

A Review of Abstracting and Indexing Services for Biomedical Journals

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ABSTRACT

The days are gone when the researchers used to go to library to look for the articles of their choice. With the introduction of electronic era, searching an article online has become easier. This has been possible due to the availability of various Abstracting and Indexing (A & I) services in the world. Of more than 400 online A & I services available, only a few like Google and Thomson Reuters cover all disciplines. Most A & I services cover just one discipline allowing them to cover their area in more depth. There are many databases and indexing services for biomedical journals, most important ones being PubMed/Medline, Scopus, and Web of Science (ISI). This article gives a review of various databases and indexes available for dental journals in the world.

Keywords: Databases, Medline, PubMed

INTRODUCTION

Today most journals require that authors compose an abstract of their article because A & I services create a searchable database with subject, author, and the title access to individual articles from a selection of journals they choose to include in their database. It is essential for the success of the journal to be represented in relevant online A & I services. A & I services facilitate the broadest dissemination of information. It is important for journals to be present in online search system, as most of them are searched online [1]. Indexation of a journal is a sign of its quality, and usually indexed journals are supposed to be of more scientific quality as compared to non indexed journals. Indexation is essential for a journal to be recognised as an authoritative high quality source of information [2]. There are various A & I services available in the world. This article discusses various Databases and Indexes in dentistry as shown in [Table/Fig-1].

Other Databases for Dentistry

- i. Bacteriology abstracts;
- ii. BIOSIS (BioSciences Information Service) previews;
- iii. Biotechnology and bioengineering abstracts;
- iv. CINAHL- Cumulative index to nursing and allied health, includes content related to dental hygiene and dental assisting;
- v. Conference paper index-index to papers and poster sessions presented at major scientific meetings;
- vi. Compendex-Index to engineering and biomedical journal;
- vii. Dynamed Plus-Clinical reference tool created by physicians and other healthcare professionals for use at the point of care;
- viii. Engineered material abstracts- includes advanced polymer abstracts, composite industry abstracts and engineered, material abstracts, ceramics;
- ix. Factiva- for news and business information. A good source if you are looking for newspaper coverage of dentistry related topics;
- x. IADR-- Abstracts of International Association of Dental research meeting Since 2001;
- xi. Index to dental literature from 1839-1999;
- xii. International pharmaceutical abstracts;

Databases	Year	Services
Index Medicus	1879-2004	Initiated by John Shah Billing
MEDLAR	1960	By NLM
MEDLINE	1971	By NLM
Old Medline	1996	By NLM
PUBMED	1996	By NLM
SCOPUS	2004	By Elseveir
EMBASE	2015	By Elseveir
ISI	1992	By Thompson Reuters
WOS		By Clarivate Analytics
DRJI		For Open Access Journals
DOAJ		For Open Access Journals
Google Scholar		For Open Access Journals
Biomed Central		For Open Access Journals
WebMed Central		For Open Access Journals
EBSCO		Library Resource Tool
PROQUEST		Library Resource Tool
Ulrichs Periodical Directory		Library Resource Tool
Primo Central		Library Resource Tool
Genamics Journal Seek		Library Resource Tool
HINARI		WHO
Expanded Academic ASAP		By Gale
SIIC DATABASES		For Spanish & Portugese Literature
Cochrane Library		By Wiley Online
Indian Science Abstracts		By NISCAIR & CSIR
IndMED		IMC

[Table/Fig-1]: Various databases and indexes in dentistry [3]: NLM-National Library of Medicine, Embase-Excerpta Medica Database, ISI-International Scientific Indexing, WOS-Web of Science, DRJI-Directory of Research Journal Indexing, DOAJ-Directory of Open Access Journals, HINARI-Health internet network Access to Research in Health Program, WHO-World Health Organization, NISCAIR-National Institute of Science and Information Resources, CSIR-Council of Scientific and Industrial Research, IndMed-Indian Medlars Centre

- xiii. Joanna Briggs Institute EBP database;
- xiv. Material research database;

- xv. Primal pictures;
- xvi. Proquest dissertation and thesis;
- xvii. Psycinfo- Index to psychology articles including articles about dental anxiety;
- xviii. Tech street: This is Thompson Reuter database that offers standards for some dental materials and equipment;
- xix. Water resource abstracts- indexes water resource literature, including articles on fluoridation;
- xx. Toxicology abstracts.

Characteristics of Ideal Bibliographic Database [3-5]

- i. Inclusive- It should cover all scientific research and must not exclude any piece of research. It should also include non peer reviewed (i.e., scientific reports, conference papers, web page, blogs etc.) information, the so called "gray literature".
- ii. Specific refined research- It should bring out the most relevant information to the user.
- iii. Advanced filters- for speciality, dates, key words, peer & non peer reviewed etc.
- iv. Link to full text articles- should provide link to full text articles.
- v. Advanced citation analysis- should have sophisticated features to track and analyse citations.
- vi. Free- should be free for users.

History of Medline and PubMed

- i. **Index Medicus-** Oldest database of medical journals since 1879- 2004. It was initiated by John Shah Billing, Head of library of Surgeon General Office US Army, which later evolved into NLM (National Library of Medicine).
- ii. **MEDLAR (Medical Literature Analysis and Retrieval System)** Bibliographic database created by NLM in 1960 by computerising index work which later became MEDLINE (MEDLAR On Line System).
- iii. **MEDLINE-** First interactive searchable database introduced in 1971 [4].
- iv. **Old Medline-** In 1996, NLM added old Medline database with coverage of publication between 1950-1965.
- v. **PubMed-** In 1996, NLM launched PubMed which is combination of old Medline and Medline.

PubMed [6]

It is a major landmark in the history of electronic archiving of biomedical scientific literature. It is free resource developed and maintained by NCBI (National Centre for Biotechnology Information) at NLM at US National Institute of Health (NIH). It comprises over 25 million citations from Medline database plus the following type of citations:

In process citations, which provide records for articles before those records go through quality control and are indexed with MeSH (Medical Subject Headings) or converted to out of scope status.

Citations to articles that are out of scope from certain Medline journals, primarily general science and general chemistry journals, for which only the life sciences articles are indexed with MeSH.

"Ahead of print" citations that precede the article's final publication in a Medline indexed journals.

Citations that proceeds the date that a journal was selected for MEDLINE indexing.

Pre-1966 citations that have not yet been updated with current MeSH and are converted to MEDLINE status.

Additional life science journals that submit full text to PMC (PubMed Central) and receive a qualitative review by NLM.

Citations to author manuscripts of articles published by NIH funded researchers.

Citations for books available on NCBI bookshelf.

Pubmed citations often include links to the full-text articles on the publishers' Websites and/or in PMC and the bookshelf. Medline is the largest subset of PubMed. You may limit your PubMed search retrieval to Medline citations by restricting your search to the MeSH controlled vocabulary or by using the journal categories filter called Medline.

Medline [6]

Medline is the NLM journal citation database, used internationally to provide access to the world's biomedical journal literature. It archives more than 22 million references to biomedical and life sciences journal since 1946. It includes citations from more than 5600 scholarly journals published around the world. The decision, whether or not to index a journal for this service is important one and made by Director of NLM, based on scientific policy and scientific quality. To review journal titles and assess quality of contents, the Literature Selection Technical Review Committee (LSTRC) was established. The LSTRC meets three times in a year and considers approximately 140 titles at each meeting. Additional titles are considered in reviews of speciality coverage. Critical elements for selection are [7]:

- i. Scope and coverage;
- ii. Quality of content;
- iii. Quality of editorial work;
- iv. Production quality;
- v. Audience;
- vi. Types of contents: NLM uses some general guidelines to decide whether a publication is a journal or not, it must have:
 - ISSN (International Standard serial Number);
 - Common title to be issued over a period of time;
 - Collection of articles by different authors;
 - Intended to be published indefinitely.

There are four broad categories of journals:

- i. Research journals;
- ii. Clinical or practice journals;
Case reports, discussions, illustrations of new technique.
- iii. Review journals;
- iv. General journals.

The International Committee of Medical Journal Editors (ICMJE) has published ICMJE recommendations which can be included by publishers (www.icmje.org/urm_main_html).

"Editorial policy statement" given by The Council of Science Editors (CSE) covers the responsibilities and rights of editors of peer reviewed journals (www.councilscienceeditors.org/i4a/pages/index.cfm?pageid=3286).

Disadvantages of PubMed/Medline: It excludes large body of both peer reviewed and also the so called grey literature (non peer reviewed). Only the journals which NLM considers relevant are included in the database. NLM takes two to three months to compile the database. PubMed, the web version of Medline is now updating Medline almost daily. It provides limited free access to full text articles.

Comparison of Pubmed and Ovid [8,9]: Ovid also searches Medline databases. Ovid was founded in 1984 by Mark Nelson who developed interface to Medline. Now it is privately owned by Ovid technologies Inc., part of Wolter Kluwer. It provides access to full text journals and books. It is difficult to learn but results in retrieval of fewer irrelevant articles. Ovid accessible databases have their own

unique MeSH terms. Ovid search engine takes you to these terms by default. The alternative to Mesh term search is text world search. Whereas PubMed's default setting will search by both text word and MeSH term simultaneously and large numbers of irrelevant articles appear unless the user is familiar with advanced search technology of the system but PubMed is easy, free and Government sponsored. It provides limited access to Full Text Articles (FTA). Ovid introduced a new database search interface called Ovid SP in 2007.

PubMed Central [6]

PMC was launched in 2000 as a free archive for full text biomedical and life science journal article. It serves as a digital counterpart to the NLM extensive print journal collection. It is repository for journal literature deposited by participating publishers, as well as author manuscripts that have been submitted in compliance with NIH Public Access policy and other similar policies of other research funding agencies. Free access is the requirement for PMC. There are reciprocal links between full text in PMC and corresponding citation in PubMed.

Scopus [5,10]

It is bibliographic database containing abstracts and citation for academic journal articles. It covers nearly 22000 titles from over 5000 publishers, of which 20000 are peer reviewed journal in scientific, technical, medical and social sciences.

It is owned by Elsevier and is available online by subscription.

Criteria for inclusion in database are ISSN number and scholarly /academic publication. An independent and international Scopus content selection and advisory board was established to prevent a potential conflict of interest in the choice of journals to be included in the database and to maintain an open and transparent content coverage policy. Its advantage is that it is easy to navigate even for a novice user and goes back to 1966. It offers author profiles which cover affiliations, number of publications, bibliographic data, references and details on number of citations and the facility to calculate author's H-index. H-Index was described in 2005 by its namesake Jorge Hirsch, is a measurement that aims to describe the scientific productivity and impact of a researcher. H-Index is a measure of the number of highly impactful papers a scientist has published. The larger the number of important papers, the higher the H-index regardless of where the work was published [11].

EMBASE (Excerpta Medica Database) [4,12]

Embase is commercial biomedical and pharmacological abstract and index data base maintained by Elsevier. It contains more than 30 million records including articles from more than 8500 journals. It contains bibliographic record with citation, abstracts and indexing derived from biomedical articles in peer reviewed journals and is especially strong in its coverage of drug and pharmaceutical research. It is subscription based.

International Scientific Indexing (ISI) [13,14]

ISI is the institute for scientific information was originally founded by Eugene Garfield in 1960 and was later acquired by Thomson Scientific and Healthcare in 1992 and became popular as Thomson ISI and Thomson Reuters. It was later acquired by Clarivate Analytics in 2016. ISI offers bibliographic database services. Its speciality is citation indexing and analysis. It provides indexing and citation calculation services to all fields of journals. It publishes annual journal citation reports which lists impact factor for each of the journal it tracks. Within the scientific community, journal impact factor plays a large and controversial role in determining the success of a journal. A list of 14000 journals is maintained by ISI. The list includes some 1100 arts and humanities journals as well as science journals. It follows comprehensive criteria for journal indexing and impact factor calculation. Impact Factor (IF) is defined as number of times articles

from a journal are cited within two years divided by total number of articles published in the same journal during two year period

$$IF = A/B$$

A= Total number of citations of journal article during two year before the year considered

B= Total number of articles published during two years before the year considered

More citation listed, higher the impact factor [15].

Web of Science (WOS) [4,16]

It was previously known as ISI web of knowledge as it was originally produced by institute of scientific information but now it is maintained by Clarivate Analytics. It is an online subscription based citation indexing service which is independent and unbiased and covers science, social science, arts and humanities. It accesses the world's leading citation databases from over 18000 high impact journals. It covers non peer reviewed literature also. It is fee based and allows citation analysis.

Directory of Research Journal Indexing (DRJI) [17]

DRJI is to increase the visibility and ease of use of open access scientific and scholarly journals thereby promoting their increased usage and impact. It is used internationally to provide access to the world's research journal literature. It covers 2500 plus international and regional journals.

Directory of Open Access Journals (DOAJ) [18]

The DOAJ was launched in 2003 at Lund University, Sweden with 300 open access journals and today it contains up to 9000 journals. DOAJ membership is available in three main categories: publisher, ordinary member and sponsor. All members adhere to commitment of quality, peer review and open access. The aim of DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals thereby promoting their increase use and impact. It is managed by IS4OA (Infrastructure Services for open Access) CIC (community Interest Company) based in UK.

Biomed Central [19]

BMC is an independent commercial publisher of online peer reviewed biomedical journals that provided free access to articles at its site. BMC encourages individual authors to submit its articles to its journals. BMC deposits its articles to PMC as they are published. Use the limit "link to free full text" when searching PubMed to find FTA from PMC and BMC.

Google Scholar [4,20]

Launched in beta version in 2004. It is Google product, the company with world's best internet search engine.

Google scholar obtains its information directly from publisher and by crawling the web for scholarly content. It does not publish list of scientific journals crawled. Frequency of its updates is unknown. The exact ranking algorithms is undisclosed. You cannot make out what is peer reviewed and what is not, what is scholarly and what is not.

Advantage is that it's free. Google scholar is currently struggling to find its niche but does have a significant role to play in free search for scholarly content. It is bound to improve with time and could threaten commercial citation tracking databases.

WebMed Central [21]

It publishes all articles without prior peer review in a climate of post publication peer review led by authors. It is based in UK and owned by a general surgeon and gastroenterologist in UK.

EBSCO [22]

It is a library resource owned by EBSCO industries Inc. and has been in business since 1944. EBSCO information services provide a complete and optimised research solution. It comprises research databases, e-books, and e-journals and includes most powerful discovery service and management resources. It supports the information and collection development needs of libraries and other institutions and maximizes the search experience for researchers and other end users.

ProQuest [23]

It empowers academic, government, corporate, school and public libraries with innovative content and technologies.

Ulrich's Periodical Directory [24]

It is by Proquest. It includes A & I coverage, including print indexes, online indexes, includes Scopus and ISI and so many others. It is standard library directory and database providing information about popular and academic magazines, scientific journals, newspaper and other publications. It is by New York public library. Ulrich's web is online version and provide link to library catalogues.

Genamics Journal Seek [25]

It is largest completely categorised database of freely available journal information available on the internet. Journal information includes the description, journal abbreviation, journal homepage, subject, ISSN. It allows rapid identification of journals to publish your research. It does not contain articles or abstracts.

Expanded Academic ASAP [26]

It is one of the Gale's premier resources for research across academic disciplines. It provides access to FTA.

Health Internetwork Access to Research in Health Programme (HINARI) [27]

Set up by WHO (World Health Organization) together with major publishers enables low and middle income countries to gain access to one of the largest collection of biomedical health literature, 15000 journals, 47000 e-books in more than 100 countries. It is free or very cost effective online access. It was launched in January 2002, with 1500 journals from six major publishers Blackwell, Elsevier, Harcourt worldwide, STM Group, Wolter Kluwer, Springer and John Wiley.

Cochrane Library [28]

The Cochrane library is a collection of six databases that contain different types of high quality, independent evidence to inform healthcare decision making and a seventh database that provides information about Cochrane group.

Databases are:

CENTRAL- Cochrane Central Register of Controlled Trials;

CDSR- Cochrane Database of Systematic Reviews;

CMR- Cochrane Methodology Register;

DARE- Database of Abstracts of Reviews of Effects;

HTA- Health Technology Assessment Database;

EED- NHS Economic Evaluation Database.

Indian Science Abstracts [29]

ISA is a bibliographic database published by NISCAIR (National Institute of Science and Information Resources), CSIR (Council Of Scientific and Industrial Research). This database provides abstracts of research articles, short communications, review articles, and informative articles published in current scientific and technical periodicals, as well as Indian standards and thesis. It is a leading

bibliographical database in India covering entire spectrum of science and technology including intellectual property rights, management and library and information science published in India and covers the information since 2009.

IndMed [30]

A bibliographic database covering prominent peer reviewed Indian biomedical journals. Database is designed to provide medical professionals, researchers, students and the medical library professional quick and easy access to Indian literature. It is designed by ICMR-NIC (The Indian Council Of Medical Research-National information centre) centre for Biomedical information (Indian MEDLARS Centre or IMC).

DISCUSSION

Because of internet, the whole world has now become a small family. Any new finding, research, invention happening anywhere in the world can be easily accessed sitting just in front of your computer. Here comes the importance of various A & I services, which helps us in searching our relevant articles. This article describes in detail the availability of various A & I services, because after completing our research during various PG and post PG programmes if we want the whole world to know about it, then we need to publish it in the relevant journals. The multiplicity and variety of services emphasises the necessity for careful planning of bibliographical searches in relation to the object of research programme involved [31]. Knowledge of using bibliographic databases assists researchers on which they can build their research hypotheses, because a database determines what the user finds, the user has to know the gaps, thematic emphasis and indexing preferences of different databases [32].

CONCLUSION

Medlar, Medline, Old medline and Pubmed are maintained by NLM. All the services provided are completely free and one of the largest database for biomedical literature. Scopus and Embase are maintained by Elsevier and Scopus calculates author's H-index. ISI calculates impact factor for the journal. DRJI, DOAJ, Google Scholar and Webmedcentral support open access journals. PMC and BMC help provide link to FTA. Ebsco, Proquest, Ulrichs periodical directory and Genamics journal seeks are the various library tools which the libraries can own to help its readers.

DISCLAIMER

The content of this manuscript required it to directly and legitimately quote from other published sources, websites and articles. Any attempt at rephrasing such quotes would have led to a loss of context and decrease in authenticity and validity of the information provided. This has inadvertently led to a higher amount of indicative plagiarism in the article. The journal has not ignored this fact and has chosen to make an exception to its usual criterion of low tolerance for plagiarism, in this case in order to keep the article revealing and illuminating. This however is not meant to serve as a precedent for future publications and/or manuscripts, and journal continues to view originality as a top criterion for publication and as an indicator for quality of work.

REFERENCES

- [1] A short guide to Abstracting and Indexing services for society journals. Marketing, Society and Partner Zone Issue 9. Available from: <http://www.springer.com> [Accessed on 06th June 2015].
- [2] Balhara YP. Indexed Journal: What does it mean? Lung India. 2012;29(2):193-94.
- [3] University of Toronto Dentistry Library (Harry R Abbott). Databases and Indexes for Dentistry. Available from: <http://dentistry.library.utoronto.ca> [Accessed on 08th June 2015].
- [4] Kejriwal D, Mahavar KK. Is your journal indexed in Pubmed? relevance of Pubmed in biomedical scientific literature today. Webmed central Miscellaneous.

- 2012;3(3):WMC003159.
- [5] Pratik P, Aparajita S. Academic Journals: A new insight. *NHL Journal of Medical Science*. 2013;2(2):05-08.
- [6] Medline, Pubmed and PMC (Pubmed central): How are they different? Available from: https://www.nlm.nih.gov/pubs/factsheets/dif_med_pub.html [Accessed on 08th June 2015]
- [7] Medline Journal Selection Factsheet- National Library of Medicine. Available from: <http://www.nlm.nih.gov/factsheet.jsel>. [Accessed on 08th June 2015].
- [8] Ovid Technologies. Available from: http://en.m.wikipedia.org/wiki/ovid_technologies. [Accessed on 10th June 2015].
- [9] Kelly L, St Pierre-Hansen N. So many databases, such little clarity: Searching the literature for the topic aboriginal. *Can Fam. Physician*. 2008;54(11):1572-73.
- [10] Scopus Wikipedia. Available from: <https://en.m.wikipedia.org/wiki/scopus>. [Accessed on 11th June 2015].
- [11] Hirsh JE. An index to quantify an individual's scientific research output. *Proc Natl Acad Sci USA*. 2005;102:16569-72.
- [12] Embase-Ovid Database guide. Available from: ospguides.ovid.com. [Accessed on 16th June 2015].
- [13] International Scientific Indexing. Available from: isindexing.com [Accessed on 15th June 2015].
- [14] Thomson Reuters ISI database. Available from: <http://www.revolvy.com/main/index.php> [Accessed on 30th Dec 2015]
- [15] Mathur VP, Sharma A. Impact factor and other standardized measures of journal citation: A perspective. *Indian J Dent Res*. 2009;20:81-85.
- [16] Web of Science-Clarivate Analytics Available from: <https://clarivate.com> [Accessed on 03rd August 2017].
- [17] Selection Criteria for DRJI Indexing. Available from: www.drji.org [Accessed on 20th June 2015].
- [18] Directory of Open Access Journals. Available from: <https://doaj.org> [Accessed on 21st June 2015].
- [19] BioMed Central. Available from: <https://www.biomedcentral.com> [Accessed on 22nd June 2015].
- [20] Google Scholar-Wikipedia. Available from: <http://en.m.wikipedia.org/wiki/google> [Accessed on 31st May 2017].
- [21] WebMed Central.Com. Available from: www.webmedcentral.com [Accessed on 30th may 2017].
- [22] About EBSCO. Available from: <https://journals.ebsco.com> [Accessed on 03 August 2017].
- [23] Proquest Databases. Available from: www.proquest.com [Accessed on 29th May 2017].
- [24] Ulrich's Periodicals Directory- Wikipedia. Available from: <https://en.m.wikipedia.org/wiki/ulrich'speriodicaldirectory> [Accessed on 05th July 2015].
- [25] Journal Seek. Available from: <https://journalseek.net> [Accessed on 10th July 2015].
- [26] Expanded Academic ASAP-Gale. Available from: www.gale.com [Accessed on 17th June 2015].
- [27] WHO | Hinari. Access to Research for Health Programme. Available from: www.who.int/hinari [Accessed on 1st July 2015].
- [28] Cochrane Library: Home. Available from: www.cochranelibrary.com [Accessed on 30th May 2017].
- [29] Indian Science Abstracts | IIT Gandhinagar. Available from: www.iit.ac.in/library_files/isa [Accessed on 05th July 2015].
- [30] IndMED: A Bibliographic Database of Indian BioMedical Research-medIND. Available on www.medind.nic.in/imvw. [Accessed on 07th July 2015].
- [31] Larkey SV, Whitlock JM. Trends in medical abstracting and indexing tools. A symposium. *Abstracting services for medicine and related fields. Bull Med Libr Assoc*. 1956;44(4):416-23.
- [32] Fangerau H. Finding European bioethical literature: an evaluation of the leading abstracting and indexing services. *J Med Ethics*. 2004;30:299-303.

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