

## **A Comparison of Handsearching Versus EMBASE Searching of the Bahrain Medical Bulletin to Identify Reports of Randomized Controlled Trials**

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**Objective:** The aim of this study is to identify reports of randomized controlled trials by hand searching the Bahrain Medical Bulletin and to determine the added value of the hand searching in minimizing the effects of indexing bias.

**Methods:** All issues of the BMB were searched by hand from cover to cover for reports of trials. These were classified as randomized controlled trials (RCTs) or controlled clinical trials (CCTs) according to the Cochrane eligibility criteria. Photocopies of the bibliographic details and of the pages describing the study design of the reports identified were sent to the UK Cochrane Centre for verification and submission to the US Cochrane Center for publication in CENTRAL in The Cochrane Library. EMBASE and CENTRAL were also searched to identify if the reports found by the handsearch were already included in either of these databases.

**Results:** Sixteen trials out of 395 articles were identified, 12 RCTs and 4 CCTs. The added value of the handsearch in relation to EMBASE was 13 of the 16 (81%), and that for CENTRAL was 8 of 16 (50%).

**Conclusion:** Handsearching provides a valuable and unique contribution from the Arab region to the global effort by the Cochrane Collaboration. The handsearching of this journal, should help reviewers to minimize the effects of publication bias by providing reports of trials not previously identified. The handsearching has also ensured that reports of trials will not remain 'buried' because of indexing bias.

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### **INTRODUCTION**

There is heightened interest in the scientific community in charting the publication of medical research by geographical region. A study of the number of MEDLINE-indexed publications in Arab countries indicated that these countries produce less than 1% of the biomedical citations in the world<sup>1</sup>. However, El Ansari stressed that a

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count of publications indexed in MEDLINE does not accurately reflect the extent of biomedical output in Arab countries and suggested several reasons<sup>2</sup>. Much of the research is published in the Arabic language (as of July 20, 2005 only 228 of 15 million citations in MEDLINE contain studies in Arabic), in formats not indexed in MEDLINE (conference abstracts in supplements) and in journals, which are not indexed in MEDLINE.

It is increasingly recognized that healthcare decision-making around the world needs to be informed by high quality and timely research evidence. The randomized controlled trial has long been considered the 'gold standard' in the hierarchy of evidence and trials involving sufficient numbers of participants are essential to distinguish reliably between the effects of healthcare interventions and the effects of bias or chance. The synthesis of the results of these trials in systematic reviews can provide reliable evidence about the effects of these interventions. The Cochrane Collaboration is an international organization dedicated to improving health care for the world's population by preparing, maintaining and promoting the accessibility of Cochrane systematic reviews of the evidence of the effects of healthcare interventions.

The validity of the results of a systematic review is highly dependent on the data included, an unbiased and a complete set of relevant studies. The Cochrane Collaboration has focused on the systematic electronic searching of MEDLINE and EMBASE and the systematic handsearching of currently over 2000 general and specialized healthcare journals for reports of randomized controlled trials. This involves reading each document in a journal to decide, according to set Cochrane eligibility criteria, if it might be a report of a randomized trial<sup>3</sup>. The efforts of many volunteers working within The Cochrane Collaboration have added a substantial number of previously 'buried' reports of randomized controlled trials to the Cochrane Central Register of Controlled Trials (CENTRAL) published in The Cochrane Library. Some of these reports of trials may have been 'buried' as a result of inconsistencies in indexing (indexing bias), a lack of cover-to-cover indexing or because they have been published in journals not indexed in the major healthcare databases such as MEDLINE and EMBASE (database bias) or in journals published in languages other than English (language bias). A good example of language bias was provided in a study of 68 Spanish general medical journals, which found that only six of them were indexed in MEDLINE<sup>4</sup>.

The Bahrain Branch of the UK Cochrane Centre is actively seeking to minimize these effects of bias by addressing problems of study identification through a comprehensive handsearching programme of journals published in the Arab world.

This study seeks to identify reports of randomized controlled trials by handsearching the Bahrain Medical Bulletin which is indexed in EMBASE but not in MEDLINE. It will also determine the added value of the handsearch in minimizing the effects of indexing bias by assessing the precision and sensitivity of (i) the EMBASE index term RANDOMIZED CONTROLLED TRIAL and (ii) the Cochrane Collaboration's systematic electronic search of EMBASE as a means of confirming the reports which were found by handsearching.

## METHODS

All issues of the BMB (1979 to December 2004) were searched by hand from cover to cover for reports of trials. These were classified as randomized controlled trials (RCTs) or controlled clinical trials (CCTs) according to the Cochrane eligibility criteria for reports of randomized trials in which participants were definitely or possibly assigned prospectively to one of two or more alternative forms of health care using random allocation or some quasi-random method of allocation such as alternation, date of birth or medical record number. The handsearcher classified reports of trials as RCTs if the groups compared in the trial were established by random allocation. If the author(s) did not state explicitly that the trial was randomized but randomization could not be ruled out, the report was classified as a CCT. CCT was also applied to quasi-randomized studies where the method of allocation was known but not considered strictly random (example date of birth), and for possibly quasi-randomized studies.

Photocopies of the bibliographic details and of the pages describing the study design of the reports identified were sent to the UK Cochrane Centre for verification and to be processed for submission to the US Cochrane Center for publication in CENTRAL in The Cochrane Library.

EMBASE (via Ovid Web) and CENTRAL (Issue 1, 2005) were also searched to identify if the reports found by the handsearch were already included in either of these databases.

## RESULTS

We checked 395 articles in the BMB and found 12 RCTs and four CCTs. The distribution by country of principal investigator was highest for Jordan, followed by India<sup>3,4</sup> (**Table 1**). Distribution by specialty was highest for anaesthesia<sup>7</sup> (**Table 1**). Of the 16 reports of controlled trials found by the handsearch only 12 were in EMBASE but only three (19%) of these had been given the index term RANDOMIZED CONTROLLED TRIAL<sup>7</sup> (**Figure 1**). The overall added value of the handsearch in relation to EMBASE, (defined as the total number of reports of trials published in these journals but not indexed as randomized controlled trials in EMBASE and therefore not easily identified except through the handsearch of these journals) was 13 of 16 (81%).

**Table 1: Total number of trials (n=16) by country and speciality:**

Country	RCTs	CCTs
Bahrain	1	1
India	3	1
Jordan	4	1
Kuwait	-	1
Oman	1	-
Saudi Arabia	2	-
USA/Bahrain	1	-
Speciality	RCTs	CCTs
Anaesthesia/Analgesia	7	1
Community Medicine	1	-
Obstetrics & Gynaecology	2	1
Paediatrics	1	-
Radiotherapy	-	1
Sports Medicine	1	-
Surgery	-	1

Figure 1

Of the 16 reports found by the handsearch, 8 were in CENTRAL (Issue 1, 2005) (**Figure 1**). The added value of the handsearch in relation to CENTRAL, defined as the total number of reports of trials published in this journal but not yet in CENTRAL and therefore not easily identified except through the handsearch of this journal was 8 of 16 (50%).

## DISCUSSION

To minimize bias due to the selective availability of data, systematic reviewers need to identify as many relevant studies as possible to provide reliable evidence on which to base healthcare decisions. It has been shown previously that the identification of trials from bibliographic databases can be problematic<sup>5</sup>. Our study confirmed that the precision of the EMBASE index term RANDOMIZED CONTROLLED TRIAL was poor and retrieved only three of 16 (19%) reports of trials found by the handsearch, which were also in EMBASE. However, the term itself was only introduced in 1994 and could not, therefore, have been applied to two of these reports, which were published in 1989 and 1990.

In an effort to minimize the effects of lack of availability of appropriate indexing terms and inconsistencies in indexing (indexing bias), The Cochrane Collaboration has carried out systematic electronic searches of MEDLINE and EMBASE using extensive search strategies designed to be sensitive i.e. to avoid missing reports of trials. The reports of trials, which were identified by an assessment of the titles and

abstracts only, using these sensitive search strategies for MEDLINE and EMBASE are included in CENTRAL.

However, despite sensitive searching of electronic databases, it has been found that handsearching still provides additional reports of trials missed by the electronic searches<sup>6</sup>. We searched CENTRAL for the reports of trials found by our handsearch of this journal to examine the potential added value of the handsearch over the systematic searching that has already been done by EMBASE.

The development of the Collaboration's sensitive search strategy for retrieving reports of randomized trials in EMBASE is ongoing and these findings are a useful contribution to investigating terms, which might be of potential value in retrieving reports of randomized trials.

### **Implications for practice**

Handsearching will identify reports of trials not found by electronic searches. When searching EMBASE for reports of randomized controlled trials, it is not advisable to rely solely on the term RANDOMIZED CONTROLLED TRIAL. It is helpful if authors of trials report study designs clearly and comply with published guidance (CONSORT – Consolidated Standards of Reporting Trials) on the better reporting of randomized controlled trials, which would in turn help indexers to apply appropriate index terms and thereby improve retrieval of reports in electronic searches<sup>7</sup>.

### **Implications for research**

Further research is required to assess the quality of the trials identified and to assess how many trials were duplicated. Additionally, comparisons need to be made in the quality of trials and the treatment effects of trials reported in Arabic with those reported in English to determine whether there might be differences which could lead to bias being introduced into reviews based exclusively on English language reports<sup>8</sup>.

## **CONCLUSION**

**The handsearching programme of the newly established Bahrain Branch of the UK Cochrane Centre is already providing a valuable and unique contribution from the Arab region to the global effort by The Cochrane Collaboration. This will help to close the gap between the number of reports of trials that exist and the number of reports of trials accessible to authors of Cochrane reviews and others needing to make informed decisions about the effects of healthcare interventions. It will also contribute to a more comprehensive assessment of the biomedical research output of Arab countries.**

**The handsearch of this first journal in the programme, should help reviewers to minimize the effects of publication bias by providing reports of trials not previously identified. Although these journals are indexed in EMBASE, the handsearch has ensured that reports of trials will not remain 'buried' because of inconsistent indexing (indexing bias).**

## **Disclaimer**

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