# Research Report

# Survey of the Reporting **Characteristics of Systematic Reviews** in Rehabilitation

Silvia Gianola, Monica Gasparini, Michela Agostini, Greta Castellini, Davide Corbetta, Paolo Gozzer, Linda C. Li, Valeria Sirtori, Mariangela Taricco, Jennifer M. Tetzlaff, Andrea Turolla, David Moher, Lorenzo Moja

S. Gianola, PT, Clinical Epidemiology Unit, IRCCS, Orthopedic Institute Galeazzi, Via R. Galeazzi, 4. 20161 Milan, Italy. Address all correspondence to Ms Gianola at: silvia.gianola@grupposandonato.it.

M. Gasparini, MD, Department of Rehabilitation, Asl Biella, Italy.

M. Agostini, PT, Laboratory of Kinematics and Robotics, IRCCS, Fondazione Ospedale Camillo, Venezia, Italy.

G. Castellini, PT, COF Lanzo Hospital, Lanzo d'Intelvi, Como, Italy.

D. Corbetta, PT, Rehabilitation Department, San Raffaele Hospital, Milan, Italy.

P. Gozzer, PT, APSS Tn, Villa Igea, Trento, Italy.

L.C. Li, PT, PhD, Department of Physical Therapy, University of British Columbia, and Arthritis Research Centre of Canada, Vancouver, British Columbia, Canada.

V. Sirtori, PT, Rehabilitation Department, San Raffaele Hospital.

M. Taricco, MD, Rehabilitation Unit, University Hospital St Orsola-Malpighi Polyclinic, Bologna, Italy.

J.M. Tetzlaff, MSc, Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Ontario, Canada.

Author information continues on next page.

**Background.** Systematic reviews (SRs) have become increasingly important for informing clinical practice; however, little is known about the reporting characteristics and the quality of the SRs relevant to the practice of rehabilitation health professionals.

**Objective.** The purpose of this study was to examine the reporting quality of a representative sample of published SRs on rehabilitation, focusing on the descriptive, reporting, and bias-related characteristics.

**Methods.** A cross-sectional study was conducted by searching MEDLINE for aggregative and configurative SRs indexed in 2011 that focused on rehabilitation as restorative of functional limitations. Two reviewers independently screened and selected the SRs and extracted data using a 38-item data collection form derived from Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The data were analyzed descriptively.

**Results.** Eighty-eight SRs published in 59 journals were sampled. The median compliance with the PRISMA items was 17 (63%) out of 27 items (interquartile ratio=13-22 [48%-82%]). Two thirds of the SRs (n=66) focused on interventions for which efficacy is best addressed through a randomized controlled trial (RCT) design, and almost all of these SRs included RCTs (63/66 [95%]). More than two thirds of the SRs assessed the quality of primary studies (74/88 [84%]). Twenty-eight reviews (28/88 [32%]) meta-analyzed the results for at least one outcome. One half of the SRs reported positive statistically significant findings (46%), whereas a detrimental result was present only in one review.

**Conclusions.** This sample of SRs in the rehabilitation field showed heterogeneous characteristics and a moderate quality of reporting. Poor control of potential source of bias might be improved if more widely agreed-upon evidence-based reporting guidelines will be actively endorsed and adhered to by authors and journals.



A. Turolla, PT, Laboratory of Kinematics and Robotics. IRCCS Fondazione Ospedale San Camillo.

D. Moher, PhD, Clinical Epidemiology Program, Ottawa Hospital Research Institute.

L. Moja, MD, Department of Biomedical Sciences for Health, University of Milan, and Clinical Epidemiology Unit, IRCCS, Orthopedic Institute Galeazzi.

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ystematic reviews (SRs) are a form of knowledge translation used to increase awareness of a problem, develop usable or actionable forms of evidence, inform end users about the evidence, and promote change in practice.1 Cochrane Collaboration<sup>2</sup> defines a systematic review as:

[A] review of a clearly formulated question that uses systematic and explicit methods to identify, select, critically appraise relevant research, and to collect and analyze data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarize the results of the included studies. Meta-analysis refers to the use of statistical techniques in a systematic review to integrate the results of included studies.3(p264)

Their rise as an efficient tool for keeping up-to-date with the accumulation of evidence in clinical content areas, as a background document for clinical practice guidelines, and as a popular publication type for health care journals is now gaining momentum in the professions allied with medicine.4 The rehabilitation field is not an exception. The first SRs relevant to the rehabilitation field were published in the early 1980s.5 Since then, the growth in the number of SRs relevant to the rehabilitation field has substantially increased, although compared with other types of publications, the relative frequency is still low (ie, 3%).6

According to the National Library of Medicine Medical Subject Headings, "rehabilitation" is defined as the "restoration of human functions to the maximum degree possible in a person or persons suffering from disease or injury" and is a cross-sectional topic dealing with a wide spectrum of specialties.<sup>7,8</sup> A very few studies have examined the quality of SRs in this field. Applying the Overview

Quality Assessment Questionnaire (OOAO) quality assessment tool on physical therapy, a branch of rehabilitation on 200 SRs, Moseley et al9 noted an increase in the quality of systematic reviews over time. A limitation of this study was the use of the OQAQ. Although this tool was formally validated,10 it does not reflect current evidence in the reporting on sources of potential bias in systematic reviews (eg, funding source, conflict of interest).11

To improve the reporting of SRs and meta-analyses in 2009, the QUOROM (QUality Of Reporting Of Metaanalyses) statement was renamed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA),3 which has been updated to address several conceptual and practical advances in the reporting of SRs. The reporting of systematic SRs was first assessed in the medical field by Moher et al in 2007.12 They set out to capture a cross-sectional sample of 300 SRs, all published in 2004, and examined them in terms of a broad range of epidemiological and reporting characteristics, including emerging issues not previously examined.12 The quality of reporting in SRs was not optimal. This study is a key milestone in determining the reporting characteristics of SRs of medicine's interventions. 13-18 Complete, accurate, and transparent reporting is an integral part of responsible research conduct. We need more studies to explore limitations of the reporting of crucial information, along with efforts to promote transparent reporting research and the use of reporting guidelines in clinical journals.<sup>19</sup> In the rehabilitation field, no studies have tested the reporting of quality of SRs.

In the current study, we replicated the methods used by Moher et al12 and restricted the eligible SRs to the rehabilitation field. We primarily



- eAppendix 1: Search Strategy
- eAppendix 2: Data Abstraction Form

aimed to assess the quality of reporting of SRs on rehabilitation, describing also how many SRs were published, where they were published, and what questions they addressed.

#### Method

#### **Review Selection**

A review was eligible for inclusion in the study if: (1) the publication type was an SR consistent with the definition used by the Cochrane Collaboration<sup>20</sup> in the PRISMA statement, (2) it was either an aggregative (ie, meta-analysis) or a configurative (ie, qualitative) SR,21 (3) the focus was on rehabilitation as defined by the National Library of Medicine,22 and (4) it was written in English. For instance, we considered an SR to be compliant with our inclusion criteria if it compared 2 rehabilitation interventions or a rehabilitation intervention (eg, manual therapy) with an intervention (eg, anti-inflammatory drug) from another specialty branch (eg, pharmacology). We excluded SRs that focused exclusively on other specialty branches (eg, pharmacology, surgery) without any comparison with rehabilitative interventions (eg, head-to-head comparisons of drugs).

Our search strategy was informed by Montori and colleagues' balanced 5-term search strategy,23 Moher and colleagues' search strategy,12 and the Clinical Query of PubMed for metaanalysis and systematic review subset. The electronic search strategy was peer reviewed by one information scientist and one physical therapist with a background in clinical epidemiology. Suggestions incorporated in a new version of the search strategy that was pilot tested in MEDLINE (see eAppendix 1, available at ptjournal.apta.org, for details).

Moving from 2 recent cross-sectional studies<sup>6,24</sup> that reported the number of SRs published in rehabilitation, we estimated that limiting the search

to a period of the current year would have provided about 300 eligible SRs. Given the monofocus of our sample, with limited inherent variability compared with Moher and colleagues study,12 we calculated that a third of all included SRs, at the maximum level of variability (ie, 0.5) for dichotomous outcomes, would have given a 95% confidence interval ranging from 0.4 to 0.6 (rounded). We assumed that this sample would provide estimates sufficiently precise to give a reliable qualitative summary of the literature and enable us to comment on the generalizability of our findings, broadly. A random sample sequence was generated by a program included in the statistical software package (SPSS version 14, SPSS Inc, Chicago, Illinois) used in this study.

Systematic reviews were identified by searching MEDLINE (January 2011-September 2011). The last search was run on September 14, 2011. All publication records were uploaded in EndNote software (Thomson Reuters, Philadelphia, Pennsylvania), and duplicates were removed. Two members (S.G., M.G.) of the research team independently screened the records (title and abstract) and subsequently the fulltext articles of potentially eligible reports. Disagreements between reviewers were resolved by consensus; if no agreement could be reached, the opinion of a third author (L.M.) was planned to be determinant.

# **Data Extraction and Analysis**

Our data extraction followed the PRISMA checklist.25 This checklist was integrated with 11 additional items targeting descriptive characteristics, for a total of 38 questions. The whole data extraction form is shown in the eAppendix 2 (available at ptjournal.apta.org). Here we summarize a subset focusing on epidemiological and descriptive characteristics, including those with a potential

independently Eight reviewers tested the data extraction form on 10 reviews. Results were compared among reviewers and disagreements openly discussed to standardize the extraction. Each review was screened independently by 1 of 8 team members, with all samples screened in duplicate by 2 reviewers. Any uncertainties were discussed among the data extractors, and conflicts were resolved by coming to consensus. All data analyses were performed using SPSS version 14. The analysis was intentionally descriptive. Data are summarized as frequency number (percentage) or median and interquartile range (IQR).

### **Role of the Funding Source**

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#### Results

A total of 824 references from MEDLINE were identified in our screening. Of these references, 10 duplicates were excluded, and 546 citations were excluded after initial screening because they were narrative reviews or outside the field of interest (Figure). Two hundred sixtyeight full-text articles were retained for further screening; 5 non-English reviews were subsequently excluded. Of the 263 eligible reviews, we randomly sampled one third for a detailed evaluation (n=88). Descriptive analyses always refer to this sample, if not otherwise stated.

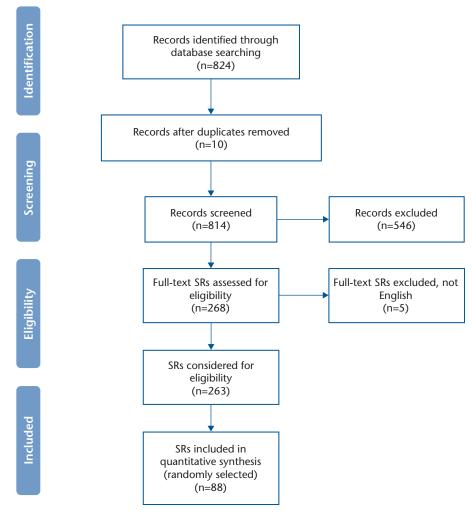


Figure. Flow diagram of strategy search.<sup>25</sup> SR=systematic review.

#### **Quality of Reporting**

Intervention (75 [85%]), population characteristics (72 [82%]), language (72 [82%]), and study design (69 [78%]) were the more frequent criteria to restrict the inclusion of eligible studies. Of those SRs that did provide information about language, 34 (39%) included all languages. Gray literature was reported to be explored in a small proportion of SRs (2 [2%]) and reported as irrelevant by some review authors (6 [7%]). Reporting characteristics of the SRs are shown in Table 1. The main databases examined were MEDLINE and PubMed (86 [98%]), followed by EMBASE (58 [66%]) and the

Cochrane Library (44 [50%]). Characteristics of search process of included SRs are reported in Table 2. Fewer than half of the SRs reported a full Boolean search (38 [43%]). Most reviews reported on the flow of information throughout the review process, although only a minority referred to the PRISMA flow diagrams (28 [32%]) and reason for exclusion of studies (23 [26%]). Two thirds (n=66) of the included reviews focused on interventions (treatment or prevention) in which efficacy is best addressed through the RCT design. Almost all SRs included RCTs (63/66 [95%]). Additional included designs were quasiRCTs (17/66 [26%]) and other designs such as case control or cohort observational studies (25/66 [38%]). In 3 cases, the eligible designs were not addressed (3/66 [5%]).

More than two thirds of the reviews (74/88 [84%]) reported information about the quality assessment of primary studies. Scales (34 [39%]) and component (eg, risk of bias tables) (25 [28%]) approaches were most frequently used to assess the validity of studies. Twenty-eight reviews (32%) meta-analyzed the results for at least one outcome. All SRs that did meta-analyze the effect size assessed

**Table 1.** Reporting Characteristics of Systematic Reviews  $(N=88)^a$ 

Category	Subcategory	Group	n (%)
Title	Use of term "systematic review"		55 (63)
	Use of term "meta-analysis"		7 (8)
	Protocol mentioned		10 (11)
Eligibility criteria	Study design	Declared criteria	69 (78)
	Intervention reviews (n=66) <sup>b</sup>		
		Only RCT	25 (38)
		RCT and quasi-RCT	15 (23)
		RCT and observational studies	9 (14)
		All study designs	14 (21)
		Cannot tell/unclear	3 (5)
	Participant	Declared criteria	72 (82)
	Intervention	Declared criteria	75 (85)
	Outcome	Declared criteria	64 (73)
	Follow-up	Declared criteria	15 (17)
	Years considered	Declared criteria	12 (14)
	Publication status	Declared criteria	36 (41)
	Language	Declared criteria	72 (82)
		English only	33 (38)
		All languages considered	34 (39)
Search		Full Boolean search reported	38 (43)
Data abstraction	Quality assessment		74 (84)
	Tools for quality <sup>c</sup>	Component	25 (28)
		Checklist	16 (18)
		Scale	34 (39)
		Unsure	5 (6)
		Other	1 (1)
	Pilot tested		48 (55)
	Duplicate		61 (69)
	Independent		55 (63)

(Continued)

the consistency (heterogeneity) of results across studies. One half of the SRs reported positive statistically significant findings (13/28 [46%]), whereas a detrimental result was present only in 1 review. Potential publication bias was discussed in a quarter of the SRs (22 [25%]). Funding sources were not reported in 10 SRs (11%). One review reported being funded by for-profit sources.

An overall reviews' compliance with the PRISMA checklist items can be used to provide a rough proxy of quality of reporting. The median compliance for rehabilitation SRs was 17 (63%) out of 27 items (IQR=13-22 [48%-82%]). Among the PRISMA items, compliance varied across items from 10% for the presence of a review protocol to 100% for the presence of the summary of evidence in the discussion. The methods for handling data and combining effect sizes and the results of studies, either presented for each study or aggregated, had

lower compliance rates. Thirteen reviews (15%) were compliant with the reporting of at least 25 out of 27 items.

# Overall Descriptive Characteristics

The 88 identified SRs were published in 59 journals, with most journals publishing only 1 SR (46/59). Four journals or databases were the top publishers: European Spine Journal (n=4), Disability and Rehabilitation (n=4), Archives of Physical

Table 1. Continued

Category	Subcategory	Group	n (%)
Results	Review flow	No	14 (16)
		Partial information in table/text	11 (13)
		Yes, in text/table	9 (10)
		Yes, in PRISMA-like flow diagram	26 (30)
		Yes, in a PRISMA flow diagram	28 (32)
	Gray literature	No	74 (84)
		Yes	2 (2)
		Cannot tell/unclear	6 (7)
		Not relevant	6 (7)
	Publication bias	Planned	12 (14)
		Discussed	22 (25)
	Quantitative synthesis performed <sup>d</sup>		28 (32)
	Consistency investigated <sup>d</sup> (ie, heterogeneity)		28 (32)
	Significance primary outcome <sup>d</sup>	Favorable, significant	13 (46)
		Nonfavorable, significant	1 (4)
		Nonsignificant	2 (7)
		Mixed	10 (36)
Other	Funding sources reported	Nonprofit	26 (30)
-		For profit	1 (1)
		Mixed	1 (1)
		Authors reported no funding	10 (11)
		Cannot tell/unclear	8 (9)
	Funding sources not reported		42 (48)

a All values are expressed as n (%) except where indicated. RCT=randomized controlled trial, PRISMA=Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Medicine and Rehabilitation (n=6), and The Cochrane Library (n=8). According to Journal Citation Reports, 17/59 (29%) were specialty journals on rehabilitation. Most reviews (31/88 [35%]) were published in journals with impact factors between 0 and 2 (31 [33%]) and between 2.1 and 5 (32 [36%]). Fifteen SRs (17%) were published in journals with moderate to high impact factors (5.1->10.0), of which 1 database was The Cochrane Library (impact factor=6.186). One fifth of the corresponding authors were from the United States, with 4 countries (the Netherlands, Canada, United Kingdom, and Australia) accounting for half of the reviews. Nearly half (41 [47%]) of the reviews were classified as diseases of the musculoskeletal system and connective tissue, followed by neurological diseases (22 [25%]) as defined by the International Classification of Diseases (ICD-10). The more frequent types of interventions on rehabilitation were physical exercise and physical activities (33 [50%]). The SRs included a median of 15 primary studies (IQR=9-28) involving a median of 589 participants (IQR=317-2,963). Table 3 presents the descriptive characteristics of the SRs.

# Discussion

In the rehabilitation field, the first trials were published in 1955,26,27 and the first review was published in 1982.28 Since then, the number of trials and reviews has grown,5 particularly in the last 2 decades.29 Our study confirmed this secular trend. In only 9 months of 2011, the new publications in rehabilitation potentially eligible as SRs in MEDLINE was 263. Two thirds of these publications were qualitative synthesis key methodological reporting dimensions that exclude or limit the bias and improve the reliability and accuracy of results and recommen-

b Totals in rows do not equal overall total because the number of systematic reviews of intervention was 66/88. Intervention group involves: treatment, education, and prevention.

Totals in rows do not equal overall total, as some reviews had multiple foci in more than 1 category.

<sup>&</sup>lt;sup>d</sup> Totals in rows do not equal overall total because the number of systematic reviews with meta-analysis was 28/88.

**Table 2.**Descriptive Characteristics of Search Process in Systematic Reviews (N=88)

Source	Characteristic	n (%)
Databases <sup>a</sup>	No. of databases, median	5
	MEDLINE/PubMed	86 (98)
	EMBASE	58 (66)
	Cochrane Library	44 (50)
	PEDro	27 (31)
	CINAHL	71 (81)
	Scopus	10 (11)
	Web of Science (ISI)	20 (23)
	PsycINFO	23 (26)
	Dissertation Abstracts	4 (5)
	BIOSIS	3 (3)
	Current Contents	1 (1)
	Other trial <sup>b</sup>	16 (18)
	Other database <sup>c</sup>	40 (46)
	No database reported	1 (1)
Other sources <sup>a</sup>	Reference lists reviewed	52 (59)
	Hand searching journals	18 (21)
	Experts or corresponding authors	9 (10)
	Conference proceedings/abstracts	7 (8)
	Personal files	5 (6)
	Pharmaceutical companies/manufacturers	2 (2)
	Other	9 (10)
	No other search methods reported	21 (24)

<sup>&</sup>lt;sup>a</sup> Does not equal 100%, as some reviews studied more sources than one.

dations. Around one third of the reviews included at least a metaanalysis and considered the consistency (heterogeneity) of results across studies. Around one quarter of the reviews reported on the flow of information throughout the review process and reasons for exclusion of studies and discussed potential publication bias. These can be considered advanced and analytic methods to increase the power and precision in estimating effects and risks.

Our study suggests that rehabilitation professionals invested a remarkable amount of energy in this field. However, this amount of energy resulted in a very heterogeneous scenario. Two thirds of the reviews reported eligibility criteria, and more than two thirds of the reviews reported the quality assessment of

primary studies frequently investigating risk of bias with scales (eg, PEDro and Jadad scales) and component approaches. These indicators, with others such as the high prevalence of reviews reporting a quantitative synthesis, investigating consistency (heterogeneity) across the studies, and dealing with publication bias, seem rather encouraging for the future development of literature synthesis science in rehabilitation. The knowledge that clinical heterogeneity is compelling and that rehabilitation professionals found ways to incorporate it to quantitatively analyze their data reinforces this interpretation,30 as well as the optimal compliance with PRISMA of some reviews.

Other indicators look more "negative." In only a small fraction of the SRs did the authors report registering their studies or updating their findings. One half of the SRs reported a statistically significant primary outcome favoring the intervention. Very few reviews referred to a protocol published in advance in order to minimize the potential for bias in the review process; these judgments should be made in ways that do not depend on the findings of the studies included in the review. A detrimental primary outcome was reported in only 1 SR. Although the implications of these findings are not conclusive of SRs on rehabilitation to be more prone to publish positive results, some previous research has identified that selective outcome reporting may occur in the context of an SR.31 There are 2 possible explanations for this finding. The first deals with an implausible optimism among rehabilitation scientists that facilitates the discovery of positive findings. Second, results originating from methodologically flawed and small-scale primary studies, mostly prevalent in this field, are likely to contain biased or misleading estimates of treatment effects.

<sup>&</sup>lt;sup>b</sup> Other trial such as ClinicalTrials.gov; National Institutes of Health (NIH) Clinical Trials Database; Stroke Trials Registry; International Clinical Trials Registry Platform; Current Controlled Trials; Cochrane Bone, Joint, and Muscle Trauma Group Specialized Register; Cochrane Ear, Nose, and Throat Disorder Group Trials Register; Cochrane Central Register of Controlled Trials (CENTRAL); Database of Abstracts of Reviews of Effects (DARE); or International Clinical Trials Registry Platform (ICTRP).

COther databases such as Google Scholar, ACP Journal Club, Comprehensive Microbial Resource (CMR), Health Technology Assessment Database (HTA), National Institute for Health Research Economic Evaluation Database (NHS EED), Pascal Biomed, SciSearch, SPORTDiscus, Index to Theses, OTSeeker (Occupational Therapy Systematic Review of Evidence), AMED, LILACS, KoreaMed, IndMED, PakMediNet, CAB Abstracts, China Knowledge Resource Integrated Database (CNKI), International Standard Randomised Controlled Trial Number (ISRCTN) Register, TRIP database, or NHS Evidence-ENT e Audiol.

Table 3. Descriptive Characteristics of Systematic Reviews (N=88)<sup>a</sup>

Category (%)	Characteristic	N (%)
Total number of journals	59	88
Type of journal <sup>b</sup>	Rehabilitation specialty	17/59
	Other specialties	42/59
Journal impact factor by review	0–2	31 (35)
	2.1–5	32 (36)
	5.1–10	15 (17)
	>10	2 (2)
	Not found	8 (9)
	Median (IQR)	3 (2–4)
No. of authors	1	7 (8)
	2–3	28 (32)
	4–6	41 (47)
	>7	12 (14)
Country of corresponding author	United States	17 (19)
	The Netherlands	13 (15)
	Canada	11 (13)
	United Kingdom	8 (9)
	Australia	8 (9)
Focus of review <sup>b</sup>	Treatment	59 (67)
	Diagnosis	5 (6)
	Mixed	3 (3)
	Education	3 (3)
	Prevention	4 (5)
	Other <sup>c</sup>	18 (21)
Common ICD-10 <sup>b</sup>	Musculoskeletal/connective tissue	41 (47)
	Neurologic	22 (25)
	Health status/health services	7 (8)
	Wounds and injuries/external causes	6 (7)
	Diseases of the circulatory system	4 (5)
	Diseases of respiratory system	2 (2)
	Endocrine and metabolic diseases	2 (2)
	Other <sup>d</sup>	3 (3)
	N/A <sup>e</sup>	14 (16)
Update of a previous review	N (%)	5 (6)
Included studies	No. of SRs reporting data	85
	Median (IQR)	15 (9–28)
Included participants in studies	Number of SRs reporting data	36
	Median (IQR)	589 (317–2,963)

(Continued)

Table 3. Continued

Category (%)	Characteristic	N (%)
Type of rehabilitative intervention $f$	Physical exercise/physical activity	33 (50)
	Physical therapy	7 (11)
	Occupational therapy	7 (11)
	Manual therapy	5 (8)
	Massage	2 (3)
	Education/prevention	3 (5)
	Virtual rehabilitation/assistive technologies	4 (6)
	Other interventions	9 (14)

<sup>&</sup>lt;sup>a</sup> SR=systematic review, IQR=interquartile ratio, N/A=not available.

Although the quality of primary studies in rehabilitation is increasing substantially,32 our findings call for urgent actions to limit the risks of publication and outcome reporting biases.

Our study indicates that SRs predominantly address questions about the effectiveness of interventions in treatment. Connective tissue and musculoskeletal diseases are most represented topics, followed by neurologic diseases and disease prevalence patterns in Western countries. It is possible that longer life expectancy and an increasing elderly population have contributed to the growing worldwide impact of musculoskeletal conditions.33 The first 5 countries of the most represented corresponding authors are the United States, United Kingdom, the Netherlands, Canada, and Australia, and they represent the driving force of literature synthesis science. They are all English-speaking countries, with the exception of the Netherlands, and have a high prevalence of specialized health professionals such as physical therapists and an academic and research funding system ranked at the top of the Western country list.34 The fact that we only searched in MEDLINE, the US National Library of Medicine database, might have influenced the prevalence of Anglophone review authors.

Of all SRs studied, one fifth did not contain the term "systematic review" or "meta-analysis" in the title or abstract, making their identification problematic from a reader's perspective. Furthermore, not all records were indexed by MEDLINE using the tag "Publication Type," "Review," or "Meta-analysis." As SRs are used more and rated more highly by health professionals in terms of relevance to clinical practice than original articles on primary research with other designs, it is inefficient that they are not easily recognizable.35,36

Because impact factors of rehabilitation journals are often smaller compared with other medical journals, most reviews were published in journals with impact factors less than 5. Nevertheless, 15 SRs (17%) were published in journals with moderate to high impact factors (5.1-10.0), in which we might assume a highly selective peer-review process, including Cochrane reviews. This can be a proxy of the relevance and quality

of the SRs published, confirming an increasing maturity of literature synthesis science into the rehabilitation field.

#### Limitations

It is possible we are underestimating the total number of new SRs, as we examined only a single database (ie, MEDLINE), excluding others, such as CINAHL, a potential relevant source for rehabilitation reviews. Furthermore, we considered only reviews published in English.

There is evidence that Cochrane SRs related to physical therapy interventions have better methodological quality compared with Cochrane reviews.9 Our findings cannot confirm or disconfirm this inference because of the paucity of Cochrane SRs we sampled, which undermines the possibility of such comparison. This said, the Cochrane Collaboration has specific guidelines<sup>37</sup> to help authors to design, conduct, and report their reviews, making their reviews comprehensive, accurate, and easier to read. Finally, we do not have any comparative data to show improvements in quality of reporting over time.

b ICD-10=International Classification of Diseases. Totals in rows do not equal overall total, as some reviews had multiple foci in more than one category.

Such as measurement, cost-effectiveness, International Classification of Functioning, Disability and Health (ICF), quality review, assistance.

<sup>&</sup>lt;sup>d</sup> Such as otorhinolaryngologic, endocrine, and metabolic diseases; malformations.

<sup>&</sup>lt;sup>e</sup> Such as developmental disorder, cognitive disorder, oncology, assessment tools.

<sup>&</sup>lt;sup>f</sup> Totals in rows do not equal overall total, as some reviews had multiple foci in more than one category. The total number of reviews considered intervention reviews was 66.

### Conclusion

It is likely that the state of maturity of rehabilitation SRs comes from a situation in progress. There are, indeed, stimuli from the broad international literature and from the evidencebased cultural movement to increase the quantity and the quality of SRs, but there is no solid ground on which advanced methods can be easily implemented. Readers interested in rehabilitation SRs should be aware that they are scattered among several journals. Regular searches or active surveillance of published journals might be time-consuming, although it is a necessary first step to identify important new evidence and assess whether it offers new information that may change clinical practice. The quality of these documents is variable, and readers should pay attention to select SRs that have been rigorously conducted. Editors might be interested in encouraging authors to publish high-quality SRs in their journals. Authors and peer reviewers are invited to improve the quality of SRs by promoting transparent and accurate reporting of their methods and results, using the reporting standards for interventions in systematic SRs.38

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#### References

- 1 MacDermid JC, Graham ID. Knowledge translation: putting the "practice" evidence-based practice. Hand Clin. 2009; 25:125-143.
- 2 Higgins JPT, Green S, eds. Glossary. In: Cochrane Handbook for Systematic Reviews of Interventions. Version 5.1.0. Updated March 2011. The Cochrane Collaboration. 2011. Available at: http://hand book.cochrane.org/. Accessed April 2012.
- 3 Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Terminology. In: Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med. 2009;151: 264 - 269.
- 4 Young C, Horton R. Putting clinical trials into context. Lancet. 2005;366:980.
- 5 Moseley AM, Herbert RD, Sherrington C, Maher CG. Evidence for physiotherapy practice: a survey of the Physiotherapy Evidence Database (PEDro). Aust J Phys iother. 2002;48:43-49.
- 6 Paci M, Briganti G, Lombardi B. Levels of evidence of articles published in physical and rehabilitation medicine journals. J Rebabil Med. 2011;43:264-267
- 7 Grimby G. Top cited articles in rehabilitation: additional list of articles. Arch Phys Med Rebabil. 2010:91:1960-1961.
- 8 Zaina F, Negrini S. EJPRM systematic continuous update on Cochrane reviews in rehabilitation: news from July to December 2011. Eur J Phys Rehabil Med. 2011; 47:601-605
- 9 Moseley AM, Elkins MR, Herbert RD, et al. Cochrane reviews used more rigorous methods than non-Cochrane reviews: survey of systematic reviews in physiotherapy. I Clin Epidemiol. 2009;62:1021-1030.
- 10 Oxman AD, Guyatt GH. Validation of an index of the quality of review articles. J Clin Epidemiôl. 1991;44:1271-1278.
- 11 Shea BJ, Bouter LM, Peterson J, et al. External validation of a measurement tool to assess systematic reviews (AMSTAR). PLoS One. 2007;2:e1350.
- 12 Moher D, Tetzlaff J, Tricco AC, et al. Epidemiology and reporting characteristics of systematic reviews. PLoS Med. 2007;4: 447-455.
- 13 McAlister FA, Clark HD, van Walraven C, et al. The medical review article revisited: has the science improved? Ann Intern Med. 1999;131:947-951.
- 14 Mulrow CD. The medical review article: state of the science. Ann Intern Med. 1987;106:485-488.
- 15 Jadad AR, McQuay HJ. Meta-analyses to evaluate analgesic interventions: a systematic qualitative review of their methodology. Ĵ Clin Epidemiol. 1996;49:235-243.

- 16 Shea B. Moher D. Graham I. et al. A comparison of the quality of Cochrane reviews and systematic reviews published in paper-based journals. *Eval Health Prof.* 2002:25:116-129.
- 17 Sacks HS, Berrier J, Reitman D, et al. Metaanalyses of randomized controlled trials. N Engl J Med. 1987;316:450 - 455.
- 18 Cornelius VR, Perrio MJ, Shakir SAW, Smith LA. Systematic reviews of adverse effects of drug interventions: a survey of their conduct and reporting quality. Pharmacoepidemiol Drug Saf. 2009;18:1223-
- 19 Altman DG, Simera I. Responsible reporting of health research studies: transparent, complete, accurate and timely.  $\hat{J}$  Antimicrob Chemother. 2010;65:1-3.
- 20 Higgins J, Green S, eds. Cochrane Handbook for Systematic Reviews of Interventions 4.2.5. The Cochrane Collaboration. Chichester, United Kingdom: John Wiley & Sons, Ltd; 2005
- 21 Gough D, Oliver S, Thomas J. An Introduction to Systematic Reviews. London, United Kingdom: Sage Publications Ltd, 2012.
- 22 MeSH. Available at: http://www.ncbi.nlm. nih.gov/mesh. Accessed September 2011.
- 23 Montori VM, Wilczynski NL, Morgan D, et al. Optimal search strategies for retrieving systematic reviews from MEDLINE: analytical survey. BMJ. 2005;330:68-71.
- 24 Paci M, Cigna C, Baccini M, Rinaldi LA. Types of articles published in physiotherapy journals: a quantitative analysis. Physiother Res Int. 2009;14:203-212.
- 25 Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 2009;6: e1000097
- 26 Harris R, Millard JB. Paraffin-wax baths in the treatment of rheumatoid arthritis. Ann Rheum Dis. 1955;14:278-282.
- 27 Coyer AB, Curwen IH. Low back pain treated by manipulation; a controlled series. Br Med J. 1955;19:705-707.
- 28 Hovell M. The experimental evidence for weight-loss treatment of essential hypertension: a critical review. Am J Public Health. 1982;72:359-368.
- 29 Costa LO, Maher CG, Lopes AD, et al. Transparent reporting of studies relevant to physical therapy practice. *Rev Bras Fisioter*. 2011;15:267-271.
- 30 van den Ende CHM, Steultjens EMJ, Bouter LM, Dekker J. Clinical heterogeneity was a common problem in Cochrane reviews of physiotherapy and occupational therapy. J Clin Epidemiol. 2006;59:914-919.
- 31 Kirkham JJ, Dwan KM, Altman DG, et al. The impact of outcome reporting bias in randomised controlled trials on a cohort of systematic reviews. BMJ. 2010;340:c365.
- 32 Latif LA, Amadera JED, Pimentel D, et al. Sample Size calculation in physical medicine and rehabilitation: a systematic review of reporting, characteristics, and results in randomized controlled trials. *Arch Phys Med Rehabil.* 2011;92:306-315.

- 33 Basu S, Roberts C, Newble DI, Snaith ML. Comparing and contrasting undergraduate competence in musculoskeletal medicine with cardiovascular medicine and neurology. Rheumatology. 2004;43:1398-1401.
- 34 Organization for Economic Co-operation and Development. Available at: http://www.oecd.org. Accessed September 2011.
- 35 Clark S, Horton R. Putting research into context: revisited. Lancet. 2010;376:10-11.
- 36 Banzi R, Cinquini M, Liberati A, et al. Speed of updating online evidence based point of care summaries: prospective cohort analysis. *BMJ*. 2011;343:d5856.
- 37 Higgins JPT, Green S, eds. Cochrane Handbook for Systematic Reviews of Interventions. Version 5.1.0. Updated March 2011. The Cochrane Collaboration. 2011. Available at: http://handbook.cochrane.org. Accessed April 2012.
- 38 Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ. 2009; 339:b2700.