Abstract

The conduct of systematic reviews is prevalent across various healthcare disciplines. However, it remains one of the least engaged methodologies in nursing. Increasingly, large numbers of individuals across healthcare are publishing in various mediums, on an annual basis, which has made it difficult for nurses to keep up with primary research evidence. The purpose of this discussion paper is to present a methodology that can be used to search for relevant materials, sort through large volumes of information, and make decisions regarding possible study selection. The intention of this paper is to describe the process involved in mapping out what is known from the existing literature about a specific area of interest, as well as the strategies used to delimit the number and type of materials to be included in a systematic review. An overview of the process of identifying relevant materials to include in a review is presented. Specifically, determining inclusion and exclusion criteria, search strategies, and selecting studies for inclusion in a systematic review are discussed. A case study of an existing systematic review that evaluated interventions for reducing the number of hospital readmissions following heart failure was used to guide this discussion.

Keywords: information access, systematic review, readmission

Introduction

A systematic review is a research methodology that summarizes the best available evidence to respond to specific research questions. Through the conduct of systematic reviews, researchers attempt to identify all relevant published and unpublished work related to a specific topic. The quality of selected work is then assessed to determine appropriateness for study inclusion; while the findings from individual studies are synthesized, interpreted, and presented in an impartial manner to respond to the main study questions (Hemingway, 2009). Depending on the nature of the systematic review, it may include qualitative and quantitative research evidence; only quantitative evidence (in particular randomized controlled trials), or all type of research evidence, as well as non-empirical based materials (Hemingway). Findings from systematic reviews have been used by clinicians and policy makers for changing practices and influencing decision making. Even though the conduct of systematic reviews is prevalent across various healthcare disciplines, it remains one of the least engaged methodologies in nursing (Hemingway). This may be due to the large quantity of materials that are present. As well, increasingly, the numbers of individuals across healthcare who are publishing on an annual basis has made it difficult to keep up with primary research evidence. Thus, many nurses may find the sheer numbers of information to be overwhelming and/or they may lack the expertise to be able to identify relevant materials to include in a systematic review.

The purpose of this discussion paper is to present an example of a methodology that was used to obtain relevant materials to be included in an upcoming systematic review. The intention of this paper is to describe the process involved in mapping out

what is known from the existing literature about a specific area of interest, as well as the strategies used to delimit the number and type of materials to be included in the review. The intended systematic review will focus on evaluating interventions for reducing the number of hospital readmissions following heart failure (HF).

Overview of process

Determining inclusion criteria

Before beginning to search for materials to include in the systematic review, specific inclusion criteria were established in order to ensure that information retrieved addressed the topic of interest. Thus, it was determined that materials to be considered for inclusion in the systematic review should contain a sample that represented patients who were recently, within the year, diagnosed with HF (Congestive Heart Failure (CHF) was considered in addition to HF in order to reduce the likelihood of missing relevant articles). In including literature on CHF, the authors were aware this might result in an unmanageable number of references; however, they felt the broader approach would generate a greater breadth of coverage. Decisions about how to set the parameters on large numbers of bibliographic references were made once the volume and the general scope of the field were gained. Materials were also included if they examined or recommended an intervention to reduce hospital readmission rates. From a practical point of view, further parameters were delineated regarding the time span and the language. Reflecting time and budget constraints, primary studies published and unpublished between 1991 and 2011 were considered. Also, a 20 year time frame was chosen because the investigation into hospital readmissions has been relatively recent. Foreign language studies were excluded because of the cost and the time involved in translating the

material. Given the above parameters, there was the potential for relevant papers to have been missed.

Search strategies

Following the identification of inclusion criteria, specific search strategies were developed to assist in the creation of search requests; aid in the access of search results; and to allow for a record of changes of results obtained as well as, search history. The use of search strategies was also important in ensuring a consistent approach was employed to obtain materials. Various strategies were used that consisted of searching electronic databases; hand-searching of prominent journals; and probing existing networks, organizations, and conferences.

The search strategy for the electronic databases was developed from the objectives of the systematic review. The research team worked with a qualified librarian to design and execute database-specific search strategies. The use of the librarian's services was central to generating the breadth of coverage. Reference lists from studies obtained through the database searches for systematic reviews and traditional literature reviews were examined to ensure they had been included in the study. The citations within the identified studies yielded further references, thus expanding the search parameters.

An alternative approach to using a qualified librarian to search the electronic databases, would be for the study investigators to engage in this process themselves. This option may arise if the research team does not have enough funds to hire a librarian. Researchers engaged in search strategies would first need to identify the key concepts relevant to the search as well as, keywords to describe these concepts. Through the

identification of keywords, any synonyms, related words, or variations of keywords would be included. Furthermore, a consideration of any search features including truncation, proximity operators, or Boolean operators that may influence search would need to be incorporated into the search. Once keywords have been identified, the researcher would then choose a relevant search engine. To identify an appropriate search engine, the researcher is encouraged to read the search engine's homepage for an overview of the particular engine. Upon selection of key search engines, search expressions are then created using syntax that is appropriate for each engine. Examples of syntax can be retrieved from various search engines' homepage. The search expressions can then be inserted into the search field. The results obtained can then be evaluated. A record should be kept of the number of hits returned and whether or not the results were relevant to the search query. Based on the examination of the results obtained, the search can be modified by using different databases and search expressions (Ackermann & Hartman, 2004).

In addition to searching electronic databases, hand-searching of prominent journals in the field of interest can be employed. With regards to the systematic review in question, hand-searching of Clinical Nursing Research, Heart and Lung, Journal of Advanced Nursing, Journal of Cardiovascular Nursing, and The European Journal of Cardiovascular Surgery, was conducted to identify articles that may have been missed through searching of the electronic database and reference lists. Also, existing networks (Cardiac Care Network of Ontario and the Ontario Heart Health Network), societies (British Society for Heart Failure, European Society of Cardiology, European Society of Cardiology Council on Cardiovascular Nursing and Allied Professions [CCNAP], and

Heart Failure Society of America), relevant organizations (Heart and Stroke Foundation of Canada, Heart and Stroke Foundation of Ontario, and American Heart Association), and conferences (Chronic Heart Failure and Hypertension Conference, Canadian Conference of Cardiovascular Nursing, Consensus Conference: Management of Heart Disease, Asian Pacific Congress of Heart Failure, and Pan American Heart Failure Congress) were searched, as existing knowledge and networks served to generate information about interventions to reduce the number of hospital readmissions following HF. Additionally, these networks, societies, organizations, and conferences were contacted by email, as well as by telephone to identify unpublished work. A total of 798 articles published between 1986 and 2011 were found to have addressed heart failure and hospital readmissions. Of these, 736 articles were excluded because 1) they described the current health care environment in which heart failure was one of many conditions putting strain on the health care system (63.2 %), or 2) they described heart failure frameworks and policies guiding practice (36.8 %). A total of 62 studies met the selection criteria and were included in the systematic review.

As anticipated, the search generated hundreds of bibliographic references, which were then appraised to determine possible inclusion in the final study selection. Reference Manager was used to manage the data, keep track of articles, and make requests for inter-library loans. This software was compatible with the word processing package that was used, which assisted in producing lists of references for inclusion in the final literature review report. A trained research assistant recorded the databases that were searched for each set of results as it was imported into Reference Manager. This information was important as it was used to update and refine subsequent searches.

Study selection

Following retrieval of studies, a criterion should be developed to assist with selecting relevant studies for inclusion. The criteria for study selection should flow from the research question and be specified a priori (Khan, Kunz, Kleijnen, Antes, 2003). The study selection criterion should include selection principals that address the basic elements of a study such as type of design, sampling techniques, instruments, sample size, missing data, and key conclusions. These elements will be reviewed and used to determine whether or not to accept or reject studies to be reviewed. As well, the selection of studies will be influenced by the inclusion and exclusion criteria. A log of studies that were excluded should be kept along with reasons for rejection. Reliability assessment for selecting studies should be employed, in which a percentage of the studies considered for inclusion should be evaluated by at least 2 rates independently from one another. One of the raters should be knowledgeable in the area under review, while the second rater should be a content expert. In this way, the bias of both the relevance and validity of articles being selected will be reduced. In cases of disagreement between authors, arbitration by another person is suggested or disagreements can be resolved through a consensus-building process (National Center for the Dissemination of Disability Research, 2007).

With regards to the HF systematic review, two reviewers applied the established conditions outlined in the inclusion criteria to all citations. Copies of full articles were obtained from those studies that appeared to represent the best fit with the study aims. If the relevance of a study appeared to be unclear from the abstract, then the full article was ordered or retrieved. Deadlines were set, after which it was determined that no additional

studies would be included in the analysis. Reviewers read the full articles to make the final decision about whether they should be chosen for inclusion in the review.

All data were extracted independently by two reviewers. Standard information was collected on each study. A data charting form was created detailing a mixture of general and specific information about each study. The specific information pertinent to the study design, including: study population, type of intervention, and outcome measures for hospital readmission rates. Information was recorded as follows: author(s), year of publication, study location, intervention type (and comparator, if any), duration of the intervention, study population, aims of the study, methodology, outcome measures, and important results. Based on the data extracted, decisions were made concerning study inclusion or exclusion.

Consultation exercise

A consultation element was included in this systematic review. This involved practitioners (cardiovascular surgical focused advance practice nurses, cardiovascular surgeons, family practitioner, a rehabilitation practitioner, an emergency room physician and nurses), patients, and hospital administrators from local organizations. It was anticipated that contributors to the consultation would provide additional references about potential studies to include in the review, as well as valuable insights concerning issues relating to the effectiveness and cost-effectiveness of interventions aimed at reducing hospital readmissions.

In conclusion, a detailed overview of the procedure involved in obtaining relevant materials was presented. Using a case study of an existing HF based systematic review, the technique involved in determining the inclusion and exclusion criteria, search

strategies, and study selection procedure was presented with the intention of addressing

the challenges that arise during the accessing, sorting through, and management of papers

during the conduct of systematic reviews.

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