
Research Article

Open Access, Volume 1

Reporting Guidelines in Orthopaedic Journals: Can We Do More to Promote Adoption? A Systematic Review

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Abstract

Introduction: Reporting guidelines have been developed as tools to improve research practices and minimise bias in reporting. Past studies have shown the adoption of reporting guidelines by journals in different fields to be variable, but generally poor. The aim of this study was to evaluate the policies of orthopaedic journals regarding reporting guidelines and checklists, and requirements for publication.

Methods: A systematic review of the 76 journals in the orthopaedic category of Journal Citation Report 2016, using the online instructions for authors for each journal, was undertaken. Two authors independently extracted data identifying mention of any reporting guideline in the EQUATOR database, strength of recommendation and whether the relevant checklist was required to be submitted.

Results: 73 journals were included; two had changed name and were therefore included twice in the list and one published instruction for authors in German language only.

48% of journals made no reference to any reporting guideline. Only 12% required adherence to at least one guideline for publication of articles of the relevant study type (any guideline). CONSORT, for reporting of randomised clinical trials, was the most frequently mentioned, in 46.6% of journals with 15% requiring a completed CONSORT checklist.

Discussion: Reporting guidelines are not mentioned at all by almost half of orthopaedic journals, and adherence is required by few. Adherence to internationally agreed guidelines may improve the quality and transparency of published research, and reduce bias. The responsibility of accuracy of articles ultimately lies with authors, however a requirement by journals to adopt guidelines and submit completed checklists may improve transparency and conformity of reporting, and reduce outcome-reporting bias.

Keywords: Guidelines; Orthopaedic journals

Manuscript Information: Received: August 10, 2020; Accepted: September 14, 2020; Published: September 17, 2020

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Citation: Faroug R, Whittaker M. Reporting Guidelines in Orthopaedic Journals: Can We Do More to Promote Adoption? A Systematic Review. *J Surgery*. 2020; 1(3): 1013.

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Introduction

Reporting guidelines specify a minimum set of essential information required for a complete, transparent and clear account of what was done and what was found in a research study, focusing in particular on aspects that might introduce bias into the research. Usually in the form of a checklist, flow diagram or specific text, most internationally recognised guidelines are based on empirical evidence and reflect consensus opinion of experts, including methodologists and journal editors, and complement general advice on scientific writing and journals' instructions to authors.

The first reporting guideline published was the CONSORT statement in 1996 [3] (Table 1); there has been a rapid increase in guideline development since.

Guidelines are intended to improve reporting of research, and promote reproducible, transparent, comprehensive, concise, accurate well written manuscripts and improve communication of research findings to the scientific community.

Guidelines are designed to do just that- provide guidance for study design and conduct, and do not aim to be absolutely prescriptive, promote uniformity or stifle creativity in writing. Not all items in a guideline will apply to every study of a particular type, and are flexible to accommodate reporting of a wide range or research areas and experimental protocols.

The EQUATOR (Enhancing the Quality and Transparency of Health Research) Network was launched in 2008 as an international initiative aiming to enhance the reliability of health research literature by promoting transparent and accurate reporting of research studies, including the wider use of robust reporting guidelines[1]. This is was the first coordinated attempt to tackle inadequate reporting in health research systematically and on a global scale, collating and advancing previous work done by isolated groups.

The EQUATOR Network serves as an umbrella organization for reporting guidelines, assists in the development, dissemination, and implementation of robust reporting guidelines. There are currently 405 in the EQUATOR database (as of October 2018) [2].

Reporting guidelines are available for most study types, and have been developed for authors to improve the reliability and quality of published health research literature. Adoption of reporting guidelines may improve transparency, accuracy and fairness in the reporting of research; helping researchers and healthcare providers clearly interpret and assess the integrity of study results. Guideline adoption may also reduce outcome reporting bias (where relevant to the study type).

Guidelines range from generic recommendations for a particular study design, for example CONSORT [3] for randomised controlled trials, PRISMA [4] for systematic reviews and STROBE [5] for observational studies (see table), to more narrow guidance focused on a specific medical condition, investigation or treatment, for example REMARK (Reporting recommendations for tu-

mour MARKer prognostic studies) [6], or section of the report (eg SAMPL, Statistical Analyses and Methods in the Published literature) [7].

The aim of this systematic review is to analyse the usage of reporting guidelines in orthopaedic journals, and the strength of recommendation in the instructions for authors.

Methods

We conducted a systematic review of orthopaedic journals' instructions for authors to examine rates of guideline mention, strength of recommendation and requirements for submission of checklists. PRISMA guidelines for systematic review [4] were applied where relevant.

Journals included in the orthopaedics category of the Journal Citation Reports (Thomson Reuters, New York) for 2016 were included. The only exclusion criteria were duplicate entries or journals not published in English (bilingual journals were included provided one language was English).

76 journals were listed in the Journal Citation Reports for 2016; two journals had changed their name and therefore were included in this list twice, and one had author instructions in German only. These three were therefore excluded from the review, leaving a total of 73.

We performed a web-based data extraction from the 'Instructions for Authors' for the 73 orthopaedic journals included. Instructions for Authors for each journal were accessed online, and assessed independently by two authors (MW and RF). Data were extracted and populated into pre-formatted Microsoft Excel spreadsheets, then the two compared for any discrepancies. Authors were blinded to one another's data until completed. Where discrepancies occurred, the instructions for authors were revisited and checked.

Any reporting guideline mentioned in the Instructions for Authors were included.

The following data were extracted for each journal: journal title, reporting guidelines mentioned, strength of recommendation (whether required by the journal for publication or adherence recommended, including exact wording used), reporting guideline checklist required, impact factor and country of publication.

Journals were said to require adherence to guidelines if the wording included 'require' or 'must'. Where the wording included 'suggest', 'encourage', 'should', 'recommend' or 'please follow' the journals were said to advise adherence to guidelines, but this not a requirement for publication in that journal.

We classified geographic location as North America, the United Kingdom, Europe (excluding the UK) and 'other'.

Table 1: Reporting guidelines mentioned in Orthopaedic Journals in Journal Citation Report 2016. Details from Equator Network.

Guideline	Full Title	Applicable to	First Published
CONSORT	Consolidated Standards of Reporting Trials	Randomised Trials	1996
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses	Systematic Reviews	2009
ARRIVE	Animal Research: Reporting In Vivo Experiments	Animal Studies	2010
STROBE	The Strengthening the Reporting of Observational Studies in Epidemiology	Observational Studies	2007
STARD	Standards for Reporting Diagnostic Accuracy	Diagnostic/Prognostic Studies	2003
CARE	CAsereport Guidelines	Case Reports	2013
SQUIRE	Standards for Quality Reporting Excellence	Quality Improvement Studies	2008
SPIRIT	Standard Protocol Items: Recommendations for Interventional Trials	Study Protocols	2013
MIAME	Minimum Information About a Microarray Experiment	Microarray Experiments	2001
TREND	Transparent Reporting of Evaluations with Nonrandomized Designs	Nonrandomised Trials	2004
TIDieR	Template for intervention description and replication	Interventional Studies	2014
SRQR	Standards for Reporting Qualitative Research	Qualitative Research	2014
COSMIN	COnsensus-based Standards for the selection of health status Measurement INSTRUMENTS		2010
SCRIBE	Single-Case Reporting guideline In BEhavioural interventions	Reporting Single Case Research	2016
MOOSE	Meta-analysis Of Observational Studies in Epidemiology	Meta-analyses of Observational Studies	2000
STREGA	STrengthening the REporting of Genetic Association studies	Genetic Association Studies	2009
GRRAS	Guideline for Reporting Reliability and Agreement Studies	Reliability and Agreement Studies	2011

Table 2: Total number of journals making mention of each guideline, and whether this was a recommendation, or a requirement for publication in the journal. Number of journals requiring a completed checklist for that guideline. Guidelines with no mention in any orthopaedic journal are not included.

Guideline	Mentioned	Advised	Required	Checklist required
CONSORT	34 (46.6%)	26 (35.6%)	8 (11%)	11 (15.1%)
PRISMA	20 (27.4%)	14 (19.2%)	6 (8.2%)	7
STROBE	17 (23.3%)	13 (17.8%)	4 (5.5%)	4 (5.5%)
STARD	9 (12.3%)	8 (11%)	1 (1.4%)	3 (4.1%)
ARRIVE	6 (8.2%)	4 (5.5%)	2 (2.7%)	1 (1.4%)
MOOSE	4 (5.5%)	3 (4.1%)	1 (1.4%)	2 (2.7%)
SPIRIT	4 (5.5%)	3 (4.1%)	1 (1.4%)	0
SQUIRE	3 (4.1%)	3 (4.1%)	0	0
CARE	2 (2.7%)	1 (1.4%)	1 (1.4%)	1 (1.4%)
TREND	2 (2.7%)	1 (1.4%)	1 (1.4%)	1 (1.4%)
GRRAS	2 (2.7%)	2 (2.7%)	0	0

MIAME	1 (1.4%)	0	1 (1.4%)	1 (1.4%)
TIDieR	1 (1.4%)	1 (1.4%)	0	0
SRQR	1 (1.4%)	1 (1.4%)	0	0
COSMIN	1 (1.4%)	1 (1.4%)	0	0
SCRIBE	1 (1.4%)	1 (1.4%)	0	0
STREGA	1 (1.4%)	1 (1.4%)	0	0

Table 3: Journals included in the orthopaedics category of the Journal Citation Reports, the number of guidelines mentioned in the instructions for authors, and the 2016 impact factor for the journal.

Title	Total mentioned	IF 2016
American Journal of Sports Medicine	2	5.673
Journal of Bone and Joint Surgery (American)	3	4.84
Osteoarthritis and cartilage	5	4.742
Arthroscopy	1	4.292
Journal of Physiotherapy	2	4.083
Clinical Orthopaedics and Related Research	3	3.897
Acta Orthopaedica	5	3.446
Knee Surgery Sports Traumatology Arthroscopy	0	3.227
Journal of Arthroplasty	1	3.055
Spine Journal	5	2.962
Bone and Joint Journal	0	2.953
Journal of Orthopaedic and Sports Physical therapy	4	2.825
Journal of the American Academy of Orthopaedic Surgeons	0	2.782
Physical Therapy	11	2.764
journal of Shoulder and Elbow Surgery	3	2.73
Journal of Orthopaedic Research	1	2.692
Bone and Joint Research	6	2.597
European Spine Journal	3	2.563
International Orthopaedics	0	2.52
Spine	2	2.499
Gait and Posture	0	2.347
Journal of Orthopaedic Trauma	3	2.251
Journal of Hand Surgery- European Volume	2	2.191
Clinical Journal of Sport Medicine	0	2.189
Journal of Spinal Disorders and Techniques	1	2.042
Cartilage	0	2
Knee	4	1.976
Archives of Osteoporosis	0	1.96

Archives of Orthopaedic and Trauma Surgery	1	1.942
Injury- International Journal of the Care of the Injured	1	1.894
Clinical Biomechanics	1	1.874
Foot and Ankle International	0	1.872
Connective Tissue Research	0	1.832
Orthopedic Clinics of North America	0	1.82
BMC Musculoskeletal Disorders	3	1.739
Skeletal Radiology	1	1.737
Journal of Pediatric Orthopaedics	0	1.695
Journal of Knee Surgery	0	1.657
Journal of Hand Surgery- American Volume	4	1.606
Journal of Orthopaedic Surgery and Research	1	1.545
Orthopaedics and Traumatology- Surgery and Research	0	1.468
Journal of Foot and Ankle Research	1	1.405
Foot and Ankle Surgery	1	1.348
Physician and Sportsmen	0	1.292
Orthopaedic Surgery	1	1.237
Brazilian Journal of Physical Therapy	3	1.226
Prosthetics and Orthotics International	1	1.185
Journal of Hand Surgery	5	1.159
Orthopedics	0	1.143
Journal of Orthopaedic Science	1	1.133
Joint Diseases and Related Surgery	0	1.101
Hip International	6	1.055
International Journal of Shoulder Surgery	0	0.98
Foot and Ankle Clinics	0	0.979
Operative Orthopadie und Traumatologie	0	0.977
Journal of Back and Musculoskeletal Rehabilitation	0	0.912
Journal of Foot and Ankle Surgery	2	0.907
Hand Clinics	0	0.904
Journal of Plastic Surgery and Hand Surgery	0	0.901
Journal of Orthopaedic Surgery	2	0.816
Indian Journal of Orthopaedics	1	0.79
Clinics in Podiatric Medicine and Surgery	0	0.726
Journal of the American Podiatric Medical Association	0	0.67
Journal of Paediatric Orthopaedics- Part B	0	0.638
Orthopade	0	0.629
Acta Orthopaedica et Traumatologica Turcica	0	0.599

Acta OrthopaedicaBelgica	0	0.576
Acta ChirurgiaeOrthopaedicae et TraumatologiaeCechoslovaca	0	0.56
Acta OrtopedicaBrasileira	0	0.538
Orthopaedic Nursing	0	0.375
Sportverletzung- Sportschaden	0	0.347
Isokinetics and Exercise Science	0	0.241
Clinical Spine Surgery	1	-
Hand Surgery and Rehabilitation	0	-

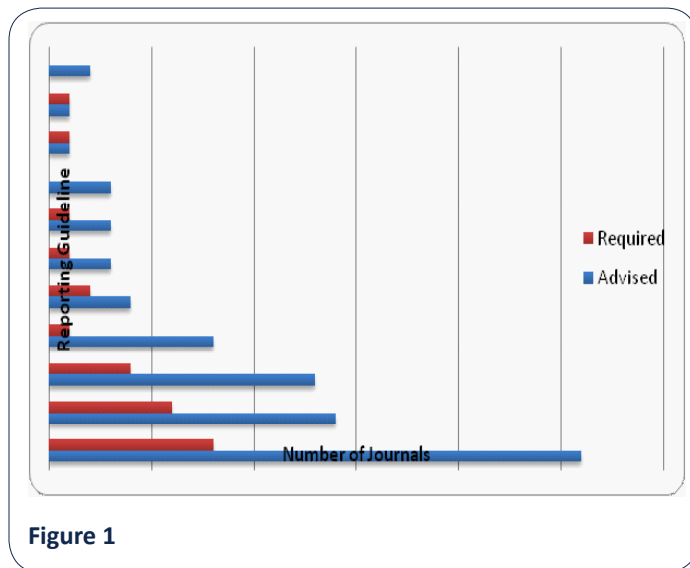


Figure 1

Results

Seventy-six journals were identified and 73 included in the analysis, as described. The impact factor of included journals ranged from 0.241 to 5.673 (mean = 1.86, standard deviation = 1.16), with two journals not listing an impact factor at the time of analysis.

Editorial offices were located predominantly in North America (28/73, 38.4%), followed by Europe (excluding the UK) (17/73, 23.3%), the UK (16/73, 21.9%) and other (12/73, 16.4%).

38 journals (52.1%) mentioned at least one guideline in the instructions for authors. Only 9 (12%) required adherence to at least one.

CONSORT, providing guidelines for the reporting of randomised clinical trials, was mentioned more commonly in instructions for authors than any other guideline. Almost half of journals made mention of CONSORT, with 8 (11%) requiring adherence for publication in that journal, and a completed CONSORT checklist to be submitted with the article by 11 (15%). Of those journals not mentioning CONSORT, only four required/advised adherence to other reporting guidelines; this may reflect the scope of these journals and article types published.

After CONSORT, PRISMA (for systematic reviews) and STROBE (for observational studies) were the next most frequently mentioned guidelines, in 20 (27.4%) and 17 (23.3%) of orthopaedic journals respectively.

Again, only a proportion of these mandated the guidelines be followed, or required a completed checklist to be submitted with articles (Table 2).

Many guidelines were mentioned by only one journal; these typically apply to a specific study design and may not be relevant to the majority of articles published in this journal set, including SCRIBE (for single case reporting in behavioural studies), STREGA (for genetic association studies) and MIAME (for microarray studies).

We compared the impact factor of each journal with the number of reporting guidelines mentioned. The impact factor of a journal reflects the number of times articles from that journal are cited.

The number of reporting guidelines mentioned in the Instructions for Authors ranged from 0 to 11, with a median of 1. The data were not normally distributed, with a Shapiro Wilk W score of 0.72 $p=0.000$.

We therefore compared the number of guidelines mentioned to the journal impact factor with Spearman's correlation co-efficient giving a value of 0.488 ($p=0.00001$), indicating a statistically significant positive correlation between number of guidelines mentioned and impact factor.

Discussion

The aim of this review was to evaluate the current state of a specific publication practice in orthopaedic journals, reporting guideline requirements. Overall, just over half (52%) of journals mentioned at least one guideline, however only 9 (12%) required adherence to any reporting guideline. CONSORT was mentioned most frequently, in 47% and a requirement in 11%.

Similar studies of journals in other fields have revealed similar findings. In emergency medicine 59.3% mention one guideline, with CONSORT the most common. In contrast to our study, this was a requirement in 40% of journals [8]. Similarly, in a review of Instructions for Authors in haematology journals, 52% mentioned at least one guideline with CONSORT mentioned most frequently (40%), however with only 10% requiring adherence [9]. In dental journals again approximately half (50.5%) mentioned guidelines with CONSORT mentioned in 45%. This study also found a positive correlation with impact factor.

In a 2008 study of instructions for authors for 165 medical journals found CONSORT to be mentioned in 38% [10]. Endorsement of reporting guidelines by journals appears to be increasing; in 134 surgical journals a statistically significant increase was seen between 2011 and 2014 for CONSORT (30% to 42%) and PRISMA (10% to 19%); no other guidelines were included in this analysis. Again, here a positive correlation was seen with impact factor. CONSORT was an absolute requirement in 33%, however PRISMA in only one journal [11].

The effect of journal endorsement of reporting guidelines on completeness of reporting of health research has not been well studied; as of 2014 only nine reporting guidelines had been evaluated to any extent [12].

CONSORT is the most evaluated reporting guideline, likely due to it being the first published and its relevance to most fields of health research.

There is some evidence that the standard of reporting of clinical trials is improved where CONSORT is adopted, in particular with inclusion of all critical and relevant data [13,14].

In an analysis of reporting in one journal that began mandating adherence to CONSORT, PRISMA and STROBE in 2013, a statistically significant difference was seen in reporting of all three study designs (randomised trials, systematic reviews and observational studies) was seen. More specifically the reporting of study design, outcome definitions and measurement, analyses and discussion of limitations and potential sources of bias improved [15].

However, an analysis of 150 RCTs in surgery showed adherence to still be fairly poor to CONSORT more than 15 years following publication of the guideline, with only 55% of items addressed [16].

The year of publication of guidelines mentioned spanned from CONSORT in 1996 to SCRIBE in 2016. This also likely influenced whether journals required or advised adherence to particular guidelines.

While evidence is lacking, adherence to other more recent guidelines is unlikely to be better.

A small improvement in reporting quality of diagnostic studies has been seen since the introduction of STARD [17].

Reporting guidelines may also be endorsed by journals at the peer-review stage, by requiring or recommending articles to be assessed against items included in the relevant guideline for study type. In an analysis of online instructions for peer-reviewers of 116 journals, 46% mentioned specific guidelines with CONSORT in all but sporadic mention of other guidelines [18].

The importance of the publication of research is not only in distribution of new information, but also providing sufficient details to allow critical appraisal of new findings and further use in clinical or research practice. Only an adequately reported research study can be fully appraised, and used to guide clinical

practice and further research, including review and meta-analysis and clinical guideline development. Published research articles should be fit for these multiple purposes, and adherence to reporting guidelines can encourage clear, transparent and comprehensive reporting.

Many journals now require or advise adherence to some guidelines; however, this is variable, and in order to reach their potential in improving health research reporting these must be used more universally and routinely by authors, editors, and peer-reviewers.

While there is insufficient evidence to determine the relation between journals' endorsement of guidelines and the completeness of reporting of published health research reports, a requirement by journals to adopt guidelines and submit completed checklists may improve transparency and conformity of reporting, and reduce outcome reporting bias.

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