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Review article

Challenges in building systematic search strategies to recognize the complexities of Public Health reviews

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Abstract

Evidence in public health has been distributed in heterogeneous sources ranging from well-controlled studies to qualitative researches. Conducting searches in public health reviews is exhaustive than the clinical reviews. Public health interventions uses a wider framework in defining the effectiveness of any strategies that are used. Hence evidence based decision making becomes more complex and to have a better understanding of the literature wider use of search strategy is essential which makes it more complex. This paper aims at describing the challenges and steps involved in developing effective search strategies in identifying the complexities of public health reviews.

Key terms: Search strategy, public heath reviews, systematic

Introduction

Scientific research has become very competitive in this technological advanced health care environment. To enhance the quality of patient care, evidence based practice is the need of the hour. Systematic reviews contribute a lot to the evidence based information. A quality systematic review depends on comprehensive literature searching capturing the key literature related to the topic (Higgins & Green, 2011). Failure to identify and consider all possibly relevant reports of controlled trials for systematic review could result in bias (Robinson & Dickers, 2002). The evidence in public health is distributed in a variety of heterogeneous sources ranging from well controlled studies to qualitative researches. Hence, it is imperative to have a broader perspective in undertaking public health review when compared to the clinical reviews. Therefore, to build a search strategy to capture the complexities of a public health review while retrieving the relevant evidence is very challenging.

Public health encompasses a number of disciplines including medicine, nursing, allied health, social science, education, agriculture, and so on. As the field of public health is broad, the decision makers require evidence on a wide range of topics (Lee, et al., 2012). In public health research area, various contextual factors interplay which makes the review even more complex. Therefore, a systematic review in public health must examine literature that appears in a wide variety of databases. Building searches in public health review is more exhaustive than the clinical review. As each database is unique in its features such as indexing system, field codes, syntaxes, filters, the search strategies should be tailored to the databases.

The quality of public health review could be compromised on assessing the methodological quality of primary studies, conducting a comprehensive search strategy, data analysis and interpretation (Tirills,

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Husson, DeCorby, & Dobbins, 2011). Developing and implementing a systematic and comprehensive search strategy for identifying all the relevant research literature is a vital first step in conducting a systematic review. Creating a search strategy requires a well thought out process for planning, testing, and refining, but this process is necessary to ensure that all relevant information is included in any research synthesis activity. To produce high quality systematic search it is essential to first identify the relevant data base to be searched and then have a clear cut understanding of using the key words, key phrases needed to refine the search. (DeLuca, Mullins, Crepaz, Kay, & Thadiparthi, 2008).

The salient features of search strategy in public health review are as follows:

Developing relevant Search Terms:

To map the complexities of public health review, an extensive identification of search terms must be employed.

PICO format

PICO format to build up search strategy should be considered in a broader perspective in public health reviews. The **'P'** component in public health often refers to population or problem and it should be looked in a broader way to include all controlled vocabulary and alternate terms. Similarly **'I'** intervention component in public health context is integrated, multidimensional, multicomponent as in health promotion strategies and takes place in a variety of settings. For example obesity prevention strategies could be diet related, exercise related, family related, environmental modifications, complementary therapies etc. This intervention could be carried out at home, community, health care agency, schools, and so on. Therefore, the search terms should also be multidimensional and comprehensive as compared to the search terms in specific interventions like drug trials. Even while describing the outcomes i.e., **'O',** a complex set of outcomes are measured such as behavioural, educational, physical, physiological, social, and so on. Another aspect that further complicates the search is the context in the public health; a wide range of cultural, social, environmental, geographical factors is to be considered. Hence, the PICO in a public health review is very much extensive than a clinical review.

Specific Search terms for databases

The retrieval of relevant citations can be improved using both indexing terms and keyword /text words/ authors' words. These techniques complement each other and help to overcome the potential differences in use of terminology among the authors, as well as the limitations of indexing (DeLuca, Mullins, Crepaz, Kay, & Thadiparthi, 2008). By listing the indexing terms, using headings and subheadings, including synonyms, related and equivalent terms, and alternative spellings of the concept, one can construct a comprehensive set of possible search term (Montori, Wilezynski, Morgan, & Haynes, 2005). The Entry Terms in Medical Subject Headings (MeSH) are useful for suggesting synonyms, or alternative terms that you might search in the abstracts and titles of articles. The option of identifying the synonyms from the databases and outside the database needs to be exploded. To maximize the retrieval of possible relevant records, it is essential to identify all possible synonyms and related terms for each PICO elements (Beahler, Sundheim, & Trapp, 2000). When planning a search strategy, it is necessary to include a widespread collection of free-text terms for each of the concepts in order to be as comprehensive as possible. For example:

- synonyms: 'obesity' OR 'overweight'
- related terms: 'brain' OR 'head'
- variant spellings: paediatric or pediatric

Keyword searching is necessary when a database has not been indexed with the subject headings. It is usually impossible to include all possible variations of a term or concept in a search, and the keyword searching is not as effective as searching with the subject headings as it is done from the controlled vocabularies (Beahler, Sundheim, & Trapp, 2000). A combination of the controlled vocabularies and the key words provides a safety net for search. Thus, to make a systematic review complete and important, the key word searches have to be used in combination with each data base search. In a focused clinical review, developing a search strategy is rather straightforward. However, in the case of public health review along with controlled vocabulary, key words used by authors, text words, related terms, synonyms all became important and need to build in.

Controlled vocabulary features: To build complex Searches

To begin with, identifying controlled vocabulary to build up complex searches is to retrieve potentially relevant articles through basic search. There after check the articles to view the controlled vocabulary, for instance an article from PubMed will provide a link to the MeSH term. Having identified a key article, using the 'Find Similar' option in Ovid or the 'Related Articles' the option in PubMed, additional relevant articles can be located. Using the search tools provided with the database such as the Permuted Index under Search Tools in Ovid and the MeSH Database option in PubMed additional controlled vocabulary terms should be identified (Higgins & Green, 2011). For the controlled vocabulary, no truncation or wild card should be used, for e.g., MeSH terms, CINHAL headings.

In well-developed databases, an indexing system of the controlled vocabulary exists. Each database has its own unique indexing system e.g., MeSH for PubMed, CINHAL headings for CINHAL, EMTREE for EMBASE. Same concept is used differently by different data base. As an example, for the term 'complementary medicine' MeSH heading in Medline is 'complementary therapies', whereas EMTREE heading is 'alternative medicine' and the equivalent CINAHL heading is 'alternative therapies'. Thus, it is evident that there is no uniform indexing system applicable to all the databases, except PubMed and Cochrane library that they share a common indexing system.

Although, the use of indexing terms is critical in locating the relevant citations, indexing can be limited by numerous factors, including poorly written abstracts, misclassification, lack of appropriate index terms, and lag time in indexing. Usually, there is a possibility that the discrepancy in the methods and objectives described by the authors affects the indexing of the articles. On the other hand, the indexing person may not be a methodological expert. As a result, there may not be appropriate indexing terms to correspond to the term researcher who wishes to look or search in the database (Higgins & Green, 2011). Therefore, a search devised with indexing terms alone may fail to capture the complete essential information regarding a particular topic of interest.

Exploding features of the database could be either by default or by command. This feature is very much relevant in the public health review, as the exploding feature will take into account all the relevant aspects of the term. The exploding opens out an avenue of sub concepts of the term as compared to the focused option. The explode option is preferred to retrieve the indexed records for a search term. The exploding search term is also useful to find the related concepts in a single search quickly. The term 'Explosion' means that by adding 'exp' to your keyword ('exp keyword') all the lower 'branches' of this specific term are automatically included in the search as well. PubMed includes all narrower terms in the hierarchical list and explodes by default. One can check the box beside "*Do Not Explode this term*" (Chapman, 2009) ; Ovid MEDLINE and CINHAL explodes only if you check the explode box.

Advance search options

Generally for a systematic review advanced search options are recommended. Here we can build complex searches one concept after the other and then combine them. In advanced search options, there is access to controlled vocabulary, provision to use field codes, syntaxes, filters, search fields, etc. Search the terms in all fields, not to restrict to title or abstract. As the advanced search options vary with each database, the authors should be knowledgeable about the unique features of the databases. In public health review, the full advantage of the advanced search option is essential, as the search is complex.

Truncation and wild cards are very efficient in searching the variations of the term in search of singular, plural, different endings, English and American spellings. For the retrieval of all possible variations of a search, the term usage of syntaxes will be beneficial. Based on each database the truncation could be used such as question mark (?) or asterisk (*) at the end of a word. The truncation allows searching and picking up any ending letter or a root form of a word. Example, typing **therap*** will find therapy, therapeutical, therapeutic, etc.

Customize the syntax of the search strategy to the specific databases to yield the appropriate data as the search syntax varies across interfaces. The usage of punctuation, controlled vocabulary, wildcards,

possibilities of truncations and automatic mapping functions vary across different databases (e.g., MEDLINE, EMBASE) or different database providers (e.g., OVID**).** The search strategy developed for MEDLINE via OVID cannot be used for searching MEDLINE via PubMed without 'translation' (Higgins & Green, 2011).

Additionally to make the search very specific, additional filters available in the database such as date, language, publication type, human species, age group, etc. can be used. Moreover, in public health review, a wide range of resources is to be considered including technical reports, policy documents, etc. For region specific review some databases like ProQuest allow a region specific geographical filter that could be used to make it more comprehensive.

Search in multiple locations

For retrieval of studies and documents in public health, the information sources other than health discipline could be utilized. As the public health issues are interrelated to various other disciplines like social welfare, transportation, education, agriculture, water, and sanitation etc., a search in those databases is vital to retrieve the relevant information. The conference proceedings and professional contacts play a greater role in the identification of literature for a systematic review in public health where much of the research is located outside the standard databases (Beahler, Sundheim, & Trapp, 2000). Cultivating good contacts is essential to have a wider topic-specific knowledge and assistance for locating literature through search. In this way, many documents were made available that would otherwise have been impossible to find (Beahler, Sundheim, & Trapp, 2000).

Study design

An additional challenge for information retrieval in the field of public health is to include a variety of study designs. While randomized controlled trials are acknowledged as the corner stone for the clinical reviews, using this as a study design filter is not appropriate for public health review (Beahler, Sundheim, & Trapp, 2000). There will not be many randomized trials available especially for public health topics with environmental or policy interventions. As a result, literature searches in these fields must be elaborate and far-ranging.

While addressing the public health reviews it is necessary to look into both quantitative and qualitative evidence. Most of the public health problems addressed in research are related to policy changes and policy interventions. Such problems are usually not subjected to randomized controlled trials (RCTs) but have been evaluated using other approaches; such as time series analyses, controlled and uncontrolled before-and-after studies, and sometimes-using qualitative methods (Petticrew, 2009). The outcome of the review should be able to direct the policy making and health care decision. Therefore, a lower level of evidence in the absence of strong evidence will throw some light in decision-making.

Combining operators

Although Boolean operators universally apply to most of the databases, the usages of proximity operators are more specific to databases. A search strategy should be built using text words, controlled vocabulary terms, synonyms and related terms. The Boolean 'OR' operator to each of the terms within each concept and then combining different concepts by 'AND' should be used.

Proximity (sometimes called 'adjacency') is a way to specify relationships between the two or more terms. Searching is similar to using the Boolean operators. Although, proximity searching allows you to specify the proximity of words to each other, the database has its own unique system. PubMed does not perform the adjacency searching but Ovid Medline, Cochrane library use.

Use combinations of Boolean operators and proximity operators to build a complex search (www.thecochranelibrary.com/view/searchmanual.html, 2015). The complex searches are built by using the searches ID numbers and associating them with search operators. The Boolean operators are extremely helpful in range searching. Nesting (or grouping terms) is more complex in public health reviews.

Conclusion

The search strategy in any systematic review needs to be planned carefully. The Public health reviews have complex or multiple interventions, which need to be

captured using effective search strategies. Hence, the complexities and challenges in building effective search strategy increases in undertaking the public health reviews.

Reference

Beahler, C. C., Sundheim, J. J., & Trapp, , N. I. (2000). Information retrieval in systematic reviews: Challenges in the public health arena. *American Journal of Preventive Medicine, 14*(4), 6-10.

Chapman, D. J. (2009). Advanced search features of PubMed. *Canadian Academy of Child Adolescent Psychiatry, 18*(1), 58-59.

DeLuca, J., Mullins, M. M., Crepaz, N., Kay, L., & Thadiparthi, S. (2008). Developing a Comprehensive Search stratergy for evidence Based Systematic reviews. *Evidence Based Library and information Practice, 3*(1).

Higgins, J. P., & Green, S. (2011). *Cochrane Handbook for systematic Reviews of Interventions.* The cochrane collaboration. Retrieved from www.cochrane.org

Lee, E., Dobbins, M., DeCorby, K., McRae, L., Tirilis, D., & Husson, H. (2012). An optimal Search filter for retriving systematic reviews and meta analyis. *BMC Medical Research Methodology, 12*, 51.

Montori, V. M., Wilezynski, N. L., Morgan, D., & Haynes, B. (2005). Optimal Search strtergies for retrieving systematic reviews from medline;analytical survey. *BMJ, 330*, 68.

Petticrew, M. (2009). Systematic reviews in Public Health:Old chest nuts and new Challenges. *Bulletin of the World Health Organisation, 87*, 163-164.

Robinson, K. A., & Dickers , K. (2002). Development of a Highly sensitive search stratergy for the retrieval of reports of controlled trials using PubMed. *International journal of Epidemiology, 31*(1), 150-153.

Tirills, D., Husson, H., DeCorby, K., & Dobbins, M. (2011). Missing and accounted for: gaps and areas of wealth in the public health review literature. *BMC Public Health, 11*, 757.

www.thecochranelibrary.com/view/searchmanual.html. (2015, Decemeber 28). Retrieved from cochrane library.