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REVIEW ARTICLE

Significant discrepancies were found in pooled estimates of searching with Chinese indexes versus searching with English indexes

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Abstract

Objective: To assess the impact of search strategies for a different language on systematic review results, using English index searches versus Chinese index searches for Chinese literature pertaining to cerebral palsy (CP) as an example.

Methods: We conducted two parallel searches with the same search strategy. Both searches looked for studies published in the Chinese language that examined risk factors for CP. The first was conducted in standard English indexes and the second was in standard Chinese indexes. We compared the results using the two searches using a Z-test. Egger's test and Begg's test were used to assess the potential publication bias.

Results: Using the English indexes, nine studies were identified. Using the identical search and inclusion/exclusion criteria in the Chinese indexes, 17 studies were returned. The association between intracranial hemorrhage and CP was much stronger in the studies found in the search by the English indexes (odds ratio [OR] 61.73, 95% confidence interval (CI) 19.48−195.61) than the results from studies identified by the Chinese indexes (OR 9.57, 95% CI 2.42−37.88). The association between hypertension and CP was not significant in studies found using the English indexes (OR 1.67, 95% CI 0.34−8.30) but was significant in studies identified by searching the Chinese indexes (OR 2.25, 95% CI 1.06−4.77). Egger's test suggested that, for the risk factor of preterm birth, some small studies with negative results might have been missed by the search using the English indexes (Egger's test: $P = 0.00$).

Conclusions: Searching Chinese literature using English indexes has the potential to fail to identify a substantial number of publications. This bias can result in significant discrepancies in the pooled estimates of risk factors for CP.

Keywords: Cerebral palsy; Risk factor; Systematic review; Meta-analysis; Literature searching; Chinese

1. Introduction

Cerebral palsy (CP) is a complex syndrome characterized by movement disorders or posture problems and is the most prevalent physical disability in childhood [1]. CP usually appears in early childhood and leads to lifelong disability. The reported prevalence of CP varies by region and population. In the United States, about 8,000 to 10,000 infants are diagnosed annually with CP [2]. Tess et al. found that the risk profiles for CP were similar in Asian and white populations [3]. In China, the incidence of CP for children aged <7 years is 1.58 per 1,000 children; however, the incidence of CP after preterm birth is 35.13 per 1,000 children [4]. It is estimated that 3,10,000 children are diagnosed with CP each year in China. The corresponding prevalence of CP is, therefore, 2.8 per 1,000 children, which is higher than the reported rates

Conflict of interest: None.

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What is new?

Key findings

- The search of studies on the risk factors of cerebral palsy (CP) published in Chinese literature with major English indexes without the search of studies with major Chinese indexes missed a significant number of studies, which resulted in major differences in meta-analysis and affected the completeness and comprehensiveness of systematic review.

What this adds to what was known?

- Although the major English databases such as Medline and Emabe can serve as the primary source for literature searching, with the rapid development of non-English indexes such as Chinese indexes, the importance of non-English indexes in systematic review should be considered.

What is the implication and what should change now?

- Strategies to incorporate major English indexes search with major non-English indexes search need to be developed to ensure the accuracy and completeness of systematic reviews.

in most countries [5]. Families with a child with CP face a tremendous economic burden, which also affects the whole society. Public policy to improve preventive and rehabilitative services is increasingly needed to alleviate this substantial burden [6]. The etiology of CP remains complex and poorly understood. A number of risk factors, such as low birth weight, malformations, and maternal and neonatal complications, have been identified by previous studies [7−9].

Systematic review is used to identify, select, assess, and synthesize all research evidence that is related to a research question. Search for all relevant literature, including non-English literature, is been considered the cornerstone of systematic review. Most systematic reviews are conducted using English indexes such as Pubmed and Embase. When a non-English literature search is undertaken, the most common practice is to search English electronic sources for articles published in different languages. The Literatura Latino Americana e do Caribe em Cie\widehat ncias da Saúde (LILACS) database, which indexes predominantly Spanish and Portuguese languages materials, was shown to improve the quality of systematic reviews [10,11]. The Chinese indexes, which make up the second largest biomedical literature after the United States, include China National Knowledge Infrastructure (CNKI), Chinese Biomedical Literature Database (CBM), Wanfang Data (Wanfang), and VIP Information (VIP) [12]. However, less than 6% of the Chinese literatures were found in English language indexes [13]. The overall impact of performing non-English language literature searches in English indexes such as MEDLINE has seldom been documented [14,15]. It is conceivable that non-English literature may not be captured in English indexes, and the validity and accuracy of evidence could be undermined by searching English indexes for non-English literature.

To the best of our knowledge, no systematic review has compared English search engine retrieval of non-English literature with other language information retrieval tools. The aim of this study was to assess the impact of using search strategies for different languages on systematic review results, using English index searches and Chinese index searches for Chinese literature pertaining to CP as an example.

2. Methods

2.1. Selection of index for searching

For English indexes, MEDLINE (1946−2014.2) and Embase (1974−2014.2) were selected to identify articles, with a supplementary search of gray literature using ‘‘Open SIGLE’’ and ‘‘Health Management Information.’’ For Chinese indexes, CNKI (http://www.cnki.net), CBM (http://www.sinomed.ac.cn/), Wanfang (http://www.wanfangdata.com), and VIP (http://www.cqvip.com) were chosen by recommendation of medical informatics specialists in China. Our searches of the Chinese indexes were updated to February 2014. These indexes are considered the most comprehensive medical research index databases for Chinese publications.

2.2. Search strategy

Two of the authors (J.X. and W.C.) and a librarian developed the search strategy. Search terms included ‘‘cerebral palsy,’’ ‘‘risk factor,’’ ‘‘case control,’’ and ‘‘cohort’’ with limits of Chinese language. As CNKI, CBM, Wanfang, and VIP databases support both Chinese search terms and English language search terms, we applied English-written search strategy for the Chinese indexes (Appendix A at www.jclinepi.com). We also contacted the corresponding author via e-mail if we had no access to the full article.

2.3. Study selection

Studies met the following criteria were included in our review: (1) observational design (eg, cohort study, case-control, or cross-sectional study); (2) studies aimed at identifying risk factors for cerebral palsy; (3) relative risk (RR) (odds ratio [ORs], risk ratio, or hazard ratio), and 95% confidential interval (CI) were reported. We excluded reviews, case reports, conference abstract, letter, nonhuman studies, or studies with crude RR reported only.