely related and because the distinction between occupational health journals and environmental health journals tends to be more and more difficult to assess, as shown by the transformation in 1994 of the *British Journal of Industrial Medicine* into *Occupational and Environmental Medicine*.

The citation rate is calculated on the basis of the database science citation index (SCI), produced by ISI, which contains up to 13 million records and 150 million scientific citations, since 1964; from more than 4900 journals in many different research fields. The citations are represented by the reference lists of articles from many of the world’s scientific journals. The references are rearranged in the database to show how many times each publication has been cited within a certain period, and by whom. The impact factor is defined as the recorded number of citations within a certain year divided by the number of items published during the preceding years. In this study, the impact factors published in 1998 were used.

### Results

Out of 2247 articles retrieved, a total of 1269 were concerned only with occupational diseases, 745 only with occupational exposure, and 233 with both. The articles appeared in 577 different journals. Most of them were English language journals, but some were in German (n=184), in Russian (n=111), in Italian (n=72), in Spanish (n=47), in French (n=42), in Polish (n=31), in Japanese (n=15), in Ukrainian (n=15), in Portuguese (n=9), in Dutch (n=4), in Serbo-croat (n=4), or in Slovenian (n=2).

Table 1 shows the journals classified according to the number of articles they published in 1998. Each journal published between one and 105 articles during this period (mean 3.89) but 4.1% of the journals published more than a quarter of the total articles and 94.2% of the journals accounted for only one half of the total articles published.

Table 2 presents the number of articles published in journals, classified according to their main subject area (occupational health, toxicology, environmental health, other specialty or general practice). Of the articles, 43.5% appeared in journals with the subject area occupational health, or closely related—that is, toxicology or environmental health. These journals represented 9.3% of the total number of journals. Nevertheless, more than half of the articles were published in journals with subject areas general practice or other medical or scientific specialties.

Tables 2 and 3 present the number of articles published in journals classified according to their impact factor. Only two thirds (65.6%) of the journals retrieved were indexed in the SCI, and thus had an impact factor. Furthermore, among the 54 journals with the subject area occupational health (or related to it), the impact factor was calculated by the ISI for only 25 (46.3%), and was <4.824 (mean 1.300).

Last but not least, although some articles appeared in journals with a high impact factor (*Nature Medicine*, *Lancet*, or *New England Journal of Medicine*), more than 80% of the articles were published in journals with an impact factor <2.

### Discussion

Medline was used to identify all the information sources in occupational health, because this database contains information on all the fields relevant in occupational health, is available worldwide, and was adopted by many if not all medical libraries. Furthermore, it can be searched free of charge with the internet (through PubMed).

Nevertheless, Medline indexes mainly English language journals, is dominated by American publications, and, as the other biomedical bibliographic databases when used alone, is not exhaustive in the field of occupational health. Despite these shortcomings, Medline includes

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**Table 1** Classification of journals according to the number of articles published in 1998

<table>
<thead>
<tr>
<th>Articles published by each journal (%)</th>
<th>Journals concerned (n (%))</th>
<th>Total articles published in the journals in each category (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (0.2)</td>
<td>26 (4.5)</td>
<td>11.382</td>
</tr>
<tr>
<td>10–19</td>
<td>14 (2.4)</td>
<td>13.018</td>
</tr>
<tr>
<td>1 (0.2)</td>
<td>14 (2.4)</td>
<td>13.291</td>
</tr>
<tr>
<td>1 (0.2)</td>
<td>83 (4)</td>
<td></td>
</tr>
<tr>
<td>101–110</td>
<td>2 (0.4)</td>
<td>206 (9)</td>
</tr>
<tr>
<td>Total</td>
<td>577 (100)</td>
<td>2247 (100)</td>
</tr>
</tbody>
</table>

**Table 2** Number of articles published by group of journals, according to their main subject area

<table>
<thead>
<tr>
<th>Articles published (n (%))</th>
<th>Journals published (n (%))</th>
<th>Total impact factor of journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational health</td>
<td>844 (37.6)</td>
<td>11.382</td>
</tr>
<tr>
<td>Toxicology</td>
<td>40 (1.8)</td>
<td>13.018</td>
</tr>
<tr>
<td>Environmental health</td>
<td>92 (4.1)</td>
<td>13.291</td>
</tr>
<tr>
<td>Other</td>
<td>1271 (56.6)</td>
<td>566.027</td>
</tr>
<tr>
<td>Total</td>
<td>2247 (100)</td>
<td>603.718</td>
</tr>
</tbody>
</table>

**Table 3** Classification of journals according to their impact factor

<table>
<thead>
<tr>
<th>Impact factor</th>
<th>Journals (n (%))</th>
<th>Articles published in these journals (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;20</td>
<td>2 (0.3)</td>
<td>6 (0.3)</td>
</tr>
<tr>
<td>10–19</td>
<td>9 (0.9)</td>
<td>12 (0.5)</td>
</tr>
<tr>
<td>5–9</td>
<td>10 (1.7)</td>
<td>18 (0.8)</td>
</tr>
<tr>
<td>4–4.999</td>
<td>9 (1.6)</td>
<td>37 (1.6)</td>
</tr>
<tr>
<td>3–3.999</td>
<td>19 (3.3)</td>
<td>68 (3.0)</td>
</tr>
<tr>
<td>2–2.999</td>
<td>44 (7.6)</td>
<td>147 (6.5)</td>
</tr>
<tr>
<td>1–1.999</td>
<td>83 (14.4)</td>
<td>699 (31.1)</td>
</tr>
<tr>
<td>&lt;1</td>
<td>149 (25.8)</td>
<td>403 (20.0)</td>
</tr>
<tr>
<td>Not indexed in SCI</td>
<td>256 (44.4)</td>
<td>797 (35.5)</td>
</tr>
<tr>
<td>Total</td>
<td>577 (100.0)</td>
<td>2247 (100)</td>
</tr>
</tbody>
</table>

SCI = science citation index.
a highly efficient hierarchical thesaurus and provides the explode and focus function. The focus function allows the search to be confined to the articles in which the topics studied are considered to be the main topics. The use of these two functions ensures that the search performed in this study was reliable in the two fields studied. Despite the fact that the database is not exhaustive, that the topics studied represent only a part of all the topics of occupational health, and that the focus function was applied, the number of retrieved articles shows the amount of literature which exists relating to occupational health. Furthermore, the number of journals involved confirms the diversity of sources, which may present problems to the occupational health specialist when trying to assess the most relevant journals to follow up.

It would seem advisable to select the most prominent journals in occupational health (Occupational and Environmental Medicine, American Journal of Industrial Medicine, International Archives of Occupational and Environmental Health, Journal of Occupational and Environmental Medicine, Scandinavian Journal of Work and Environmental Health, Occupational Medicine (London), Annals of Occupational Hygiene, and International Journal of Occupational and Environmental Health). Nevertheless, these journals have published only 529 articles in 1998 in the fields studied—that is, 23.5% of the total articles. Moreover, following up all the journals with the subject area occupational health would lead to a follow up of more than 40 journals, but would still cover <50% of the relevant publications. Therefore, following up only occupational health journals is important but insufficient to cover the literature in occupational health; another method for selecting journals is still required.

An approach based on the impact factor of the journals retrieved in the search could be more useful. The impact factor of a scientific journal is the mean citation rate of all the articles contained in the journal and is widely considered as a quality ranking for journals. This is the only tool available but it has numerous shortcomings. Some are not specific to occupational health and have been reviewed by Seglen.4 Briefly, the SCI covers about 4900 journals, mainly in the English language, compared with an estimated world total of 126 000.5 Secondly, the impact factor is calculated in a way that favours review articles as they generally receive a greater number of citations than ordinary articles. Thirdly, the journal impact factor is not representative of the citation rate of individual articles in the journal. Seglen7 has shown that the most cited half of the articles are cited, on average, 10 times as often as the least cited half. Thus, the impact factor cannot readily be applied to assess the citation rates of individual articles in the journal nor to evaluate individual scientists.

In the specific field of occupational health, the fact that more than half of the journals retrieved in the search are not indexed in SCI is a definite bias. This result would probably have been even worse if a less American dominated database—such as Embase—had been used.1 Furthermore, the impact factors of the few occupational health journals for which the impact factors exist are less than 2.119 (Environmental Health Perspectives) except for Critical Reviews in Toxicology (4.824) which is at the border end of occupational health. This can be compared with the mean impact factor of

<table>
<thead>
<tr>
<th>Periodicals classified in categories according to the number of articles they published in the fields studied in 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact factor</td>
</tr>
<tr>
<td>&gt;100 Articles in 1998</td>
</tr>
<tr>
<td>Am J Ind Med</td>
</tr>
<tr>
<td>Occup Environ Med</td>
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*Environmental Health Perspectives and Environmental Health Perspectives Supplement are two distinct journals, with different subscription procedures.
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The summary of the journals and the abstracts are available free of charge on the internet, through the PubMed search system (http://www.ncbi.nlm.nih.gov/PubMed/). It provides access to the PubMed database of bibliographic information which is drawn primarily from Medline and PreMedline. It is possible to construct a search strategy for the summaries and abstracts of these eight or 38 journals, to run the strategy and to save the Uniform Resource Locator (URL) or address location—for example, bookmark. Reopening the URL will run the same strategy again.

We thank Mr R Medeiros for his valuable advice in editing the manuscript.