

Searching for the Right Evidence

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Literature search is a systematic and well-organized search from published data to identify good quality references on a specific topic. The search can be a simple involving just a couple of sources and done within an hour or so. It can also be comprehensive and thorough where it involves multiple sources. However, in EBFP main purpose of a literature search is to obtain only a few available but relevant and high-quality evidence that can help the family practitioner make a clinical decision. The first step in making evidence-based decision is to convert the clinical problem for decision-making into a clinical question. It should be phrased in a simple sentence that is relevant and specific to the clinical problem, interesting enough to warrant searching for the answer and will likely obtain the article to answer the question. Based on the formulated clinical question discussed previously, identifying the key terms to be used for the search is the next step. The key terms are usually based on the PICO or its variants, POEM, SPICE or ECLIPSE elements in the clinical question. Since it will only be a simple search in EBFP, it is recommended to look in PubMed. PubMed is the online version of Index Medicus produced by the US National Library of Medicine (NLM). If the article is not available in PubMed, Google Scholar is another free web search engine that indexes the full text of scholarly literature across an array of publication formats and disciplines. Other advice for an efficient literature search is also discussed.

Key words: Evidence-based family practice, literature search, PubMed

Definition of Literature Search

Literature search is a systematic and well-organized search from published data to identify good quality references on a specific topic.¹ The search can be a simple involving just a couple of sources and done within an hour or so. It can also be comprehensive and thorough where it involves multiple sources like as many available internet database and publications like journals, textbooks or in digital media like compact discs and the grey literature. A comprehensive and thorough literature search is done when planning to conduct research, systematic reviews or meta-analysis or guideline development. It usually involves several hours and repeated in appropriate time intervals like a month or so. However, in EBFP, the main purpose of a literature search is to obtain only a few available but relevant and high-quality evidence that can help the family practitioner make a clinical decision.

Clinical Question

The first step in making evidence-based decision is to convert the clinical problem for decision-making into a clinical question. It should be phrased in a simple sentence that is relevant and specific to the clinical problem, interesting enough to warrant searching for

the answer and will likely obtain the article to answer the question. To achieve this, clinical question usually includes the population-intervention-comparator-outcome (PICO) elements. This format can apply to clinical question on effectiveness of treatment or accuracy of diagnostic test. P - refers to the patient or the clinical condition, I - refers to the drug or other form of intervention or diagnostic test, C - is the comparator if possible and O - refers to the clinically relevant outcomes preferred by the patient. Intervention needs to be as broadly or as narrowly defined keeping only the interventions of our interest.² In some situation expanding the PICO to include the setting i.e., "family practice" PICOS or "method" PICOM, or "time frame" PICOT might help narrow the search.

There are also alternatives to the PICO format that family physicians can use depending on the scenario that warrants decision making. Some clinical decisions may be giving appropriate health education and advice to the patient about risk behaviors or prognosis of a disease. Research methods conducted in these topics are usually observational studies. For the observational study (diagnosis, risk factors, prognosis), the clinical question usually contain population-outcome-exposure-method (POEM). The P - refers to patient or population, O - refers to the outcome, E - is the exposure which can be a risk factor or prognostic factor and M - refers to the method i.e.,

cross-sectional, case-control or cohort study. In some situation, the clinical question may be about a public health program. The setting-perspective-intervention-comparison-evaluation elements (SPICE) i.e., S – Setting: City-wide health system; P – Perspective: Public fund; I – Intervention: Early GDM screening; C – Comparison: Standard GDM screening; and E – Evaluation: Health economic analysis.³ Social health service can also be search with expectation-client-location-impact-professionals-service elements (ECLIPSE) i.e., E – Expectation why the user want the information; C – Client to whom is the service intended; L – Location - where the service will be provided; I – Impact that would represent success; and P – Professionals - who provides or improves the service; and SE – Service under consideration?⁴

Identifying the Key Terms

Based on the formulated clinical question discussed previously, identifying the key terms to be used for the search is the next step. The key terms are usually based on the PICO or its variants, POEM, SPICE or ECLIPSE elements in the clinical question. Synonyms or alternative terms may be considered i.e., paracetamol or acetaminophen. Different spellings should also be considered i.e., anesthesia or anaesthesia. PubMed recommends word or phrase stock for keywords being typed in the search box based on Medical Subject Headings or MeSH. As you type the word in the search box, PubMed recommends words and phrases in the dropdown part of search box. MeSH is NLM's controlled hierarchical vocabulary that is used for indexing articles in PubMed. Phrase search by enclosing the phrase in quotation marks such as "blood pressure" is also another important strategy. This will identify articles with only the words typed in the phrase in that exact order and exclude articles with the same words but not in exact phrase i.e., article with the phrase "blood was extracted under negative pressure" in the abstract.

Sources of Evidence

Knowing where to search for evidence is essential after formulating the clinical question. Since it will only be a simple search in EBFP, it is recommended to look in PubMed. PubMed is the online version of Index Medicus produced by the US National Library of Medicine (NLM).⁵ The subjects covered are medical, biomedical & life sciences and the citations date back to 1966 and selectively to 1809 up to the present. Titles and abstracts are freely available on the Internet while some full text is available only for subscribers or can be purchased online. Free full text articles are available in PubMed Central. A subset of PubMed which is Medline is made available by NLM to commercial suppliers and interfaces like OVID. If the article is not available in PubMed, Google Scholar is another free web search engine that indexes the full text of scholarly literature across an array of publication formats and disciplines.⁶ It is not limited to medical, biomedical or life sciences and are not subjected to peer review, thus it is considered as "grey literature". This is the limitation and caution on the articles obtained from this database. However, a study to review the features, benefits and limitations of Google Scholar concluded that it is still a valid tool for researchers in health sciences for the purpose of information retrieval.⁷ HERDIN (Health Research and Development Information Network)

developed and maintained by PCHRD (Philippine Council for Health Research and Development) is a database for local scientific journals.⁸ The limitation of HERDIN is it currently provides only the abstract of the article, but in the future full text may also be available with HERDIN Plus. Other database services can be accessed from university libraries.

Using the Boolean Operators

The Boolean operators are the capitalized words AND, OR and NOT. They are used when combining search terms to get the desired articles. Combining two search terms using AND will get articles that mention both terms. For example, if you type in the search box "fever AND paracetamol", you will get articles that contain both the terms fever and paracetamol in any order. This will usually decrease the number of articles. OR will widen the search and get articles that contain either fetch more articles that mention either term i.e., "paracetamol OR acetaminophen". This will usually increase the number of articles. While NOT will get articles containing the first word but not the second, also decreasing the number of articles. For example, "rheumatic NOT rheumatoid" will exclude articles that contain the term rheumatoid. This is helpful if you're interested with rheumatic fever instead of rheumatoid arthritis. Truncated search by adding * to the initial letters of the word like "diabe*" will get articles that contain the words diabetes, diabetic, diabetologist etc.

Filtering the Search

On the left side of PubMed, there are filters that can be used to refine the search. You can choose articles with abstract or free full text, article types, language, age, sex, etc. This will limit the results to articles that are more relevant to your clinical question. Figure 1 is a sample search in PubMed with the clinical question "Among patients with type 2 diabetes, what is the effectiveness of insulin in controlling HbA1c in family practice". The Boolean operators were "AND" and the filter used was "free full text" and "randomized controlled trial".

Reviewing the Search Results

After the search and filters, PubMed will show the list of summaries that includes the title, authors, journal and brief section of the abstract. To identify relevant articles, the elements of the PICO, POEM, SPICE and ECLIPSE may initially be used to screen the article's relevance in the title and abstract. This title-only screening using terms based on the PICO elements i.e., Participants, Interventions, and Comparators, but not the Outcomes, have been shown to reduce the screening effort from 11 to 78% with a median reduction of 53%. This will expedite your search and facilitate EBFP.⁹

The objective of reviewing your search results is to decide which of the articles you will use for decision making. It may be good to prioritize the most relevant and recent publication, which is usually in the top of the sequence. The other decision is the study methodology of the article you will choose. Your clinical question will be very important in this decision. Figure 1 can help you decide which article to retrieve. Depending on the clinical question, it may be good to retrieve the

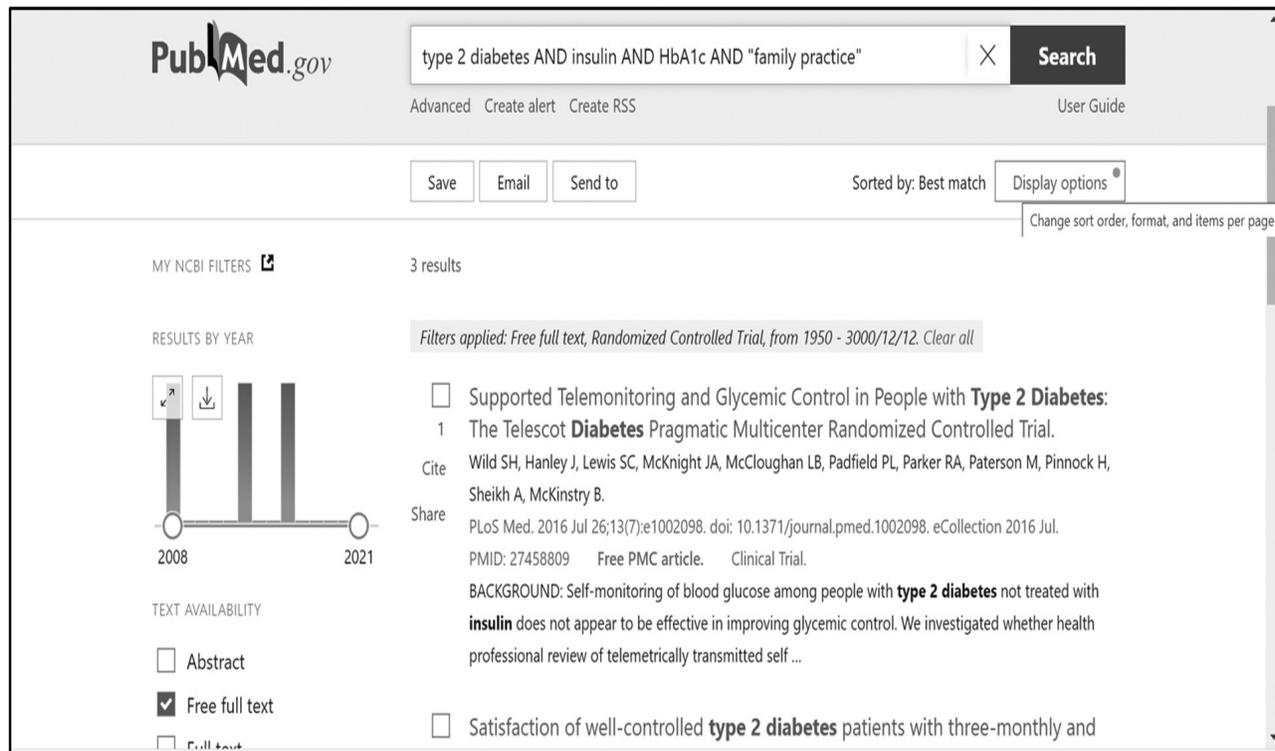


Figure 1. Sample PubMed search

priority type of article. If the priority article is not available or outdated, the alternative article can be used.

Questions related to differential diagnosis and accuracies of diagnostic tests can be answered by cross-sectional studies, questions on treatment answered by meta-analysis or randomized controlled trials and questions on risk factors and prognosis by cohort or case-control studies. Multiple clinical questions can be answered by secondary study designs like a clinical practice guideline. Non-randomized trials sometimes, but not always, differ from results of randomized studies of the same intervention. It usually over- or under-estimate the effect of intervention. Non-randomized studies are undertaken when RCTs are infeasible or unethical.¹⁰ Observational research is used to address issues not addressed or not addressable by RCTs. The potential for bias is higher in observational research but there are design and analysis features that can address these concerns although not completely eliminate them. Pharmacoepidemiologic research may also provide important information regarding relative safety and effectiveness of drugs. Such research must effectively address the important issue of confounding by indication in order to produce clinically meaningful results.¹¹

Despite the bias associated with observational studies, they are still helpful in clinical practice. Cross sectional studies are used to determine prevalence. This study design is relevant in considering probable diagnosis and differential diagnosis. They do not establish a cause-and-effect relationship. Cohort studies are used to study

incidence, causes, and prognosis. Because they measure events in chronological order they can be used to distinguish between cause and effect. Case controlled studies compare groups retrospectively. They seek to identify possible predictors of outcome and are useful for studying rare diseases or outcomes. Both cohort and case control can be used to establish association of exposure to development of disease (risk) or development of outcome of disease (prognosis).¹²

Clinical practice guidelines are systematically developed statements to assist practitioners make a clinical decision on the appropriate health care for a specific clinical condition. The recommendation statements are also derived from review of evidence from primary study designs like randomized controlled trials and observational studies.

Retrieving the Full Text

When you search PubMed, the results will also show if the article is available for free. If it is not for free, try to email the authors if they can share the full text can also be done. The author's email address is available in the abstract of the article. You can also go back to search and limit to free full text. There may also be a possibility that the article is available in Google Scholar or other sites that offer free full text i.e., Free Medical Journals (LinksMedicus), Genamics JournalSeek and Sci-Hub.¹³⁻¹⁵ You can also obtain it from a library service available in your institution or area or purchase it online.

Table 1. Suggested type of evidence-based on the clinical question.

Type of Clinical Question	Priority Article	Alternative Article
Multiple clinical questions	Clinical practice guideline	Narrative or scoping review
What is the possible diagnosis or differential diagnosis?	Cross-sectional study (prevalence study)	Clinical practice guideline Narrative or scoping review
What diagnostic test to request?	Meta-analysis of diagnostic test Cross-sectional study (diagnostic accuracy)	Clinical practice guideline Narrative or scoping review
What drug or other intervention to prescribe?	Meta-analysis of treatment or intervention Randomized controlled trial of treatment or intervention	Clinical practice guideline Narrative or scoping review
Should the patient be advised to avoid this risk factor?	Risk factor from cohort or case-control study	Risk factor from cross-sectional study Clinical practice guideline Narrative or scoping review
What should I tell the patient about his/her prognosis	Prognostic factor from cohort or case-control study	Prognostic factor from cross-sectional study Clinical practice guideline Narrative or scoping review
What should I tell the patient if the intervention is expensive?	Cost-effectiveness or cost-benefit analysis	Cost minimization analysis

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