Information in practice

Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources

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Abstract

Objective To describe where papers come from in a systematic review of complex evidence.
Method Audit of how the 495 primary sources for the review were originally identified.
Results Only 30% of sources were obtained from the protocol defined at the outset of the study (that is, from the database and hand searches). Fifty one per cent were identified by “snowballing” (such as pursuing references of references), and 24% by personal knowledge or personal contacts.
Conclusion Systematic reviews of complex evidence cannot rely solely on protocol-driven search strategies.

Introduction

In Cochrane reviews of therapeutic interventions, most high quality primary studies could be identified by searching four standard databases—the Cochrane Controlled Trials Register (which contains 79%) of studies listed in Cochrane systematic reviews), Medline (69%), Embase (65%), and Science and Social Sciences Citation Indexes (61%). Searching 26 further databases identified only an extra 2.4% of trials. No comparable figures have been published for systematic reviews of complex evidence, which address broad policy questions and synthesise qualitative and quantitative evidence, usually from multiple and disparate sources.2

The aim of our study was to audit the origin of primary sources in a wide ranging systematic review of complex evidence.

Method

We reviewed the diffusion of service-level innovations in healthcare organisations. The methods and full report have been published elsewhere.3,4 Briefly, six researchers mapped 13 different research traditions, compared their conceptual and theoretical approaches, and synthesised the empirical evidence. We report here on the search phase.

After extensive “browsing” in libraries and bookshops to get a feel for the overall research field, we used the following methods:

• Protocol driven (search strategy defined at the outset of the study)
• Hand search of 32 journals across 13 disciplinary fields
• Electronic search of 15 databases by index term, free text, and named author
• “Snowballing” (emerging as the study unfolded)

Reference tracking: we scanned the reference lists of articles in mainstream journals that had subsequently been published for systematic reviews of complex evidence, which address broad policy questions and synthesise qualitative and quantitative evidence, usually from multiple and disparate sources.2

Our existing knowledge and resources

Our personal contacts and academic networks

Serendipitous discovery (such as finding a relevant article in mainstream journals that had subsequently cited those papers)

*15 databases including Medline, EPOC, ASSCI, and ERIC.
†Numbers add up to more than 100% because some sources were located by more than one method. The proportion of sources double counted is probably a substantial underestimate since (for example) we did not flag a paper identified in a reference track if we already had it on file.
What is already known on this topic

It is generally assumed that the more explicit and meticulous the search strategy, the more likely a systematic review is to pick up all the important papers. In systematic reviews of clinical treatments, most high quality primary studies can be identified by searching four standard electronic databases.

What this study adds

In systematic reviews of complex and heterogeneous evidence (such as those undertaken for management and policymaking questions) formal protocol-driven search strategies may fail to identify important evidence. Informal approaches such as browsing, “asking around,” and being alert to serendipitous discovery can substantially increase the yield and efficiency of search efforts.

“Snowball” methods such as pursuing references of references and electronic citation tracking are especially powerful for identifying high quality sources in obscure locations.

We initially scanned over 6000 electronic abstracts and book titles, and selected 1004 full-text books or papers for further analysis. After appraising all these for quality and relevance, we cited 495 (of which 213 were empirical studies and 21 were systematic or quasi-systematic reviews) in the final report. We classified each according to its origin, using the taxonomy above.

Results

The table shows the origins of our 495 sources. Twenty three per cent of the sources were known to us or were recommended by colleagues when we approached them by email, which took little time. Electronic searching, including developing and refining search strategies and adapting these to different databases, took about two weeks of specialist librarian time and yielded only about a quarter of the sources—an average of one useful paper every 40 minutes of searching. It took a month to hand search a total of 271 journal-articles, from which we extracted only 24 papers that yielded any useful information. After appraising all these, we recommended 1004 full-text books or papers for further analysis. We initially scanned over 6000 electronic abstracts and book titles, and selected 1004 full-text books or papers for further analysis. After appraising all these for quality and relevance, we cited 495 (of which 213 were empirical studies and 21 were systematic or quasi-systematic reviews) in the final report. We classified each according to its origin, using the taxonomy above.

Five papers came our way by chance, including a major systematic review that was passed to one of us in a coffee queue by someone who did not know about this research.

Discussion

Systematic review of complex evidence cannot rely solely on predefined, protocol driven search strategies, no matter how many databases are searched. Strategies that might seem less efficient (such as browsing library shelves, asking colleagues, pursuing references that look interesting, and simply being alert to serendipitous discovery) may have a better yield per hour spent and are likely to identify important sources that would otherwise be missed. Citation tracking is an important search method for identifying systematic reviews published in obscure journals.

This study builds on extensive secondary research by all the authors on the systematic review (see reference list), whose input we gratefully acknowledge. We also thank Jeanette Buckingham for comments on a previous draft of this paper. Competing interests: None declared.


Corrections and clarifications

A randomised multicentre trial of integrated versus standard treatment for patients with a first episode of psychotic illness

An error crept into this paper by Lone Petersen and colleagues during editing and subsequently evaded detection (BMJ 2005;331:602-5, 17 Sep). In the methods section, the description of integrated treatment should have stated that psychoeducational family treatment was offered in 1.5 hour sessions twice a month (not twice weekly).

Dutch experience of monitoring euthanasia

Poor editorial communication led to the omission of a figure that should have accompanied this Education and Debate article by Bregje D Onwezen who were unable to establish this fact (Peter J Neumann) of this paper by Dan Greenberg and colleagues did not appear in the full text version and the contents page on bmj.com, although it did appear in the pdf version and in the printed journal (BMJ 2004;328:1536-7). The online omissions have been corrected.

Penicillin should remain the standard treatment for early syphilis—for now

Despite managing to cite azithromycin correctly three times in the text of this Short Cut item, compiled by Alison Tonks (BMJ 2005;331:721-2, 1 Oct), we failed in our fourth attempt. Towards the end of the item, we called it azithromycin (which we misspelt).

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