The Quality of Reports of Randomized Controlled Trials Varies between Subdisciplines of Physiotherapy

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ABSTRACT

Purpose: The quality of reports of randomized trials of physiotherapy interventions varies by year of publication, language of publication and whether the intervention being assessed is a type of electrotherapy. Whether it also varies by subdiscipline of physiotherapy has not yet been systematically investigated. The purpose of this study was to determine whether the quality of trial reports varies according to the subdiscipline of physiotherapy being evaluated.

Methods: Reports of physiotherapy trials were identified using the Physiotherapy Evidence Database (PEDro). Quality of the trial report was evaluated using the PEDro scale (total PEDro score and 11 individual PEDro scale items). Multiple linear and logistic regressions were used to predict the quality of trial reports, with subdisciplines, time since publication, language of publication, and evaluation of electrotherapy as independent variables in the model. **Results:** Total PEDro scores are higher when trial reports are more recent; are published in English; investigate electrotherapy; and are in the subdisciplines of musculoskeletal, neurology, cardiopulmonary, gerontology, continence and women's health, orthopaedics, or paediatrics. Trials in the subdisciplines of ergonomics and occupational health, oncology, and sports are associated with lower total PEDro scores. The musculoskeletal subdiscipline had a positive association with six of the PEDro scale items, more than any other subdiscipline. **Conclusions:** There is scope to improve the quality of the conduct and reporting of randomized trials across all the physiotherapy subdisciplines. This study provides specific information about how each physiotherapy subdiscipline can improve trial quality.

Key Words: Randomized controlled trials as topic.

RÉSUMÉ

Objectif: La qualité des rapports sur les essais randomisés portant sur des interventions en physiothérapie varie selon l'année de publication, la langue de publication et la question de savoir si l'intervention évaluée constitue un type d'électrothérapie. On n'a pas encore cherché systématiquement à déterminer si la qualité varie aussi en fonction de la sous-discipline de la physiothérapie. Cette étude visait à déterminer si la qualité des rapports portant sur les essais varie en fonction de la sous-discipline de la physiothérapie évaluée. **Méthodes:** On a trouvé des rapports portant sur des essais en physiothérapie en utilisant la base de données factuelles sur la physiothérapie (PEDro). On a évalué la qualité du rapport sur l'essai en fonction de l'échelle PEDro (résultat PEDro total et 11 questions individuelles). De multiples régressions linéaires et logistiques ont servi à prédire la qualité des rapports sur les essais et les sous-disciplines, le temps écoulé depuis la publication, la langue de la publication et l'évaluation de l'électrothérapie ont servi de variables indépendantes dans le modèle. **Résultats:** Les résultats PEDro globaux sont plus élevés lorsque les rapports sur les essais sont plus récents; lorsqu'ils sont publiés en anglais, lorsqu'ils portent sur l'électrothérapie et les sous-disciplines suivantes: musculosquelettique, neurologie, cardiopulmonaire, gérontologie, continence et santé des femmes, orthopédie ou pédiatrie. On établit un lien entre les essais dans les sous-disciplines ergonomie et santé au travail, oncologie et sports et des résultats PEDro globaux moins élevés. Il y a un lien positif entre la sous-discipline musculosquelettique et six des questions de l'évaluation PEDro, plus que dans toute autre sous-discipline. **Conclusion:** Il est possible d'améliorer la qualité de l'exécution d'essais randomisés et des rapports à leur sujet dans toutes les sous-disciplines de la physiothérapie. Cette étude présente de l'information précise sur la façon dont chaque sous-discipline de la physiothérapie peut améliorer la qualité des essais.

Together with clinical expertise and patients' preferences, relevant and high-quality clinical research is used to guide evidence-based physiotherapy practice.¹ High-quality research has a lower risk of bias, or error, than

low-quality research.¹ The highest-quality research to guide decisions about the effects of physiotherapy interventions consists of systematic reviews of randomized controlled trials (RCTs) and well-designed RCTs.² As in

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other areas of health care, the quality of reports of RCTs evaluating physiotherapy interventions varies widely: less than half of all trial reports indexed in the Physiotherapy Evidence Database (PEDro)³ fulfil six or more design features associated with a low risk of bias.⁴

The quality of reports of RCTs of physiotherapy interventions varies according to the year of publication, the language of publication, and whether the intervention being assessed is a type of electrotherapy.^{5,6} An analysis of 10,025 physiotherapy trial reports that were rated for methodological quality using the 10-point PEDro scale⁷ found that total PEDro score increased by an average of 0.06 points per year (or 0.6 points per decade).⁵ An analysis of 13,392 trial reports, which adjusted for the year of publication, revealed that publication in English increased the total PEDro score by an average of 0.15 points over publication in languages other than English.⁶ Two items of the PEDro scale (blinding of therapists and patients) are rarely fulfilled in reports of physiotherapy trials⁴; this is because physiotherapy usually involves complex interventions in which patients actively engage in the treatment program (e.g., exercise). One of the few physiotherapy treatments of which blinding of the patient and therapist can often be achieved is electrotherapy. An analysis that adjusted for both year and language of publication found that for trials evaluating electrotherapy intervention, total PEDro scores were higher by an average of 0.30 points compared with trials evaluating interventions that did not involve electrotherapy.⁶

Another factor that may be associated with the quality of physiotherapy trial reports is the area or subdiscipline of physiotherapy being evaluated. As of December 2012, there were 18,874 trial reports indexed on PEDro,³ which were coded as being relevant to the following subdisciplines: musculoskeletal (26%), cardiopulmonary (20%), gerontology (14%), neurology (12%), continence and women's health (10%), paediatrics (8%), orthopaedics (6%), sports (4%), oncology (3%), and ergonomics and occupational health (2%). (Note that because trial reports can be coded for up to three subdisciplines, these percentages do not add to 100%). As the teaching, practice and specialization process (including research training) in physiotherapy occur separately for these main subdisciplines, it is possible that the conduct and reporting of clinical research vary by area of physiotherapy. Some preliminary data suggest that trial reports in neurology are of slightly higher quality (mean total PEDro score 5 [SD 1.6])⁸ than reports relevant to sports (median total PEDro score 4 [IQR 4–5]).⁹

The primary aim of our study, therefore, was to determine whether the quality, measured using the total PEDro score, of the published reports of trials evaluating physiotherapy interventions varies according to the subdiscipline of physiotherapy to which they are relevant. A secondary aim was to determine whether the subdiscipline

of physiotherapy is associated with the likelihood of each of the individual PEDro scale items being achieved.

METHODS

Data source and extraction

We chose the Physiotherapy Evidence Database (PEDro)³ as the data source for this study because it is the most complete index of reports of RCTs of physiotherapy interventions^{10,11} and all reports are assessed for methodological quality using the PEDro scale.⁷ A trial report meets the criteria for inclusion on PEDro if (1) the trial involves comparison of at least two interventions (one of which may be a no-treatment control or a sham treatment); (2) at least one of the interventions being evaluated is currently part of physiotherapy practice or could become part of physiotherapy practice; (3) the interventions are applied to subjects who are representative (or who are intended to be representative) of those to whom the intervention might be applied in the course of physiotherapy practice; (4) the trial involves random allocation or intended-to-be-random allocation of participants to interventions; and (5) the report is a full paper (not an abstract) in a peer-reviewed journal.³

The PEDro scale consists of 11 items: (1) eligibility criteria and source specified; (2) random allocation; (3) concealed allocation; (4) baseline comparability; blinding of (5) subjects, (6) therapists, and (7) assessors; (8) more than 85% follow-up; (9) intention-to-treat analysis; (10) reporting of between-group statistical comparisons; and (11) reporting of point measures and measures of variability. The last 10 items are used to calculate the total PEDro score by summing the number of items fulfilled; the first item is not used because it relates to generalizability rather than methodological quality. The total PEDro score therefore ranges from 0 to 10; higher scores indicate higher methodological quality. The PEDro scale has been shown to be both reliable⁷ and valid.^{12,13}

Each trial report indexed on PEDro is rated by two independent assessors; if necessary, a third assessor arbitrates any disagreements. Assessors also allocate codes for the therapy being evaluated (acupuncture; behaviour modification; education; electrotherapies, heat, cold; fitness training; health promotion; hydrotherapy; balneotherapy; neurodevelopmental therapy, neurofacilitation; orthoses, taping, splinting; respiratory therapy; skill training; strength training; stretching, mobilisation, manipulation, massage; no appropriate value) and the subdiscipline of physiotherapy (cardiopulmonary; continence and women's health; ergonomics and occupational health; gerontology; musculoskeletal; neurology; oncology; orthopaedics; paediatrics; sports; no appropriate value). Each trial report can be coded using up to three therapy codes and three subdiscipline codes. Reports of trials written in languages other than English are rated and

Table 1 Reports for Each Subdiscipline of Physiotherapy, Ranked by Mean Total PEDro Score

Subdiscipline	Total PEDro score (/10)		Total no. of trial reports	Year of publication		No. of English-language reports	No. of electrotherapy reports
	Mean	SD		First	Most recent		
Musculoskeletal	5.08	1.72	4,290	1955	2011	3,944	1,168
Neurology	5.01	1.63	1,837	1958	2012	1,614	357
Gerontology	4.97	1.53	2,426	1961	2011	2,353	196
Oncology	4.93	1.67	399	1981	2011	388	40
Continence and women's health	4.88	1.56	1,556	1963	2011	1,484	263
Ergonomics and occupational health	4.79	1.54	307	1966	2011	298	18
Cardiopulmonary	4.75	1.42	3,201	1952	2011	3,039	92
Orthopaedics	4.72	1.70	1,056	1961	2011	972	222
Paediatrics	4.69	1.47	1,320	1929	2011	1,279	67
Sports	4.46	1.61	743	1964	2011	711	203
Other	4.62	1.44	1,530	1931	2011	1,438	190
All trial reports	4.86	1.58	14,910	1929	2012	13,916	2,272

Note that each trial report can be coded for more than 1 subdiscipline, so the total number of reports does not equal 14,910.

coded by bilingual assessors, using the English version of the PEDro scale.

All reports of RCTs indexed on the PEDro database as of November 9, 2011, were extracted and downloaded into Microsoft Excel. The data downloaded included the citation details (authors, article title, journal title, year, volume, issue, pages), language of publication, therapy codes, subdiscipline codes, and PEDro scale scores (individual item scores plus total PEDro score). We calculated the number of years since publication of the trial report by subtracting the year of publication from 2012. The language of publication was converted to a dichotomous variable (1 = English, 0 = other). The therapy codes were processed to create a new variable called *electrotherapy*, which had a value of 1 if the “electrotherapies, heat, cold” therapy code was used and 0 for reports that did not evaluate these interventions. The subdiscipline codes were processed to code each trial as 1 (yes) or 0 (no) for each subdiscipline.

Statistical analysis

Within each subdiscipline of physiotherapy, we calculated descriptive statistics for the number of trials, year of publication, number of electrotherapy reports, number of English-language reports, number of individual PEDro scale items fulfilled, and total PEDro score. Any trial report coded with more than one subdiscipline was analyzed for each subdiscipline (e.g., data from a trial report coded as both cardiopulmonary and neurology were included in both the cardiopulmonary and the neurology subdisciplines).

Multiple linear regression was used to predict the total PEDro score (dependent variable) from 13 independent

variables: language, electrotherapy, number of years since publication, and 10 subdisciplines (cardiopulmonary; continence and women's health; ergonomics and occupational health; gerontology; musculoskeletal; neurology; oncology; orthopaedics; paediatrics; sports).

We then performed 11 multiple logistic regression analyses to predict the fulfilment of each PEDro scale item (dependent variables) from the same 13 independent variables used in the linear regression, with Bonferroni adjustment to minimize the risk of type I errors (false positives). As 12 comparisons were made, the level of significance was adjusted from $p \leq 0.05$ to $p \leq 0.004$.

RESULTS

Description of trials extracted

As of November 9, 2011, PEDro had indexed 20,553 reports of RCTs, systematic reviews and clinical practice guidelines. We extracted data for the 16,392 reports of RCTs. Of these, we removed 1,482 because they were in-process citations with incomplete PEDro codes and PEDro scale scores. The remaining 14,910 trial reports were used in our analysis. The distribution of total PEDro score is approximately symmetric, with a skewness statistic of 0.125.

The included trial reports were published between 1929 and 2012; 93.3% (13,916 trial reports) were published in English, and 15.2% (2,272 trial reports) evaluated the effects of electrotherapy interventions (see Table 1). The mean total PEDro score increased from 3.1 (SD 1.5) for trial reports published in 1929–1959 to 5.2 (SD 1.6) for those published in 2000–2012 (see Figure 1). The most prevalent subdiscipline was musculoskeletal (4,290 trials,

Figure 1 Mean (SD) total PEDro score (/10) and number of trial reports published in each decade since 1929. The years 1929 to 1959 have been combined into a single bar because of the low number of trial reports in this period.

29%), followed by cardiopulmonary (3,201, 21%), gerontology (2,426, 16%), neurology (1,837, 12%), continence and women's health (1,556, 10%), paediatrics (1,320, 9%), orthopaedics (1,056, 7%), sports (743, 5%), oncology (399, 3%), and ergonomics and occupational health (307, 2%). (Because trial reports can be coded for up to three subdisciplines, these percentages do not add to 100%.) One-tenth of trial reports were coded as "other," including trials evaluating physiotherapy interventions for health conditions such as diabetes and obesity.

Quality of trials in each subdiscipline

We calculated the mean total PEDro score for each subdiscipline. Musculoskeletal had the highest mean total PEDro score at 5.08 (SD 1.7), and sports had the lowest at 4.46 (SD 1.61). Table 1 ranks all subdisciplines from highest to lowest mean total PEDro score. Musculoskeletal had the highest number of electrotherapy trials ($n = 1,168$), while ergonomics and occupational health had the lowest ($n = 18$). Musculoskeletal also had the highest number of English-language reports ($n = 3,944$), as well as representing the highest proportion of the total number of trials.

Table 2 shows the proportion of reports that fulfil each individual PEDro scale item. The item most commonly fulfilled was random allocation, at an average of 95% overall; the remaining 5% of trials were quasi-randomized (e.g., randomized by day of the week or by hospital ID number). The item least commonly fulfilled was therapist blinding, with an average of 2% across all disciplines.

The multivariate linear regression analysis indicated that total PEDro scores are higher when trial reports are more recent, are published in English, investigate elec-

$$\begin{aligned}
 \text{total PEDro score} = & \\
 & + 5.138 \\
 & - (0.055 \times \text{years since publication}) \\
 & + (0.147 \times \text{English language}) \\
 & + (0.251 \times \text{electrotherapy}) \\
 & + (0.391 \times \text{musculoskeletal}) \\
 & + (0.194 \times \text{neurology}) \\
 & + (0.157 \times \text{cardiopulmonary}) \\
 & + (0.147 \times \text{gerontology}) \\
 & + (0.093 \times \text{continence and women's health}) \\
 & + (0.025 \times \text{orthopaedics}) \\
 & + (0.003 \times \text{paediatrics}) \\
 & - (0.021 \times \text{oncology}) \\
 & - (0.161 \times \text{ergonomics and occupational health}) \\
 & - (0.477 \times \text{sports})
 \end{aligned}$$

Figure 2 Equation for predicting the total PEDro score from the multivariate linear regression to predict the total PEDro score (dependent variable) from 13 independent variables: language, electrotherapy, the number of years since publication of trial report, and 10 subdisciplines. The coefficient for each independent variable plus the constant are listed.

trotherapy, and are in the musculoskeletal, neurology, cardiopulmonary, gerontology, continence and women's health, orthopaedics or paediatrics subdisciplines. Ergonomics and occupational health, oncology, and sports subdisciplines were associated with lower total PEDro scores. The resulting predictive equation, shown in Figure 2, indicates that total PEDro scores are on average 0.055 points lower for every year before 2012 that a trial report was published and are 0.147 points higher for trial reports published in English, and 0.251 points higher for electrotherapy trial reports, compared to trials without these features. PEDro scores for trial reports from the musculoskeletal subdiscipline tend to be 0.391 points higher, followed by neurology (0.194), cardiopulmonary (0.157), gerontology (0.147), continence and women's health (0.093), orthopaedics (0.025), and paediatrics (0.003). Trials from the sports subdiscipline, on average, have a lower total PEDro score by 0.477 points, followed by ergonomics and occupational health (-0.161) and oncology (-0.021).

Table 3 presents the 11 multiple logistic regression analyses, showing the associations between the fulfilment of each PEDro scale item and the same 13 independent variables used in the linear regression. The regression coefficients, which can be interpreted as odds ratios (OR), are displayed only for those independent variables where $p \leq 0.004$. The musculoskeletal subdiscipline was positively associated with 6/11 PEDro scale items, more than any other subdiscipline: concealed allocation (OR 1.90), blinding of assessors (OR 1.86), blinding of subjects (OR 1.49), intention-to-treat analysis (OR 1.47), eligibility and source specified (OR 1.38), and $>85\%$ follow-up (OR 1.30). However, musculoskeletal trial reports were also less likely to have used true randomization (OR 0.68). The subdisciplines with positive associations only were cardiopulmonary (4 items) and continence

Table 2 Reports That Fulfil Each PEDro Scale Item, by Subdiscipline

Subdiscipline	No. (%) of trial reports fulfilling each PEDro scale item										
	1	2	3	4	5	6	7	8	9	10	11
Musculoskeletal	3,237 (75)	4,048 (94)	1,154 (27)	2,905 (68)	555 (13)	162 (4)	1,705 (40)	2,580 (60)	1,097 (26)	3,949 (92)	3,645 (85)
Neurology	1,371 (75)	1,732 (94)	429 (23)	1,266 (69)	81 (4)	19 (1)	819 (45)	1,155 (63)	418 (23)	1,679 (91)	1,612 (88)
Gerontology	1,908 (79)	2,357 (97)	533 (22)	1,862 (77)	106 (4)	34 (1)	822 (34)	1,316 (54)	613 (25)	2,262 (93)	2,160 (89)
Oncology	319 (80)	384 (96)	118 (30)	276 (69)	29 (7)	7 (2)	95 (24)	232 (58)	123 (31)	370 (93)	333 (83)
Continence and women's health	1,159 (74)	1,494 (96)	384 (25)	1,108 (71)	117 (8)	28 (2)	402 (26)	858 (55)	380 (24)	1,458 (94)	1,369 (88)
Ergonomics and occupational health	261 (85)	292 (95)	81 (26)	206 (67)	8 (3)	4 (1)	69 (22)	161 (52)	91 (30)	290 (94)	267 (87)
Cardiopulmonary	2,172 (68)	3,089 (97)	623 (19)	2,208 (69)	237 (7)	31 (1)	786 (25)	1,817 (57)	534 (17)	3,008 (94)	2,864 (89)
Orthopaedics	703 (67)	947 (90)	292 (28)	571 (54)	69 (7)	29 (3)	342 (32)	658 (62)	224 (21)	975 (92)	879 (83)
Paediatrics	984 (75)	1,241 (94)	258 (20)	848 (64)	78 (6)	8 (1)	406 (31)	780 (59)	196 (15)	1,240 (94)	1,138 (86)
Sports	451 (61)	698 (94)	114 (15)	384 (52)	75 (10)	30 (4)	207 (28)	383 (52)	107 (14)	693 (93)	624 (84)
Other	1,052 (69)	1,482 (97)	225 (15)	1,053 (69)	119 (8)	28 (2)	346 (23)	781 (51)	301 (20)	1,402 (92)	1,336 (87)
All trial reports	10,842 (73)	14,217 (95)	3,269 (22)	10,182 (68)	1,221 (8)	305 (2)	4,759 (32)	8,554 (57)	3,240 (22)	13,825 (93)	12,962 (87)

1 = eligibility criteria and source specified; 2 = random allocation; 3 = concealed allocation; 4 = baseline comparability; 5 = blinding of subjects; 6 = blinding of therapists; 7 = blinding of assessors; 8 = more than 85% follow-up; 9 = intention-to-treat analysis; 10 = reporting of between-group statistical comparisons; 11 = reporting of point measures and measures of variability.

and women's health (1 item); those with negative associations only were sports (6 items) and oncology (1 item). The strongest association for any subdiscipline was of the blinding of assessors item with the neurology subdiscipline (OR 2.17). The number of years since publication had a negative association with nine PEDro scale items, more than any other independent variable we analyzed, but older trials were slightly more likely to have blinded therapists. The associations of the greatest magnitude (regardless of direction) were between electrotherapy and blinding of subjects and therapists.

DISCUSSION

Our study found small but potentially important differences in the average quality of reports of RCTs across the subdisciplines of physiotherapy. The quality of trial reports was also associated with the year and language of publication and whether the intervention evaluated was electrotherapy, confirming previous studies in this area.^{5,6} Although the associations with these other factors were fairly strong, the associations with subdiscipline were still present even after allowing for the influence of year, language and electrotherapy.

While the musculoskeletal subdiscipline had the highest mean total PEDro score and sports had the lowest, all physiotherapy subdisciplines have the potential to improve the quality of their reports of RCTs. Striving to achieve items on the PEDro scale is important because clinicians rely on the information covered by these items to determine to which patients the results apply (item 1), whether the results are likely to be affected by bias (items 2–9), and the magnitude and precision of the estimate of the treatment effect (items 10 and 11).¹⁴

Many items on the PEDro scale are readily achievable. For example, authors can easily report how they recruited participants and what eligibility criteria were applied (item 1), and true randomization (item 2) can be achieved via simple methods such as tossing a coin or using a random number table. Concealed allocation (item 3) can be achieved by sealing random allocations in sequentially numbered opaque envelopes. Appropriate analysis and reporting of data (items 9–11) only require an understanding of fundamental statistical methods. Therefore, theoretically, all trials in all subdisciplines could achieve full adherence to these items. Among these readily achievable items, the least frequently achieved were concealed allocation (achieved in 15%–30% of trials across all subdisciplines) and intention-to-treat analysis (achieved in 14%–31% of trials across all subdisciplines). One reason for this is that the earliest publications describing concealed allocation¹⁵ and intention-to-treat analysis¹⁶ were in the early 1990s. Encouragingly, these items have been achieved with markedly increasing frequency since that time: both had stronger negative associations with time since publication than all other items on the PEDro scale. The subdisciplines that could particularly focus on ensuring true randomization (item 2) are musculoskeletal, neurology, orthopaedics and sports. Researchers in the sports subdiscipline could also focus on reporting eligibility criteria (item 1), concealment of allocation (item 3) and intention-to-treat analysis (item 9). Oncology could focus on improving reporting point measures and measures of variability (item 11).

Other items on the PEDro scale can be more difficult to achieve. Baseline comparability of the randomized groups (item 4) can be influenced by random chance,

Table 3 Regression Coefficients and *p*-values of Individual PEDro Scale Items for 13 Independent Variables

PEDro item		Years since publication	English language	Electrotherapy	Subdiscipline										
					CP	CWH	EOH	Ger	MS	Neuro	Onc	Orth	Paed	Sport	Constant
Eligibility criteria and source specified	Exp(B)	0.96		0.72			1.94	1.45	1.38				1.33	0.60	4.50
	<i>P</i>	<0.001		<0.001			<0.001	<0.001	<0.001				<0.001	<0.001	<0.001
Random allocation	Exp(B)	0.96	2.75					1.49	0.68	0.60		0.35	0.67		19.49
	<i>P</i>	<0.001	<0.001					0.003	<0.001	<0.001		<0.001	0.003		<0.001
Concealed allocation	Exp(B)	0.93	2.25						1.90	1.43		1.94		0.53	0.19
	<i>P</i>	<0.001	<0.001						<0.001	<0.001		<0.001		<0.001	<0.001
Baseline comparability	Exp(B)	0.95		0.80				1.55				0.58		0.57	4.83
	<i>P</i>	<0.001		<0.001				<0.001				<0.001		<0.001	<0.001
Blinding of subjects	Exp(B)			5.04			0.27	0.58	1.49	0.46		0.66			0.06
	<i>P</i>			<0.001			<0.001	<0.001	<0.001	<0.001		0.003			<0.001
Blinding of therapists	Exp(B)	1.02		13.60						0.44					0.01
	<i>P</i>	0.002		<0.001						0.002					<0.001
Blinding of assessors	Exp(B)	0.98	2.80	1.51			0.53	1.18	1.86	2.17				0.65	0.16
	<i>P</i>	<0.001	<0.001	<0.001			<0.001	0.001	<0.001	<0.001				<0.001	<0.001
> 85% follow-up	Exp(B)	0.99	0.58		1.16				1.30	1.37		1.42		0.71	2.07
	<i>P</i>	<0.001	<0.001		0.003				<0.001	<0.001		<0.001		<0.001	<0.001
Intention-to-treat analysis	Exp(B)	0.90	0.56	0.70				1.24	1.47				0.74	0.57	
	<i>P</i>	<0.001	<0.001	<0.001				<0.001	<0.001				<0.001	<0.001	
Reporting of between-group statistical comparisons	Exp(B)	0.95			1.42										22.47
	<i>P</i>	<0.001			<0.001										<0.001
Reporting of point measures and measures of variability	Exp(B)	0.94			1.46					0.54					13.46
	<i>P</i>	<0.001			<0.001					<0.001					<0.001

CP = cardiopulmonary; CWH = continence and women's health; EOH = ergonomics and occupational health; Ger = gerontology; MS = musculoskeletal; Neuro = neurology; Onc = oncology; Orth = orthopaedics; Paed = paediatrics; Sport = sports.

Note: The regression coefficients are only displayed for independent variables with $p \leq 0.004$.

although the use of true randomization should increase the likelihood of baseline comparability. Additional resources can help by facilitating recruitment of a larger sample size, thereby reducing the likelihood of important differences between the groups at baseline. Follow-up of participants (item 8) can be influenced by the tolerability of the intervention and the characteristics of the participants. Again, additional resources can help, reducing loss to follow-up by maintaining close contact with participants in a long-term trial or by paying participants. However, some physiotherapy trials are unfunded or are not funded sufficiently to undertake these additional measures. Physiotherapy researchers, especially in the orthopaedics and sports subdisciplines, should remember to include these strategies in the budget when applying for research grants for clinical trials.

The importance of blinding was one of the earliest elements of trial design to be established, yet blinding of patients and therapists remains low across all subdisciplines of physiotherapy, because physiotherapy interventions are by nature difficult to blind effectively. However, blinding of the investigators who assess outcomes should be achievable in all trials, using simple procedures,¹⁷ given sufficient resources. Grant funding can be used to employ blinded assessors, while other strategies such as engaging students and volunteers or bartering research time with colleagues could be used to achieve blinding in unfunded trials. Physiotherapy researchers in the ergonomics and occupational health and sports subdisciplines could seek to obtain funding or design their trials in such a way that outcome assessment is blinded.

A strength of our study is the large and representative data set used in the analysis.^{5,11} One weakness is that the electrotherapy coding we used included interventions that apply heat and cold, which would be difficult to blind. This could have accounted for electrotherapy trials adding only 0.251 points to the total PEDro score in our model, while blinding both the therapists and subjects would add 2.0 points. Therefore, the true association between electrotherapy and blinding may have been underestimated. A second limitation of the study is that it was not possible with this data set to investigate possible reasons for the observed associations. Although we made suggestions for improvements in specific physiotherapy subdisciplines, based on factors that have previously been identified, there may be other influencing factors in specific subdisciplines that we are not aware of.

Clinicians should be aware of the quality criteria that are typically met or not met in their subdiscipline of interest. Researchers should strive to fulfil all items of the PEDro scale when designing and publishing RCTs, taking particular note of those items that are less commonly achieved in their subdiscipline. The results of this study provide specific information on how each physiotherapy sub-discipline can improve trial quality.

KEY MESSAGES

What is already known on this topic

The quality of reports of randomized trials of physiotherapy interventions varies according to the year of publication, the language of publication, and whether the intervention being assessed is a type of electrotherapy.

What this study adds

The quality of reports of randomized trials of physiotherapy interventions are higher when trial reports are in the subdisciplines of musculoskeletal, neurology, cardiopulmonary, gerontology, continence and women's health, orthopaedics, or paediatrics. Trials in the subdisciplines of ergonomics and occupational health, oncology, and sports were associated with lower total PEDro scores. There is scope to improve the quality of the conduct and reporting of randomized trials across all subdisciplines of physiotherapy.

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