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Poor reporting and inadequate searches were apparent in systematic reviews of adverse effects

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Abstract

Objective: Systematic reviews incorporating adverse effects are assuming increasing importance as questions raised extend beyond clinical effectiveness to all effects (beneficial and harmful). The aim of this study was to survey the methods used to identify relevant studies for systematic reviews of adverse effects.

Study Design and Setting: All records within the Database of Abstracts of Reviews of Effects and the Cochrane Database of Systematic Reviews were scanned for systematic reviews in which the primary outcomes were adverse effects. Two information professionals independently assessed the methods used to identify relevant research as reported in the 277 reviews that met the inclusion criteria.

Results: A major weakness of the reviews was inadequate reporting of the search strategies used. In addition, of the reviews that did report a search strategy, few used the sensitive search strategies recommended for systematic reviews. The majority of reviews did not search more than one or two databases, and few other methods of identifying information were used.

Conclusion: This investigation shows the variation in the searching element of systematic reviews of adverse effects and demonstrates that the reporting of the methods used to identify research in such reviews could be vastly improved.

Keywords: Systematic review; Literature review; Adverse effects; Information retrieval; Meta-analysis; Database

1. Introduction

Systematic reviews aim to provide comprehensive, unbiased evaluations of the effects of health care interventions. This process of systematic assessment often requires authors to adhere to painstakingly thorough methods for identifying relevant research. Most reviews have concentrated on identifying information regarding the effectiveness of interventions, but there is now a growing realization that adverse effects should be scrutinized in the same thorough manner [1]. Conducting systematic reviews of adverse effects brings about many new challenges to systematic review methodology, not least in the retrieval of adverse effects information.

Searching for relevant studies to include in a systematic review is one of the most important steps in the systematic review process, and a thorough search is one of the key factors that distinguishes a systematic review from other types of review. Missing relevant studies can result in bias for systematic reviews. A thorough search depends on the sensitivity of the search strategies as well as the variety of sources searched. Sensitive searches tend to use a mixture of text words and indexing as well as synonyms, and appropriate truncation [2,3].

A number of researchers have reported on the difficulties faced when searching electronic databases for information on adverse effects [4−7]. Unlike the assessment of clinical effectiveness, the difficulties with identifying adverse effects information are compounded by poor reporting and indexing of adverse effects terms [4−7]. The adverse effects of interest may also include new, previously unrecognized effects, so it may not be known which particular adverse effects the searches should be designed to retrieve [1,4,7,8]. Moreover, there are a wide variety of study designs that are potentially useful in evaluating

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adverse effects [9], and this complicates the search further [10].

We do not currently have good empirical evidence for what constitutes an effective search strategy for adverse effects. The lack of guidance on how to identify information on adverse effects means that there may be considerable variation and uncertainty in the methods used. As a first step toward improving our understanding of the current situation, and before formatting any new suggestions, we aimed to survey the methods used for identifying relevant research in existing systematic reviews of adverse effects. Any important issues or deficiencies identified here will then help us focus the future research agenda, as well as develop training material that is relevant to systematic reviewers for the identification of adverse effects.

2. Methods

This detailed analysis of the methods used for identifying information on adverse effects was carried out as part of a larger survey of the methods used in systematic reviews of adverse effects [11].

2.1. Search strategy

Relevant systematic reviews were identified by screening all records published since 1994 in the Cochrane Database of Systematic Reviews (CDSR) (via The Cochrane Library, Issue 2:2005), and the Database of Abstracts of Reviews of Effects (DARE) (via the Centre for Reviews and Dissemination (CRD) Web site, April 2005).

2.2. Inclusion/exclusion criteria

Two researchers independently screened the titles and abstracts of the database records on CDSR and DARE. We then checked the full text of any reviews identified as potentially relevant by either researcher. Each researcher individually selected reviews based on the criterion that a review would be included if the primary outcome was an adverse effect or effects thought to be caused by the intervention.

2.3. Data extraction

We abstracted predefined descriptive data using a standardized form designed for this study. First, we recorded how the information on adverse effects was identified by the authors, namely:

- which databases (e.g., MEDLINE, EMBASE),
- which interfaces (e.g., PubMed, OVID, SilverPlatter),
- any other sources of information consulted or approaches to information gathering used (e.g., reference checking, hand searching, contacting experts).

We also extracted details concerning the database search strategies, as well as their reproducibility:

- which category of search terms was used from the standard categories of terms used to devise clinical effectiveness search strategies [2] (e.g., patient group, disease or condition, intervention, comparator, outcome),
- in which database fields the terms were searched (e.g., title, abstract, indexing),
- whether any synonyms, truncation, or search filters were used,
- whether any language or date restrictions were applied to the searches.

We judged searches to be reproducible if the reviewers provided details of the combinations of search terms used, including field restrictions, truncation, and search filters, as well as any date or language restrictions applied.

Finally, we checked for the qualifications of the searcher, and noted the number of records identified, and the number of studies included in each review.

3. Results

We retrieved 320 full reports after screening titles and abstracts; of these, 277 reviews (from 278 publications) met our inclusion criteria. Most of the included reviews were identified from DARE (256 reviews), and only 21 were Cochrane Reviews identified from CDSR.

Most of the reviews (224/277, 81%) concentrated on prespecified adverse effects outcomes (such as thrombosis or stroke), rather than on analyzing all potential adverse effects for a given intervention. The majority of reviews (177/277, 64%) evaluated the adverse effects of drug therapies. The most common interventions studied were Hormone Replacement Therapy (29 reviews), Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (17 reviews), and oral contraceptives (15 reviews).

3.1. Resources searched

Nearly all of the reviews (269/277, 97%) listed the methods used to identify research for the review. Those that did not, either did not report any methods used (five reviews) or gave only partial information on the sources searched, such as ''we used computer based searches and bibliographies of published articles'' or ''studies were identified from review articles, computer aided literature searches, and from discussion with colleagues'' (three reviews).

The median number of electronic databases searched was 2 (range 0–25), MEDLINE being the most popular followed by EMBASE (Table 1). Three reviews did not search any bibliographic databases, 88 (88/269, 33%) searched only one database; in 83 cases this database was MEDLINE, and in only one review this database was EMBASE. Over half of the reviews searched two or fewer databases (156/269, 58%), and less than one-fifth (49/269, 18%) searched more than four databases.