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SYSTEMATIC REVIEW

The effect of education on pain and functionality on patients with musculoskeletal dysfunctions of the upper limb: a systematic review

O efeito da educação na dor e funcionalidade em pacientes com disfunções musculoesqueléticas do membro superior: uma revisão sistemática

El efecto de la educación sobre el dolor y la funcionalidad en pacientes con trastornos musculoesqueléticos de miembro superior: una revisión sistemática

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ABSTRACT | This study verifies the effects of patient education (PE) in patients with musculoskeletal disorders of the upper limb (UL) on pain and/or functionality. The PubMed, Cochrane, PEDro, SciELO, and LILACS databases were independently searched by two reviewers, from the beginning of the publications until April 2021. We included randomized clinical trials with individuals with musculoskeletal disorders of the UL with pain and/or functionality outcomes, who have undergone intervention with PE. Reviewers independently determined study eligibility, extracted data, and assessed methodological quality using the PEDro scale. We included eight studies, totaling 603 participants. Compared to the controlled group, the PE intervention showed better results in three studies for pain relief and/or functionality improvement. Apparently, PE is more effective when combined with exercise.

Keywords | Patient Education; Upper Extremity; Pain; Functionality; Physical Therapy.

RESUMO | Este estudo teve como objetivo verificar os efeitos da educação ao paciente (EP) em pacientes com disfunções musculoesqueléticas do membro superior (MS) para os desfechos de dor e/ou funcionalidade. Dois revisores realizaram independentemente buscas nas bases de dados PubMed, Cochrane, PEDro, SciELO e LILACS, considerando o período desde o início das publicações nessas bases até abril de 2021. Foram incluídos ensaios clínicos randomizados com seres humanos com disfunções musculoesqueléticas no MS; que tenham realizado intervenção com EP; e com desfechos de dor e/ou funcionalidade. Os revisores, separadamente, determinaram a elegibilidade dos estudos, extraíram dados e avaliaram a qualidade metodológica por meio da escala PEDro. Oito estudos foram incluídos nesta revisão, totalizando 603 participantes. A EP teve resultados superiores em três dos estudos no alívio da dor e/ou melhora da função em relação ao grupo comparativo. Sugere-se que a EP é mais eficaz quando associada a exercícios.

Descritores | Educação do Paciente; Extremidade Superior; Dor; Funcionalidade; Fisioterapia.

RESUMEN | Este estudio tuvo como objetivo verificar los efectos de la educación del paciente (EP) en individuos con trastornos musculoesqueléticos del miembro superior (MS) sobre los resultados de dolor y/o funcionalidad. Dos revisores realizaron búsquedas de forma independiente en las bases de datos PubMed, Cochrane, PEDro, SciELO y LILACS, desde el comienzo de las publicaciones en estas bases hasta abril de 2021. Se incluyeron ensayos clínicos aleatorizados con seres humanos con trastornos musculoesqueléticos en el MS; que han sido intervenidos con EP; y con resultados de

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dolor y/o funcionalidad. Los revisores determinaron de forma independiente la elegibilidad del estudio, extrajeron los datos y evaluaron la calidad metodológica mediante la escala PEDro. En esta revisión se incluyeron ocho estudios con un total de 603 participantes. La EP tuvo resultados superiores en tres de los estudios en cuanto al alivio del dolor o la mejora de la función en el grupo comparativo. Aparentemente, la EF es más efectiva cuando se combina con ejercicio.

Palabras clave | Educación del Paciente; Extremidad Superior; Dolor; Funcionalidad; Fisioterapia.

INTRODUCTION

Musculoskeletal dysfunctions are considered the most common causes of chronic disability worldwide[1], representing a critical cause of morbidity among workers[2] as they affect general health and quality of life[3], resulting in a growing worldwide impact[1]. In upper limb (UL), they are one of the main causes of severe pain and long-term physical disability[4] since activities of daily living strongly depend on the UL activity[5].

Patient education (PE) is an alternative to the several conservative approaches to treat UL dysfunctions. PE is any combination of learning experiences aiming at improving behaviors and/or health status, by providing information that influences how patients experience their disease. In other words, PE aims to ease the voluntary adoption of health-beneficial actions, allowing the patient to play an active role in their disease managament[6,7].

The effects of PE observed in previous systematic reviews are controversial. In patients with patellar pain, PE administered by health professionals may produce similar results to exercise therapy associated with PE regarding pain and function[8]. However, in patients with cervical pain, PE does not seem to have significant results[9].

Given the diverse ways of performing PE, it is still unclear which approach is more effective (verbal, written, or audiovisual), as well as the extent of the intervention. In addition, systematic reviews addressing PE in other pathologies and regions have been previously conducted, but none focused on the pain and functionality outcomes of the UL. Therefore, we aim to verify the effects of PE in patients with musculoskeletal dysfunctions of the UL for pain and/or functionality outcomes.

METHODOLOGY

This systematic review was conducted in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[10] and was previously registered in the International Prospective Register of Systematic Reviews (PROSPERO), record: CRD42021253783. The Population, Intervention, Comparison, Outcome, Time (PICOT) approach was followed, being (P) patients with upper limb musculoskeletal dysfunctions; (I) patient schooling level; (C) any other intervention or control group; (O) pain and functionality; and (T) short-term follow-up time (up to four weeks after the end of the intervention), medium-term (from one and six months after the end of the intervention) and long-term (more than six months after the end of the intervention).

The search was conducted in PubMed, Cochrane, PEDro, SciELO, and LILACS databases, from the beginning of the publications in the databases until April 2021, based on the following combinations of keywords: (1) Patient education OR education OR patient centred care OR information booklet OR book OR video OR pamphlet OR leaflet OR poster OR information OR psychoeducation; (2) shoulder OR wrist OR elbow OR upper limb OR pain OR ache; (3) randomized clinical trial; (4) NOT stroke NOT neck pain.

The studies were independently selected by two authors, based on four inclusion criteria: (1) randomized clinical trials (RCTs); (2) with humans with musculoskeletal dysfunctions of the UL; (3) who have performed intervention with PE; and (4) with pain and/or functionality outcomes. In this study, the standard PE and not the educational-behavioral interventions was considered. There is no consensus in the literature on the definition of standard PE, but it was considered as programs aiming to educate the patient by lectures, booklets, books, pamphlets, posters, videos, audios, group or individual conversations with health professionals. Additional references were identified by manually screening the bibliography of the included articles. Studies in which UL musculoskeletal dysfunction was a consequence of stroke, cervical pain, or tumors were

excluded. In cases of disagreement during the study selection, a third reviewer was consulted.

The following information was extracted from the articles by two independent reviewers: author and year of publication; sample (number of participants, gender, and mean age); diagnosis (according to the description of the study itself); PE intervention; comparative group; outcomes; instruments used to assess the outcome; follow-up; and results.

The risk of bias in the studies was evaluated according to the PEDro scale, which has an acceptable validity and reliability[11]. Studies with a score equal to or higher than 7 were considered as low risk of bias, studies with a score 5–6 as moderate, and studies with a score equal to or lower than 4 as a high risk of bias[12].

Data analysis was performed descriptively. Firstly, a general comparison of the effects of PE in musculoskeletal disorders of the UL on pain and functionality outcomes was performed. Then, an analysis was performed for subgroups, observing the effect of PE by diagnoses and in the short, medium, and long term.

RESULTS

Figure 1 shows the study complete flowchart. Table 1 shows the characteristics of the included studies.

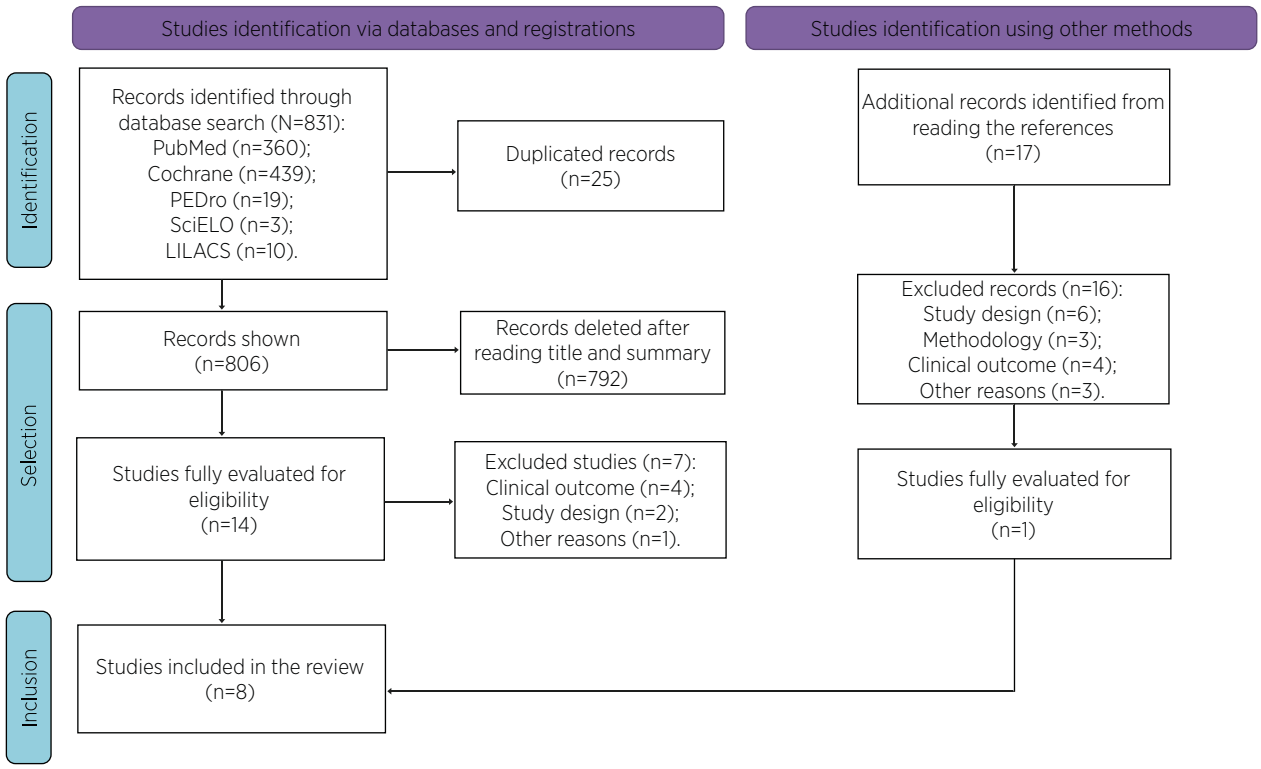

Table 1. Flowchart

Overall, three studies showed decreased pain in favor of PE[15,17,18]. However, four studies showed no difference between the groups in pain relief[13,14,16,19], and five studies found no difference between the groups in functionality [13,14,16,18,19]. A study presented higher results compared to the control group[15], but this result was not sustained during follow-up. This result does not mean that there was no improvement in both groups for pain and functionality outcomes, only that one intervention was not superior to the other. In one study, standard PE presented worse results when compared to behavioral education for pain and functionality[20]. Table 2 shows the PE results in musculoskeletal dysfunctions of the UL for pain and functionality outcomes.

Table 1. Characteristics of the included studies

Author (Year)	Sample (N; NFem; average age)	Diagnosis	PE Intervention	Comparative group	Outcomes	Instrument	Follow-up	Results	PEDro score
Núñez-Cortés et al. (2019)[13]	30; 30; 53.8 years	CTS	An audiovisual PNE session on neurophysiology, biopsychosocial aspects + PO exercises	Received a standard audiovisual PE session on medical and anatomical aspects + PO exercises	Pain and UL function	Pain: VAS UL Function: QuickDASH	Weeks 4 and 12 after surgery	Week 4: Pain: EG=CG Function: EG=CG Week 12: Pain: EG=CG Function: EG=CG	7
Clark, Bassett and Siegert (2019)[14]	108; 54; 50.55 years old	Shoulder injuries	Audiovisual PE on anatomy, treatment, exercise demonstration and diary	Had access to module 1 of the intervention program and the diary	Pain and UL function	Pain: Scale P4 UL Function: DASH	Week 8 after the start of the study	Pain: EG=CG Function: EG=CG	6
Manning et al. (2014)[15]	108; 82; 55.15 years old	RA	PE in groups with interactive seminars on RA and exercises + usual care	Received only usual care	UL function, hand functional capacity, and pain	UL Function: DASH Hand functional capacity: GAT Pain: VAS	Week 12 and 36 after the start of the study	Week 12: Function, hand functional capacity, and pain: EG>CG Week 36: Function, hand functional capacity: EG=CG Pain: EG>CG	8
Hall et al. (2013)[16]	54; 41; 54.35 years old	CTS	PE on anatomy and CTS information + didactic materials + wrist orthosis	Did not receive any intervention	Pain and UL function	Pain: VAS Function: BQFSS	Week 8 after the end of the intervention	Pain: EG=CG Function: EG=CG	5
Lin et al. (2010)[17]	62; 42; 49.37 years old	MPS	Audiovisual PE and didactic materials with information on MPS and stretching + DN	Received summary on general intervention + DN	Pain	Pain: BPI-T	Week 4 after the end of the intervention	Pain: EG>CG	6
Hansson et al. (2010)[18]	114; not described; 49.37 years old	OA	PE on anatomy, physiology, pain, OA, exercises and treatment	Continued living normally	Pain and hand function	Hand function: GAT Pain: EQ-5D	6 months after the intervention	Function: EG=CG Pain: EG>CG	8
Hammond and Freeman (2004)[19]	127; 97; 50.52 years old	RA	Standard PE on RA, pain, treatment, and exercises + information leaflets + joint protection	Received behavioral education on joint protection + didactic material with information	Pain and UL function	Pain: VAS UL Function: AIMS2	4 years after the end of the intervention	Pain: EG=CG Function: EG=CG	6
Hammond and Freeman (2001)[20]	127; 97; 50.52 years old	RA	Standard PE on RA, pain, treatment, and exercises + information leaflets + joint protection	Received behavioral education on joint protection + didactic material with information	Pain and UL function	Pain: VAS UL Function: AIMS2	6 and 12 months after the end of the intervention	6 months: Pain: EG=CG Function: EG=CG 12 months: Pain: EG<CG Function: EG<CG	6

CTS: carpal tunnel syndrome; PNE: pain neuroscience education; PO: postoperative; VAS: visual analog scale; QuickDASH: abbreviated form of the Arm, Shoulder and Hand Disabilities Questionnaire; EG: experimental group; CG: comparative group; DASH: disabilities of the arm, shoulder and hand; RA: rheumatoid arthritis; GAT: grip ability test; BQFSS: Boston Carpal Tunnel Syndrome Questionnaire Functional Status Scale; MPS: myofascial pain syndrome; DN: dry needling; BPI-T: brief pain inventory (Taiwanese version); OA: osteoarthritis; EQ-5D: generic EuroQol instrument – 5 Dimensions; AIMS2: arthritis impact measurement scales 2; =: no significant difference between groups; >: significant difference in favor of EP; <: significant difference in favor of the comparative group.

Table 2. Results for pain and functionality

Author (year)	Follow-up	Pain	Functionality
Núñez-Cortés et al. (2019)[13]	Week 4 and 12	EG=CG	EG=CG
Clark, Bassett and Siegert (2019)[14]	Week 8	EG=CG	EG=CG
Manning et al. (2014)[15]	Week 12	EG>CG	EG>CG
	Week 36	EG>CG	EG=CG
Hall et al. (2013)[16]	Week 8	EG=CG	EG=CG
Lin et al. (2010)[17]	Week 4	EG>CG	NA
Hansson et al. (2010)[18]	6 months	EG>CG	EG=CG
Hammond and Freeman (2004)[19]	4 years	EG=CG	EG=CG
Hammond and Freeman (2001)[20]	6 months	EG=CG	EG=CG
	12 months	EG<CG	EG<CG

EG: experimental group; CG: comparative group; NA: not assessed; =: no significant difference between the groups; >: significant difference in favor of PE; <: significant difference in favor of the comparative group.

Studies that presented superior results among the groups in favor of PE had as diagnoses: rheumatoid arthritis (RA)[15], myofascial pain syndrome (MPS)[17], and osteoarthritis (OA)[18]. Studies that presented no significant differences among the groups had as diagnoses: RA[19,20], carpal tunnel syndrome (CTS)[13-16], and shoulder lesions[14]. Table 3 shows subgrouped results of PE in pain and functionality according to the diagnosis.

Table 3. Results for pain and functionality subgrouped by clinical diagnosis

Diagnosis	Author (year)	Follow-up	Pain	Functionality
RA	Manning et al. (2014)[15]	Week 12	EG>CG	EG>CG
		Week 36	EG>CG	EG=CG
	Hammond e Freeman (2004)[19]	4 years	EG=CG	EG=CG
	Hammond e Freeman (2001)[20]	6 months	EG=CG	EG=CG
		12 months	EG<CG	EG<CG
CTS	Núñez-Cortés (2019)[13]	Week 4 and 12	EG=CG	EG=CG
	Hall et al. (2013)[16]	Week 8	EG=CG	EG=CG
OA	Hansson et al. (2010)[18]	6 months	EG>CG	EG=CG
MPS	Lin et al. (2010)[17]	Week 4	EG>CG	NA
Shoulder injuries	Clark, Bassett and Siegert (2019)[14]	Week 8	EG=CG	EG=CG

RA: rheumatoid arthritis; CTS: carpal tunnel syndrome; OA: osteoarthritis; MPS: myofascial pain syndrome; EG: experimental group; CG: comparative group; NA: not assessed; =: no significant difference between the groups; >: significant difference in favor of PE; <: significant difference in favor of the comparative group.

We also performed a subanalysis to observe the effects of PE on pain and/or functionality in the short-term (up to 4 weeks after the end of the intervention), in the medium term (8 to 12 weeks after the end of the intervention) and in the long term (from 6 months to 4 years after the end of the intervention). Table 4 shows the effects of PE in the short-, medium-, and long-term.

Table 4. Short, medium and long-term pain and functionality results

Monitoring	Author (year)	Follow-up	Pain	Functionality
Short-term	Núñez-Cortés (2019)[13]	4 weeks	EG=CG	EG=CG
	Lin et al. (2010)[17]	4 weeks	EG>CG	NA
Medium-term	Núñez-Cortés (2019)[13]	12 weeks	EG=CG	EG=CG
	Clark, Bassett and Siegert (2019)[14]	8 weeks	EG=CG	EG=CG
	Manning et al. (2014)[15]	12 weeks	EG>CG	EG>CG
	Hall et al. (2013)[16]	8 weeks	EG=CG	EG=CG
Long-term	Manning et al. (2014)[15]	36 weeks	EG>CG	EG=CG
	Hansson et al. (2010)[18]	6 months	EG>CG	EG=CG
	Hammond e Freeman (2004)[19]	4 years	EG=CG	EG=CG
	Hammond e Freeman (2001)[20]	6 months	EG=CG	EG=CG
		12 months	EG<CG	EG<CG

EG: experimental group; CG: comparative group; NA: not assessed; =: no significant difference between the groups; >: significant difference in favor of PE; <: significant difference in favor of the comparative group.

Among eight studies, three achieved a score equal to or higher than 7[13,15,18], and five scored 6–5 on the PEDro scale[14,16,17,19,20]. In none of them, the therapists were blinded; in one, patients[13] were blinded; in five, evaluators were blinded[14,16,17]. In four studies, the analysis was not seeking treatment[13,14,16,17]; in four, the allocation of the individuals was not confidental[13,16,19,20]; in two, the follow-up was not adequately conducted[19,20].

DISCUSSION

This is the first systematic review that verifies the effects of PE on musculoskeletal dysfunctions of the UL for pain and functionality outcomes. We found that three studies lacked pain relief and/or improvement of functionality, in favor of PE[15,17,18]. In three other groups,

both EG CG had improvements for outcomes, but there were no significant differences among them[13-16]. In one study, standard PE was evaluated in comparison to behavioral education, which presented better results[20], but did not remain over four years[19].

We registered this review in PROSPERO, following the PRISMA[10] guidelines, but it also has some limitations. Due to the scarcity of studies on PE for specific diagnoses, we chose to include RCTs on any musculoskeletal dysfunction of the UL. Therefore, our findings must be interpreted carefully since each diagnosis may have a distinct natural history and react differently to the same treatment. To reduce this limitation, we conducted a subanalysis by separately grouping the studies of each diagnosis. The heterogeneity of PE is also a limitation since some studies associated PE with other interventions. Furthermore, we did not analyze publication biases.

To the best of our knowledge, this is the first systematic review on PE for musculoskeletal disorders of the UL; thus, it is not possible to make a direct comparison with previous reviews because they deal with different disorders. Nevertheless, previous systematic reviews on PE had different results. Engers et al.[6] demonstrated that a 2.5-hour PE intervention accelerates the return to work in people with acute or subacute low back pain. Meeus et al.[21] found strong evidence that PE reduces pain in patients with neck pain associated with whiplash.

On the other hand, according to Engers et al.[6], shorter and simple sessions of PE or written information do not seem to be effective as a single treatment, corroborating our findings. In our review, we observed that PE presents significant results when associated with another intervention, such as exercises. García-Ríos et al.[22] also presented strong evidence supporting the efficacy of combining PE with other types of therapy for patients with fibromyalgia.

In a systematic review of self-management PE programs for OA, Kroon et al.[23] concluded that, compared to usual care, PE intervention group might experience a slight relief in pain and improvement in functionality, although these benefits are unlikely to be clinically significant. However, since PE is harmless—based on up-to-date evidence—there is no reason not to use verbal and written education in support of treatment[6].

The first of its topic, this review brought advances in knowledge of the effects of PE on pain and functionality of patients with musculoskeletal disorders of the UL. However, we must highlight that five studies had a moderate risk of bias. The most frequent items unscored according to the PEDro scale were blinded patients, therapists, and assessors, analysis seeking treatment, allocation concealment, and inadequate follow-up[14,16,17,19,20]. These methodological flaws can affect the results. Regardless, the superiority of PE was observed not only in studies with a higher risk of bias: among three studies with higher scores on the PEDro scale, two had positive results for pain and/or functionality outcomes in favor of PE[15,18]. Therefore, future studies on PE and musculoskeletal dysfunctions of the UL should be conducted with greater methodological rigor, especially regarding the items least punctuated by the included studies: the investigation of the best approach to PE (verbal, written, or audiovisual), the effects of PE individually or in group (as well as the number of sessions), and the most appropriate weekly frequency and extent.

Based on our findings, PE seems to have a positive effect for the outcome pain when associated with exercises or other interventions. For functionality, however, more studies are needed. Apparently, the effects on pain relief are perceived in the short-, medium- and long-term (up to 36 weeks), but studies with a longer follow-up observed that the intervention lost its effectiveness.

CONCLUSION

Using PE in patients with musculoskeletal dysfunctions of the UL to relieve pain and/or improve functionality is controversial. Only three of the eight studies showed superior results of PE in reducing pain and/or improving functionality in the short-, medium-, and long-term. However, we must highlight that two out of these studies presented a lower risk of bias. Indications show that PE can be a promising approach when associated with other conservative interventions, such as exercises. Randomized clinical trials of good methodological quality are still necessary.

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