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## The reporting quality of systematic reviews and meta-analyses in vascular surgery needs improvement: A systematic review

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## HIGHLIGHTS

- The PRISMA guidelines (2009) provide authors with a 27-item checklist of items that need to be reported when publishing a systematic review.
- We assessed the quality of reporting of systematic reviews relating to vascular surgery, before and after the publication of PRISMA.
- We assessed the quality of reporting of systematic reviews relating to vascular surgery, before and after the publication of PRISMA.
- More effort is required on the part of authors and journal editors/reviewers to insist that the PRISMA guidance is followed.

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## ABSTRACT

**Introduction:** Systematic reviews and meta-analyses are important in shaping clinical practice, but the underlying quality of these studies is critical. The PRISMA guidelines for the reporting of systematic reviews, published in 2009, aimed to improve the quality of reporting of these studies. We looked at whether the reporting of systematic reviews relevant to vascular surgery had improved since the introduction of these guidelines. **Methods:** All systematic reviews and meta-analyses published in the top five general and top five vascular surgery journals in the years 2008 (pre-PRISMA) and 2012 (post-PRISMA) were included. We examined the proportion of concordance of each individual paper with the 27 PRISMA statements. **Results:** A total of 74 studies were found ( $n = 37$  in 2008,  $n = 37$  in 2012), most of which were found in the specific vascular surgery journals. The average proportion of concordance of systematic reviews to the PRISMA guidance increased between 2008 and 2012 (from 65% to 73%,  $p < 0.01$ ), indicating some improvement in reporting quality. **Discussion:** Since the publication of the PRISMA guidance, there has been a marginal improvement in the quality of reporting of systematic reviews and meta-analyses in the field of vascular surgery. However, given the importance of these studies, this needs to be improved, especially as poor reporting may reflect poor methodology in conduct. Journals' instructions to authors should insist on submissions following the published guidance, and this intervention would likely improve both the methodology and quality of reporting of published systematic reviews.

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## 1. Introduction

Systematic reviews and meta-analyses provide the highest quality of scientific evidence, and are important resources in shaping our clinical decision-making [1]. Given the plethora of studies being published in the biomedical literature, these reviews are becoming increasingly important, since they rigorously

summarise the results of many trials, and have the ability to improve the accuracy of the answer of a given research question, allowing clinicians to locate and interpret results of primary studies. However, as with any type of research, these studies themselves may be flawed in several different ways especially in their methodology; thus, results from systematic reviews or meta-analyses should be interpreted with caution.

The lack of standardization and poor quality of reporting among systematic reviews and meta-analyses had led to the development of the QUOROM statement (Quality of Reporting of Meta-analyses) in 1999, and its subsequent evolution into the PRISMA statement

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(Preferred Reporting Items for Systematic Reviews and Meta-analyses) in 2009 [2,3]. The PRISMA statement is an internationally-recognised document which contains a checklist of 27 items, and a four-phase flow diagram [4]. The items included within this checklist were deemed to be crucial in ensuring transparent and comprehensive reporting of systematic reviews and meta-analyses [5].

The introduction of the PRISMA statement was thought to be a stepping stone towards better reporting; however, the quality of reporting systematic reviews and meta-analysis remains well short of ideal. In the field of orthopaedic surgery, one study analysed the methodological quality of relevant studies which were published in the top five highest impact factor orthopaedic journals and found that only 68% of items within the PRISMA statement were reported [6].

Although many systematic reviews are being published in the field of vascular surgery, there is as yet no assessment of the quality of reporting in this field. The aim of this study was to investigate the quality of reporting systematic reviews and meta-analyses relevant to vascular surgery, before and after the introduction of the most recent PRISMA statement, and to compare articles from both these points to determine if there was any improvement.

## 2. Methods

### 2.1. Study selection

The eligibility criteria for the inclusion of articles were defined *a priori*. Studies were included only if they met the following inclusion criteria: 1) the study had to be a systematic review, with or without a meta-analysis; 2) the study had to be published in either 2008 (pre-PRISMA) or 2012 (post-PRISMA, chosen to allow time for the incorporation of these guidelines into new studies and journals' instructions to authors); and 3) the study had to be related to the field of vascular surgery and published either in the top five journals relating to surgery in general, or the top five vascular surgery journals as determined by the Institute for Scientific Information (ISI) Thompson Reuters Journal Citation Reports (accessed December 2013).

The top five general surgery journals were: *Annals of Surgery*, *British Journal of Surgery*, *Journal of the American College of Surgeons*, *Archives of Surgery and Surgery*. The top five vascular surgery journals were: *Journal of Vascular Surgery*, *European Journal of Vascular and Endovascular Surgery*, *Journal of Endovascular Therapy*, *Annals of Vascular Surgery and Vascular and Endovascular Surgery*. The contents lists of all of these journals were individually searched, and the abstracts read, including all volumes published in either 2008 or 2012; a list of all relevant systematic review was thus made (W.K.T.). When the inclusion of a particular study was uncertain, a decision was reached following discussion with another author (S.S.).

### 2.2. Data extraction and analysis

All collated studies were then read and analysed for concordance according to the PRISMA statement. Each item in the PRISMA checklist was labelled as 'yes' or 'no', depending whether or not the requirements of that particular item had been satisfied. In this study, the assessment of studies was performed independently by two authors (W.K.T. and S.S.). Disagreements between authors were resolved through discussion along with a third author (J.W.) until a consensus was reached.

The extracted data were recorded on a purpose-designed spreadsheet using Microsoft Excel (Redmond, Washington). The proportions that each PRISMA item that were fulfilled were also

calculated using this software. Statistical comparisons between the proportions of two groups were performed with the Z-test, using GraphPad Prism v6 (GraphPad Software, California).

## 3. Results

The ISI Thompson Reuters Journal Citation Reports® were searched to determine the five-year impact factor of the top five general surgical and vascular surgical journals (Tables 1 and 2). The journal *Vascular and Endovascular Surgery* did not have a 5-year impact factor, however, its 2012 impact factor was the fifth highest among vascular surgical journals, and hence, this journal was selected for inclusion within this review. In total, 74 papers met our pre-defined eligibility criteria and were included for analysis, with 37 systematic reviews being identified in both years; 2008 and 2012.

Based on our data, it can be seen that only a small proportion of systematic reviews with a vascular surgical theme were published in the general surgery journals (2/37 in 2008, 7/37 in 2012), with the majority being published in vascular surgical journals. Another obvious trend noted was that systematic reviews were more likely to be published in journals with a higher impact factor (possibly as they are deemed to provide better-quality evidence). Among the 35 studies published in vascular surgery journals in 2008, 33 were published in either the *Journal of Vascular Surgery* or the *European Journal of Vascular and Endovascular Surgery*, which were the top two vascular surgery journals. The same trend was also noted, although to a lesser extent, in 2012, where 22 of the 31 systematic reviews were published in the top two vascular surgery journals.

### 3.1. Concordance with the PRISMA statement

The quality of reporting of systematic reviews and meta-analyses were assessed using the PRISMA statement. Data were stratified by journal and year of publication (2008 or 2012). A summary of these are found below (Table 3). In 2008, the *British Journal of Surgery* had the highest reporting of PRISMA items among the general surgical journals, in which 70% of items were reported. Among the vascular surgery journals, the *Journal of Vascular Surgery* had the best concordance, with an average of 78% of PRISMA items reported. Among the general surgical journals in 2012, the *Archives of Surgery* had the highest quality of reporting items from the PRISMA checklist, in which PRISMA items were reported 89% of the time. Among vascular surgical journals, the *European Journal of Vascular and Endovascular Surgery* had the best reporting quality with an average of 77% items being reported. Overall, systematic reviews published in 2012 related to the field of vascular surgery reported an average of 73% of the items on the PRISMA statement.

The range of PRISMA items fulfilled among journals varied from 52%–78% in 2008 to 63%–89% in 2012. The average percentage of

**Table 1**

Five-year impact factor and number of studies included in the top five general surgery journals.

Journal	5-year impact factor	Number of studies included	
		2008	2012
<i>Annals of Surgery</i>	8.3	1	0
<i>British Journal of Surgery</i>	5.0	1	6
<i>Archives of Surgery</i>	4.8	0	1
<i>Journal of the American College of Surgeons</i>	4.5	0	0
<i>Surgery</i>	3.9	0	0
TOTAL		2	7

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