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# How to write an introduction and methods of a systematic review of literature

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## How to write an introduction and methods of a systematic review of literature

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Writing systematic review in English language is challenging for those whose first language is other than English and those who are not primarily trained on writing skill such as medical doctors.<sup>1</sup> The guidelines to write and publish a systematic review are usually specific to scientific journals or such research groups that publish systematic reviews. Systematic reviews are accepted in most of the medical journals. The top 100 most cited systematic reviews in medical sciences research between 1977 and 2008 have mainly been published in Journal of American Medical Association (JAMA), British medical journal (BMJ) and the Lancet.<sup>2</sup> These journals provide guidelines on how to write systematic reviews. There are online resources that promote quality, transparency and standardization on methods of conducting and publishing systematic reviews e.g. The Cochrane review of the Cochrane collaboration; Prospero: International Prospective register of systematic reviews of the center of review and Dissemination of University of York, England; and PRISMA" Preferred reporting items of systematic reviews. In this article a review on methods to write the "introduction and methods sections" of the systematic review is provided.

Two international groups have developed guideline for reporting systematic reviews, known as PRISMA statement and Cochrane handbook on conducting and dissemination the systematic reviews. The PRISMA statement requires that introduction of systematic review should have two parts namely rationale (what is already known in the context) and objective that is a statement to address a particular question.<sup>3</sup>

The Cochrane guidelines on writing the introduction of the systematic review require splitting the introduction of systematic review into four sub headings/parts. The first part should provide short description of the medical problem its importance in terms of disease burden and policy relevance. The second should describe the intervention under consideration with all possible alternatives. This may also include key features of

intervention such as its clinical presentation and management. The third part of the introduction may include the efficacy of the intervention/therapy on the target population. The last part of the introduction may provide justification to carry out the systematic review. It should identify how much is already known and what needs to be known.<sup>4</sup>

For writing the methods section of the systematic review the Cochrane guideline and PRISMA are quite explicit. Both of these guidelines have recommended headings (but not mandatory) to be covered in the methods part. It requires that method section should be written in past tense. In Cochrane review there are 11 sections in the methods section of the systematic review. The PRISMA guidelines require that methods section should be split into 10 sub-headings. Both guidelines have some common features such as 1) Study selection criteria data 2) collection/extraction, summary measures of treatment effect 3) how reporting bias/ Risk of bias would be addressed and 4) methods on data/ results syntheses including/excluding meta-analysis.

The Cochrane review reporting guidelines on method are more inclined to rigor in the methods used, for example it requires to provide methods on sub-group analysis to deal with heterogeneity of outcomes and sensitivity analysis to check the robustness of results. The PRISMA checklist on the other hand strives to ensure transparency and validity of results by requiring protocols and their registration and mentioning information sources and date of search. Possibly Cochrane publishes reviews only if their protocol are already registered with Cochrane review.

Medical journals such as JAMA and BMJ etc. encourage authors to use PRISMA guidelines for writing systematic reviews. Unlike the abstract and overall word limit for original research articles by different journals, there is no set forth word limit for the introduction. The Cochrane systematic review word limit is 10000 words. It suggests that the introduction should be concise and preferably on one printed page. For research articles in British Medical Journal (BMJ), The Lancet, New England Journal of Medicine (NEJM) and Journal of American Medical Association (JAMA) the word limit is 4000, 3000, 2700 and 3500 words respectively. Except in BMJ that requires a

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brief introduction, the other journals do not specify any guidelines for the introduction part of the research articles. On writing an introduction for clinical reviews (words limit 1800-2000 words) BMJ specified word limit is 100-150 words (5%-7% of the words limit of the article).<sup>1</sup>

For the purpose of providing some direction on how to write introduction of a systematic review, the introduction part systematic review was reviewed for word limits, number of citations, number of paragraphs and grammar etc. The top seven from a list of 50 most accessed systematic reviews in English language from Cochrane review were selected for this purpose.<sup>5-11</sup> The findings of this review are given in Table-1.

In writing introduction third person singular is commonly used in this review. On other aspects of introduction there is no agreement on number of paragraphs, word limits and citations. The word count of introduction varies between 3%<sup>11</sup> and 21%<sup>6</sup> of the total word counts of the main text. Number of citations and number of paragraphs in introduction of the systematic reviews are also in wide ranges of 5<sup>6</sup>-44<sup>6</sup> and 4<sup>11</sup>-13<sup>8</sup> respectively (Table-1). This wide variation in the contents of the systematic reviews that were reviewed here is due to writing style of the authors and nature of diseases and intervention to be reviewed. For example Taylor et al, (2013) wrote almost 400 words on the type and prevalence of CVDs while the topic of the review was Statins for prevention of CVD. On the other Jefferson et al (2010) wrote the introduction/background precisely i.e. with 872 words and five citations.

In the wake of variation on methodology on writing the introduction and methods of systematic review, the researchers intending to write systematic reviews should follow general (e.g. PRISMA) or specific guidelines (Cochrane guidelines on writing Systematic review) provided by the publishers of systematic reviews. They may also consider other peer reviewed sources on medical writing that provide some insight on how to write introduction of a research article. For instance on writing a research paper Alexandrov (2003) suggested that the introduction should be written in a maximum of three paragraphs.<sup>12</sup> For the methods part Alexandrov (2003) suggested to mention data collection methods and analysis techniques in the method part.

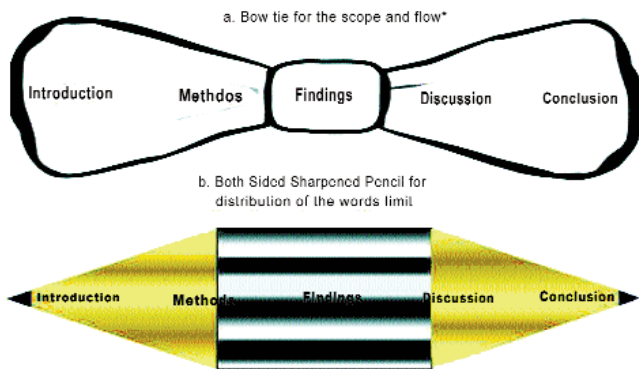
For writing research papers the bowtie approach provided by BMJ student is a good explanation of flow of research articles<sup>13</sup> i.e. general to specific and then to general. While for word distribution in different parts of the systematic review the authors may use "both sides sharpened pencil" approach for writing the systematic review. These two approaches are illustrated in Figure below. The author may start with general statements about the systematic review and then move to specific importance of the systematic review carried out. On the word limit of introduction we may conclude that introduction and conclusion should not exceed 20% of had the word counts of manuscript.

For citations in the introduction the author may consider citation limits given by the respective journals. The common

**Table:** Review of background/introduction part of systematic reviews published by Cochrane review from the list of top 50 most-accessed abstracts of systematic reviews in past 3 months.

Authors/Topic	Trials/ studies reviewed	Approximate word count of main text	Review of background/introduction			Review of Methods section		
			Word count	citations	Number of paragraphs	Grammar*	Word Counts	citations
Jefferson et al, 2010 <sup>5</sup> / Influenza vaccine	50	7456	872	5	5	TPS/P, SPP	2026	6
Taylor et al, 2013 <sup>6</sup> / Statins for prevention of CVD	18	7118	1485	44	10	TPS/S	1210	7
Cooney et al, 2013 <sup>7</sup> / Exercise for Depression	39	14054	1424	33	6	TPS/P	3120	11
Hemilä et al 2013 <sup>8</sup> / Vitamin C for cold	29	12006	1657	34	13	TPS/P	2099	26
Sandall et al, 2013 <sup>9</sup> / Midwife led continuity model for care of women in childbearing age	13	9185	1140	21	7	TPS/P	2186	6
Singh et al, 2013 <sup>10</sup> / Zinc for common cold	18	11874	1279	16	6	TPS/P, FPP	1601	7
Götzsche et al, 2013 <sup>11</sup> / Mammography for breast cancer screening	8	13571	392	44	4	TPS/P, FPP	722	1

\*First/second/third person singular or plural i.e. FPS/P,SPS/P,TPS/P.



\*adopted from Udani R.D. et al. Student BMJ 2007; 15: 383-426

**Figure:** Flow and distribution of words limit of systematic review article.

practice for citation for the review articles in case of many journals is between 25-30 citations or in some cases a maximum of 40 citations. For Cochrane systematic review there is no limit on citations. However as a common practice for citation in the introduction the author may choose only a few references. They could cite such citations in the introduction that would be referred repeatedly so as to keep more citations for the methods, findings and discussion parts of the manuscript. Number of citations in the method section the in the systematic reviews given in Table vary from 1-26 citations. This could be due to complexity of methods applied in some of the systematic reviews. For instance Hemila et al (2013) systematic review was update of two earlier reviews on the same topic. They reviewed 29 placebo control trials so they might need more details on methods. On the other hand Gøtzsche et al, 2013 reviewed only 8 studies and their methods were more brief than Hemila et al (2013). They did not mention conducting subgroup analysis or sensitivity analysis in their methods section of the review.

The findings on writing introduction and methods of systematic review are not conclusive. However it does provide a reasonable insight on how to write these two important sections of the systematic review. This is particularly important for students in medical research and early career researchers to build their writing skill on the feature of introduction and methods section of systematic reviews discussed here.

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