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Network meta-analyses could be improved by searching more sources and by involving a librarian

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Abstract

Objective: Network meta-analyses (NMAs) aim to rank the benefits (or harms) of interventions, based on all available randomized controlled trials. Thus, the identification of relevant data is critical. We assessed the conduct of the literature searches in NMAs.

Study Design: Published NMAs were retrieved by searching electronic bibliographic databases and other sources. Two independent reviewers selected studies and five trained reviewers abstracted data regarding literature searches, in duplicate. Search method details were examined using descriptive statistics.

Results: Two hundred forty-nine NMAs were included. Eight used previous systematic reviews to identify primary studies without further searching, and five did not report any literature searches. In the 236 studies that used electronic databases to identify primary studies, the median number of databases was 3 (interquartile range: 3−5). MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials were the most commonly used databases. The most common supplemental search methods included reference lists of included studies (48%), reference lists of previous systematic reviews (40%), and clinical trial registries (32%). None of these supplemental methods was conducted in more than 50% of the NMAs.

Conclusion: Literature searches in NMAs could be improved by searching more sources, and by involving a librarian or information specialist.

Keywords: Network meta-analyses; Search strategy; Literature search; Gray literature; Handing searching; Databases searching

1. Introduction

In the last decade, network meta-analyses (NMAs) have been introduced as a generalization of pairwise meta-analysis. The method is a new, promising extension of systematic reviews and is becoming increasingly popular [1,2]. NMAs permit assessment of the relative effectiveness of multiple interventions, synthesizing evidence across a network of randomized trials [1,3−5] using both direct comparisons of interventions reported within randomized controlled trials (RCTs) and indirect comparisons across trials based on the common comparator [6,7]. In the absence of head-to-head comparisons of all interventions of interest, indirect treatment comparison analyses using NMAs of various RCTs can provide useful evidence to inform health-care decision making. Even when the results of the direct comparisons are conclusive, combining them with indirect estimates in a mixed treatment comparison may yield more refined estimates [8]. NMAs may also combine information from a larger number of RCTs, to rank the benefits (or harms) of available treatments, to identify the best option(s) for patients [8,9].

Although there are some differences in statistical analytical methods between traditional systematic reviews and NMAs, the conduct of literature searches are very similar. Both need to include all available evidence and apply a systematic and unbiased approach to estimate potential differences. Studies have evaluated the conduct of searches in traditional systematic reviews [10−12], but these examinations have not extended to the conduct of literature searches in NMAs. Thus, the objective of our study is to assess the conduct of literature searches for NMAs.

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What is new?

- In the studies that used electronic databases, the number of databases searched ranged from 1 to 25, with a median number of 3 (interquartile range: 3−5).
- MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL) were the most common databases searched.
- None of these supplemental methods was conducted in more than 50% of the network meta-analyses. The most common supplemental search methods included reference lists of included studies (48%), reference lists of previous systematic reviews (40%), and clinical trial registries (32%).
- Among the search terms used in the literature searches, 191 (81%) used terms relating to patients or the condition (P), 184 (78%) used terms describing interventions or exposures (I), 18 (8%) used terms relating to outcomes (O), and 137 (58%) used terms relating to study design (S).

2. Methods

2.1. Literature searches

We searched PubMed (via pubmed.com), EMBASE (via Embase.com), Web of Science (via ISI Web of Knowledge, including Science Citation Index Expanded, Social Sciences Citation Index, Conference Proceedings Citation Index−Science, Conference Proceedings Citation Index-Social Science and Humanities), and the Cochrane Library (via thecochranelibrary.com, including Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Health Technology Assessment Database, NHS Economic Evaluation Database) from inception to September 29, 2013. No restrictions as to language, publication date, or publication status were applied.

The search strategy was constructed using free text relating to ''network meta analysis'' OR ''mixed treatment comparisons meta analysis'' OR ''multiple treatments meta analysis'' OR ''indirect comparison meta analysis.'' Subject headings, such as MeSH terms, were used when relevant terms were available. The details of the search strategy were developed according to the search strategy for NMAs by Bafeta et al. [13], and are presented in Appendix 1 at www.jclinepi.com. The search strategy was developed by L.L. and J.T. (10 years experience as information specialist). The search strategy was peer reviewed by B.S. (20 years experience as information specialist) and K.Y. (20 years experience as information specialist) using peer review of electronic search strategies (PRESS) [14].

Google Scholar and health technology assessment Web sites (National Institute for Health Research: http://www.hta.ac.uk, Agency for Healthcare Research and Quality: http://www.ahrq.gov, and National Institute for Health and Care Excellence: http://www.nice.org.uk) were also searched using the main search terms in the free text format. References of relevant methodological articles, letters, editorials, correspondences, and cost-effectiveness reviews (identified throughout literature screening), and included NMAs were screened to identify additional relevant studies. Tables of contents of the eight journals that published the most NMAs (Lancet, BMJ, Curr Med Res Opin, BMC Med Res Methodol, J Clin Epidemiol, Stat Med, Health Technol Assess, and Value Health) were also hand-searched.

All searches were concluded on September 29, 2013. Two reviewers (L.L. and J.T.) independently ran the peer-reviewed database search strategies and compared results, to ensure accuracy and consistency.

2.2. Inclusion criteria and study selection

We included any NMAs in the English language, regardless of the health conditions or interventions. NMAs were defined as meta-analyses that used network meta-analytic methods to analyze, simultaneously, three or more different interventions [6]. We excluded adjusted indirect comparison meta-analyses of an open-loop network of three interventions. Methodological articles, conference abstracts, letters, editorials, correspondences, cost-effectiveness reviews, and reviews based on individual patient data were also excluded.

Two trained reviewers (L.L. and J.T.) independently assessed potential citations for inclusion based on screening titles, abstracts, and full texts. Disagreements were resolved by a third reviewer (K.Y.).

2.3. Data abstraction

A standardized form (Appendix 2 at www.jclinepi.com) was developed to abstract data including: the sources searched (medical databases, hand-searching of related journal and conference abstract, cross-checking of relevant systematic reviews and included studies, and clinical registries); search terms; and search restrictions. We relied on the published information (including appendices, additional files and online materials at www.jclinepi.com) and did not contact the authors for additional details of the literature search. The basic information of included NMAs was also abstracted: author, publication year, journals, the country of the first author, and the disease (according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision).

The standardized form was tested with a pilot abstraction of 30 NMAs (randomly selected); no additional data items regarding the conduct of literature searches were identified. Three trained reviewers (L.L., H.T., and F.L.)