

DHARA: Digital Helpline for Ayurveda Research Articles

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INTRODUCTION

DHARA is the acronym for Digital Helpline for Ayurveda Research Articles. It is the first comprehensive online indexing service exclusively for research articles published in the field of Ayurveda. DHARA is accessible online at www.dharaonline.org.

With an evolutionary history that spans several thousands of years, Ayurveda is one of the oldest and meticulously codified systems of health care in the world. However, in modern times, the Ayurvedic community has lagged behind in the task of projecting Ayurveda as an evidence-based system with adequate research support to vouchsafe its therapeutic claims of safety and efficacy. For this reason, Ayurveda has not been able to position itself in an advantageous manner in spite of the growing interest and prevalence of Complementary and Alternative Medicine world over.

Ayurveda faces constraints and hurdles from regulatory authorities and the scientific community that come in the way of its global acceptance. Researchers find it very difficult to access reliable data to lend authenticity to Ayurveda. Hardy et al^[1] laments about the difficulties in searching for research papers in Ayurveda and after painstaking efforts manage to publish a systematic review on Ayurvedic interventions in Diabetes mellitus. Narahari et al^[2] have discussed the difficulties encountered in systematic literature search in

Ayurveda and also suggest approaches that can yield better results. Other authors have also discussed the difficulties in conducting literature search in Ayurveda.^[3, 4]

A lot of research that happens in Ayurveda languish in the form of unpublished theses submissions or dissertations. Most of what gets published remain inaccessible because they are published in journals in regional languages or other India journals that are not indexed in international databases, such as PubMed. DHARA is the first systematic and comprehensive initiative to fill this gap.

At this point of time, DHARA has indexed research articles on Ayurveda that have been published in more than 4100 journals worldwide. The total number of indexed articles exceed 52,000. Care has been taken to exclude publications that would not qualify as research journals, such as magazines and souvenirs. However, research journals which have not disclosed their editorial policies in the field of Ayurveda have also been included due to paucity of research publications dealing exclusively with Ayurveda. These journals also publish high-quality articles occasionally.

The acronym DHARA in Sanskrit means flow. It symbolizes the facilitation of the free flow of information on research in Ayurveda. The DHARA project was an offshoot of a collaborative initiative between Central Council for Research in Ayurvedic Sciences (CCRAS), New Delhi, The Ayurvedic Trust (AVT), Coimbatore, and Swiss Ayurveda Medical Academy (SAMA), Switzerland. SAMA is working for the official recognition of Ayurveda in Switzerland in the wake of a constitutional referendum in favor of Complementary and Alternative Medicine from the Swiss Government. The tripartite collaboration between CCRAS, AVT, and SAMA was initiated with the goal of generating reports of meta analysis and systematic reviews of research done in Ayurveda. It was hoped that this data would help to showcase Ayurveda as an evidence-based medical system in Switzerland. Official recognition of Ayurveda in Switzerland is expected to create a favorable impact in Europe and other parts of the western world, and therefore this initiative assumes significance for Ayurveda at the global level.

It was realized that systematic access to published research

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on Ayurveda was a prerequisite to explore the feasibility of meta-analyses and systematic reviews. Such a resource was not available and hence the task of building a comprehensive database that will allow systematic access to published research on Ayurveda was taken up by AVT Institute for Advanced Research (AVTAR), the research wing of The Ayurvedic Trust with financial assistance from CCRAS. The scope for the tripartite initiative between CCRAS, AVT, and SAMA to generate meta-analyses and systematic reviews on published research in Ayurveda will be explored in the future.

Less than 10% of the articles indexed in DHARA can be retrieved using keyword Ayurveda in international databases. Thus, DHARA provides a first of its kind resource to access research papers published on Ayurveda in a comprehensive manner.

Nearly 1 million articles were indexed in PubMed in the year 2010. In comparison, the number of articles indexed and identified as related to Ayurveda in PubMed was around 240. About 50,000 articles were indexed from the field of Complementary and Alternative Medicine (CAM). Chinese medicine alone contributed 6000 articles in 2010, and this number makes up the entire collection of research articles on Ayurveda in DHARA database. About 1500 articles on Acupuncture were indexed in PubMed. DHARA has indexed 4123 articles on Ayurveda in 2010 compared with the 3780 indexed in PubMed, out of which only 240 are identified as related to Ayurveda.

More than providing access to published research on Ayurveda, DHARA also makes it possible to do a comprehensive gap analysis with reference to the current status of research in Ayurveda.

CRITERIA FOR INCLUSION OF ARTICLES IN DHARA

For indexing, DHARA includes any research article published on Ayurveda in research journals that meet basic editorial standards. In other words, the journal should have an independent editorial board and accept articles for publication only after internal editorial review and external peer review. Articles published in magazines and unpublished theses and dissertations are not included for indexing in DHARA. Research articles dealing directly or indirectly with research findings related to Ayurveda are accepted. Relevant articles from other systems of complementary and alternative medicine are also included after scrutiny, if they refer to Ayurveda in the content or deal with a drug, therapy, instrument, or any procedure which is also used in Ayurveda.

HOW INDEXING IS DONE

In the initial phase, available data on published research

journals that can be accessed in the public domain have been included to set up the DHARA indexing service for the first time. In future, the journals will have to make formal request for indexing and also provide the data for indexing the articles. Articles, Journals, and Authors are indexed separately. The articles may include only title or title and abstract or title, abstract, and link to full text. Journals are indexed independently with relevant metadata. Authors are indexed with affiliations in separate fields.

INDEXING OF RESEARCH ARTICLES

Article titles and abstracts are indexed in separate fields. DHARA does not deposit the full version of the articles directly. DHARA provides link to the full text wherever available. This link can be seen below the abstract. Access to the full article may be free or against payment depending on the policy of the research journal. In some cases, even abstracts are copyrighted and hence not displayed if not provided by the journal. Every entry is given a unique identification number known as DHARA ID. If the article is also indexed in PubMed, then the PubMed ID is also included.

FEATURES

The web architecture of DHARA has been designed keeping in mind familiarity of users with popular databases and indexing services. The main features of DHARA include the 1. Wild Keyword Search Option, 2. Advanced Search with Boolean Operators, 3. Search Field Tags, 4. Limiting Search with Controlled Vocabulary, 5. Journals Area for listing journals by keyword search or in alphabetical order to access basic information on journals, 6. Authors area for listing authors by keyword search or in alphabetical order to search articles by author names, 7. Building Uniform Resource Locators (URLs) that can be stored for future use, 8. Options for sorting search results, and 9. Exporting the search results as text file.

SUMMARY INFORMATION

The home page of DHARA displays summary information of the total number of articles indexed and also gives break up of article titles, abstracts, and full text access, free or paid. Year wise index to published articles is also provided. The home page also lists the number of authors as well as the number of first and last authors. These numbers are not accurate as the names of the same author are indexed in different formats and get indexed as independent names. The number of journals indexed in DHARA is also displayed with a break up of the category of journals belonging to Ayurveda, CAM, and other disciplines. In

addition, the link to the Journals Area and Authors Area are also provided and the five latest articles indexed in DHARA are listed on the home page. The home page provides a snapshot of the information available in the database. The search field is prominently displayed above the summary information.

KEYWORD SEARCH

The simple way to search for information in DHARA is to just type the keyword in the search field. The search field is displayed prominently on all pages and will fetch all information related to the keyword. The search results are displayed by default as article titles with author names sorted by the date of publication. On the right side, the search summary is given indicating how many articles are available for the search with break up of titles, abstracts, and paid or free full text access. Keyword search has limitations because it may pull up information not directly relevant to the keyword. For example, if the search keyword is asthma, articles that do not deal directly with asthma, but have this word in the abstract will also be retrieved. On the other hand, keyword search may also fail to retrieve relevant information linked with synonyms of the search word. For example, keyword search for the term piles will fail to retrieve information linked with the term hemorrhoids. Advanced search options can help to overcome this problem.

ADVANCED SEARCH

The link to advanced search is provided below the search field. The advanced search allows to control the search parameters by using the boolean operators “AND”, “OR”, “NOT”. The search for “Ayurveda” and “Unani” will fetch only articles that contain both these key words. It will omit articles containing only one of these two words. The “OR” operator can be used to expand the scope further. When we search “Ayurveda” OR “Unani,” the search will fetch articles containing one of these words as well as the combination of both. The “NOT” operator can be used to exclude one word and include the other. For example, the search parameter “Ayurveda” NOT “Unani” will fetch articles that contain the term Ayurveda. It will exclude articles that contain the term “Unani” as well as articles that contain both these terms. Through the advanced search module, it is also possible to restrict the search to specific fields like “Title,” “Abstract,” “Author,” “Journal,” and so on and so forth. These limits can be activated by choosing the drop down option.

SEARCH FIELD TAGS

Regular users of DHARA may want to use search field tags to control their search parameters. The search can be limited

to specific fields by adding particular field tags after the keyword. For example, to restrict the search to authors, the field tag [au] may be typed after the author name—Narayana [au] will search for Narayana only in the author field. In a similar way, titles can be searched with the field tag [ti]. When the title field tag is added—Diabetes [ti], then the search will be restricted to the title fields only. To restrict the search to abstracts alone, the field tag [abs] may be used. Use of the field tag [tiab] will restrict the search to titles and abstracts. The field tag [jour] restricts the search to journal names.

CONTROLLED VOCABULARY AND LIMITING SEARCH

All the above options still fall short of narrowing down the search parameters to pick up specific information from the database in a jiffy. Advanced users have the option of limiting their search by using the controlled vocabulary developed for this purpose. This option can be accessed by following the “Limits” link that can be seen just below the main search field. This link leads to a page that lists the controlled vocabulary. A combination of various terms from the controlled vocabulary can help to limit the search in a precise manner. The controlled vocabulary is a classified list of technical terms that can enable the user to quickly build a precise search parameter.

For example, all articles are classified on the basis of the nature of submission using controlled vocabulary, such as Original Articles, Review Paper, Short Communication, and so on. Based on the type of study, the articles are classified as Preclinical, Clinical, Postclinical, and so on. Depending on clinical trial design the articles are classified into open label, single blind, double blind, randomized, nonrandomized, and so on. The controlled vocabulary classifies the articles on the basis of a wide range of criteria. Also specific formulations, diseases, medicinal plants, animal species, and study technique used can be selected with the help of drop down menus. By checking the boxes against relevant terminologies, the search parameters can be limited in a precise manner. For example, by choosing *Tinospora cordifolia* from the drop down menu for medicinal plants, Rheumatoid Arthritis from the drop down menu for disease names, and selecting the terms Original articles, Clinical, Trials, Double Blind, and Randomized, the search will fetch only those articles that meet these criteria. In this way, the search options can be built in various permutations and combinations. This feature is presently under testing and needs to be developed and fine tuned further.

AUTHORS AREA

Home page displays a link pointing to Authors’ Area. Following this link will open a page that provides an alphabetical index to author names. By clicking on each

alphabet, author names beginning with that alphabet will be listed. The Author's Area also provides a search field to retrieve specific author names. The full name, first name, or last name of the author can be typed in the field with or without initials and the database will display the results.

Often the name of one author is available in different formats. Different names of the same author can be merged by checking boxes against the name to retrieve all articles pertaining to that author.

JOURNALS AREA

Home page displays a link pointing to Journals' Area. This link will lead to a page that provides an alphabetical index to journal names as well as a search field to retrieve specific journals by typing journal names. The alphabetical index can retrieve journal names beginning with a particular alphabet. The search field will retrieve the specific journal depending on the keyword. The journal name and the number of articles indexed from that journal will be displayed. By clicking the journal name, information regarding the journal will be retrieved. And by clicking the number of articles, an issue by issue index to the journal will be displayed and the articles can be retrieved by clicking on each issue.

BUILDING SEARCH UNIFORM RESOURCE LOCATORS

Customized search URLs can be built by defining search parameters in the keyword search field, advanced search field, or the limit search option. These URLs can be saved for quick access to the relevant information in the future. For example, an author can build a search URL that will list articles that he has authored. The URL will retrieve updated information everytime it is used. Similarly, a search URL can be built for retrieving articles related to clinical trials on a particular disease or a drug. The URL can be used as a permanent link to retrieve updated information.

SORTING SEARCH RESULTS

By default, search results will display only titles of articles with author names, journal name, issue, and date of publication. The articles are sorted automatically by publication date. On the left top corner below the keyword search field is the link that will help the user to modify the display settings. The options available are to display 5, 10, 20, 50, 100, or 200 results per page, summary of articles with or without abstract and to sort by recently added, publication date, journal, and title.

EXPORTING SEARCH RESULTS

On the right corner of the webpage below the keyword

search field, is the "Send to" option, which helps one to export the search results. Before exporting, one has to check the articles to export by clicking on the check box provided against each article title. The Select All option can be used to select all the articles listed in the search result. Once the relevant articles are checked, clicking on the "Send to" link will export the search results as a text file.

HOW TO GIVE FEEDBACK

DHARA is running a beta version at this point of time. User testing and feedback is expected to provide valuable and crucial inputs to identify bugs, fine tune the features and also to improve the design and user friendliness of the database. Users can provide feedback by clicking on the "Send Feedback" link located on the right top corner of the page above the keyword search field.

THE CHALLENGES AND LIMITATIONS

The beta version of DHARA has been set up within a short span. The alpha version went online in March 2010 and the beta version in January 2011. Since then it has been updated several times. The current version is beta 3. 1, which is also undergoing revisions and update.

There are many challenges that need to be surmounted before DHARA becomes fully functional and effective. There is still a lot of unpublished research work that is beyond the reach of DHARA database. Unless publication of research work in good journals becomes a priority for academicians and scholars in Ayurveda, DHARA cannot become an exhaustive resource base.

Another limitation is that DHARA adopts a twin strategy of indexing journals as a whole or only indexing selected articles. Only the journals publishing papers exclusively on Ayurveda are indexed completely. These journals constitute less than 2% of all the journals indexed in the DHARA database. Ninety-eight percent of the journals are only partially indexed. From such journals, only articles directly dealing with Ayurveda or with a drug, therapy, instrument, or any procedure used in Ayurveda are accepted for indexing. Partial indexing is a challenge when it comes to identifying articles relevant for Ayurveda issue by issue. It is not possible to predict which journal in the world will publish an article on Ayurveda and most of the mainstream journals are not interested in partial indexing of articles.

The primary function of the DHARA database is to bring the journals on Ayurveda and other disciplines that publish articles on Ayurveda into the limelight. These are not yet indexed in international databases. It would also be desirable that the full text of articles published in these

journals are made freely accessible as this would bring greater visibility and accessibility to research conducted on Ayurveda in India. The journal offices would have to cooperate with DHARA to make this possible.

Some of the international publishers also copyright the abstracts of research papers. In these cases, only titles can be indexed in the database unless the journals give permission to include the abstracts, not to speak of the full article, which is usually paid access in such cases. This is an issue only with respect to the high-impact paid access journals, which are published by professional publishers.

DHARA cannot provide complete access to all the articles that are indexed in its database. Access to full text depends on the journal policy. In most cases, at least titles and abstracts are available. And in many cases, the full text can be accessed free of cost by following the link to the journal website. But for some articles, the abstracts are not available and in some cases the full text cannot be accessed even if one is willing to pay for it. Link to an electronic version is simply not available. It is hoped that in the future, DHARA will maintain a separate facility for archiving full text of articles similar to PubMed Central. These are all plans for the future and can be explored only after DHARA becomes a well-accessed utility by researchers worldwide. At present, one of the top priorities is to bring visibility for DHARA by announcing the availability of such a resource and also by search engine optimization. Feedback from users will help to chalk out the future action plan.

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FUTURE PROSPECTS

It is hoped that DHARA will serve as a national and international resource base for reviewing and improvising research initiatives and publication in the field of Ayurveda. DHARA will bring visibility to many journals published in the field of Ayurveda from India. This means increased access to the articles published in these journals and in turn scope for critical review and feedback. This can have a positive impact on the quality of research publications in Ayurveda.

Although the foundation has been laid for setting up a resource for indexing research papers published in the field of Ayurveda, it will be quite a challenge to keep the database updated and engaged in other maintenance tasks.

Not to speak of upgradations and further development. All this would be possible only if funding is available. DHARA can serve as an impetus for journals on Ayurveda to improve the quality of editorial work and for researchers to not only publish but also improve the quality of their research work. The DHARA database makes it possible to publish systematic reviews of prior work and this can help in setting priorities for future research in Ayurveda.

Apart from the available services, options to automatically list the related articles, other articles by same author and controlled vocabulary search for Ayurvedic terminology will be integrated into the DHARA database in the near future.

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