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Measurements of self-efficacy in musculoskeletal rehabilitation: A systematic review

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Abstract

Objectives: Low self-efficacy is a barrier to rehabilitation adherence. Before an intervention can be implemented to improve self-efficacy, assessment is required. It is currently unknown if a standard measure of self-efficacy has been used to assess this in patients with musculoskeletal conditions, specifically for home exercise programmes (HEPs). The aim of the present study was to determine which self-efficacy scales are being used in conjunction with exercise adherence, identify if any scale has been developed to evaluate self-efficacy for HEPs and evaluate their psychometric properties.

Methods: Data sources included CINAHL, MEDLINE, Pubmed, PsycInfo, and Sport Discus. Studies had to include patients suffering from a musculoskeletal injury, pain or disorder; a measure of rehabilitation adherence; and patient's self-efficacy. The study population, self-efficacy measurement used, study quality as identified with the Modified Downs and Black checklist, results pertaining to self-efficacy, and level of evidence were extracted. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed and 29 articles were included.

Results: A total of 14 scales assessing self-efficacy were identified but no scale to assess self-efficacy for HEPs was found. Many scales report internal consistency but lack test–retest reliability and validity.

Conclusions: The scales identified were specific to condition or tasks, and not applicable for all musculoskeletal patient populations. It is important, both for use in the clinic and for research, that outcome measures used are reliable and valid. Unfortunately, no scale was found to assess self-efficacy for HEPs, which is problematic as self-efficacy is task specific. As HEPs are essential to rehabilitation, there should be a scale designed specifically to assess self-efficacy for this task.

KEYWORDS
adherence, assessment, patient barriers, social cognitive theory

1 | INTRODUCTION

Musculoskeletal injuries requiring rehabilitation, such as low back pain or ankle sprains, affect a significant portion of the population every year. Although these injuries may be debilitating, researchers have found that patients are non-adherent to their rehabilitation

[Correction added on 09 October 2018, after first online publication: The reference "Tenenbaum, G., & Eklund, R. C. (2014)" has been correctly updated.]

programmes approximately 50% of the time (Kolt & McEvoy, 2003; Sluijs, Kok, & van der Zee, 1993). In addition to in-clinic rehabilitation sessions, home exercise programmes (HEPs) are utilized to promote healing. The benefits of HEPs include range of motion and strength gains, reinforcement of motor learning, pain reduction and improvements in function (Jack, McLean, Moffett, & Gardiner, 2010; Muratori, Lamberg, Quinn, & Duff, 2013). Unfortunately, the literature suggests that patients are non-adherent to HEPs as often as 70% of the time (Essery, Geraghty, Kirby, & Yardley, 2017; Sluijs et al., 1993). Researchers have examined the barriers to patient adherence to HEPs, which include low physical activity levels at baseline; depression; anxiety; helplessness; forgetfulness; increased pain levels during exercise; and low self-efficacy (Essery et al., 2017; Jack et al., 2010). Among these psychological barriers to adherence, a patient's level of self-efficacy toward performing exercises at home is most readily influenced by the rehabilitation clinician (Altmaier, Russell, Kao, Lehmann, & Weinstein, 1993; Storheim, Brox, Holm, Koller, & Bo, 2003).

Self-efficacy is defined as one's belief in his or her capability to succeed in completing a specific task (Bandura, 1997; Eklund & Tenenbaum, 2014). Self-efficacy has been shown to influence behaviours, choice of activities and level of achievement (Eklund & Tenenbaum, 2014). Bandura (1997) contended that: "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true". That is, if patients do not believe that they can successfully complete their HEPs, they may not even attempt the prescribed exercises. Self-efficacy also predicts how much effort people put into a task (Heslin & Klehe, 2006). Research has suggested that clinicians who assess a patient's self-efficacy prior to prescribing an HEP can better adjust and individualize these programmes in various ways, such as goal setting and providing additional social support, that are supportive of a patient's perceived efficacy (Picha & Howell, 2017). In their theoretical model, Picha and Howell proposed that if self-efficacy for HEPs is addressed initially, a patient's adherence to the prescribed programme would increase (Figure 1) (Picha & Howell, 2017).

Researchers investigating treatment methods have used a variety of measures to evaluate self-efficacy, including general perceptions, exercise-specific judgements and perceived efficacy for pain management (Brand, Nyland, Henzman, & McGinnis, 2013; Coppack, Kristensen, & Karageorghis, 2012; Koumantakis, Watson, & Oldham, 2005). Self-efficacy is task specific; therefore, the measure used to assess this construct should differ based on the clinical question of the clinician or researcher. Scales have been developed to study certain patient populations and specific tasks. For example, cardiac rehabilitation research has evaluated self-efficacy extensively and has incorporated findings into clinical practice. Rajati et al. (2014) conducted a systematic review to examine the effect of interventions to improve exercise self-efficacy in patients with heart failure. Interventions that included the sources of self-efficacy were found to improve confidence, increase the ability to initiate exercise, and reduce symptoms (Rajati et al., 2014). Self-efficacy outcome measures used in cardiac rehabilitation included the Barriers Self-Efficacy Scale, Exercise Self-Efficacy Scale, Barnason Efficacy Expectation Scale (Barnason et al., 2003), Exercise Cardiac Self-Efficacy, Self-Efficacy Scale, Cardiac Exercise Self-Efficacy Questionnaire (Yeh, Wayne, & Phillips, 2008) and Self-Efficacy Expectations Scale (Rajati et al., 2014). As self-efficacy is task and situation specific, these measures may not be applicable to a patient with a musculoskeletal injury performing an HEP.

Self-efficacy has been studied extensively within cardiac rehabilitation, but less so for patients undergoing musculoskeletal rehabilitation. Initial evidence shows that interventions targeting self-efficacy are successful in individuals with low back (Petrozzi et al., 2015) and knee (Lim, Yobas, & Chen, 2014) pain. However, it is not known which scales are being used to evaluate self-efficacy, what psychometric properties have been established, and if these scales are able to predict rehabilitation exercise adherence. Therefore, the present systematic review had five aims: (a) to determine which self-efficacy scales were being used in conjunction with exercise adherence within the musculoskeletal literature; (b) to identify if any self-efficacy scale had been developed specifically to assess self-efficacy for HEPs; (c) to determine the psychometric properties of each scale identified; (d) to determine which scales were being used to predict adherence to rehabilitation exercise; and (e) to examine which scales had measured improvements in self-efficacy over time, using interventions that specifically targeted self-efficacy.

2 | METHODS

2.1 | Search criteria and strategy

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 checklist was used as a guide for conducting the study. Articles were retrieved in November 2017 by searching online databases. The databases searched included CINAHL, MEDLINE, PubMed, PsycINFO and Sport Discus. All databases were searched using specific search terms. The terms and strategy are displayed in Table 1.

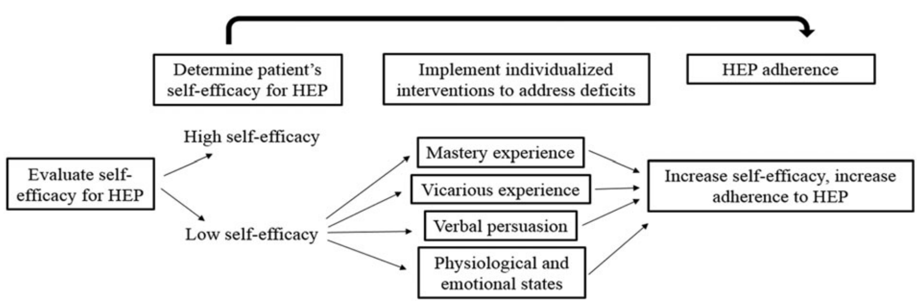

FIGURE 1 Modified from Picha & Howell, 2017 self-efficacy model for improved adherence to home exercise programmes (HEPs)

TABLE 1 Terms and database results

Search	Terms	Cinahl	Medline	Sport Discus	PsycINFO	PubMed
1	Musculoskeletal patients OR musculoskeletal pain OR musculoskeletal injury OR musculoskeletal disorder OR orthopedic patients OR orthopedic injury OR orthopedic pain OR orthopedic disorder	10,352	17,169	7,012	5,806	1,100,225
2	Patient compliance OR patient adherence OR compliance OR adherence OR rehabilitation adherence OR rehabilitation compliance	266,423	1,028,433	47,801	190,846	1,029,444
3	Self-efficacy OR self-confidence OR efficacy OR confidence OR efficacy beliefs	64,052	241,404	9,638	54,350	245,354
4	Combine searches 1, 2 and 3 with the term "AND" with the following limits terms: children, cancer, breast cancer, adolescents, cardiac, heart failure, drug, medication, diabetes and post-traumatic stress disorder	54	46	24	23	427

Inclusion and exclusion criteria were agreed upon by the reviewers. All of the following inclusion criteria had to be met:

- Articles in the English language
- Randomized clinical trials, studies of level three evidence or greater, according to the Oxford Centre for Evidence-Based Medicine, 2011
- Patient populations suffering from a musculoskeletal injury, pain or disorder
- Reported on rehabilitation exercise adherence
- Reported on patient's self-efficacy.

Articles were excluded if any of the following were true:

- Articles not in the English language
- Commentary or editorial
- Involved children or adolescents, prevention measures, cancer, opioid or drug use, and pregnancy.

2.2 | Article quality evaluation

Two reviewers used the Modified Downs and Black (Downs & Black, 1998; Muthuri et al., 2014) quality assessment tool to review the full-text articles independently. This tool was created to assess randomized controlled trials, nonrandomized controlled trials, and observational studies in the healthcare field. For each question in the assessment tool, a score of a 0 (no, not present) or 1 (yes, present) was given.

2.3 | Data extraction

The following components were extracted from the full-text articles: study sample population, type of self-efficacy measurement used, study quality as identified by the Modified Downs and Black tool, results pertaining to self-efficacy, and level of evidence (LOE). LOE was based on the Oxford Centre for Evidence-Based Medicine (2011). A standardized template was used to extract all data. The psychometric properties of the instruments were recorded if previously established. Reliability and validity were extracted to determine the strengths and weakness of the scales when assessing self-efficacy for exercise in patients suffering from a musculoskeletal injury, disorder or pain. When this information was not provided, the authors completed an additional search in order to collect this information. The same databases were used to search for the psychometric properties of the scales or scale development if not reported in the included study. No statistical analyses were conducted within the review.

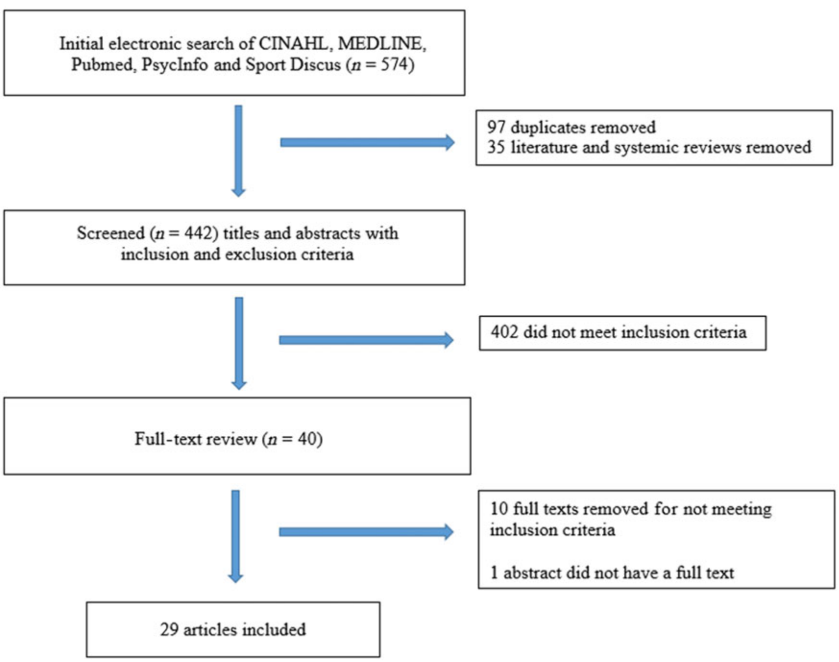

FIGURE 2 Systematic search strategy

3 | RESULTS

The initial search produced 574 citations. After removal of 97 duplicates and 35 review articles from the multiple databases searched, two authors reviewed the remaining 442 titles and abstracts. The level of agreement for this process was 95% (κ = 0.73). The reviewers identified 23 articles with disagreement regarding inclusion; a third independent reviewer made the final decision on whether or not to include these. Of the 23, 11 were included. There were 402 articles that did not meet the inclusion criteria, leaving 40 full-text articles to review. Of the remaining articles, one was removed because a full text could not be located and 10 were removed because they did not meet inclusion criteria or did not provided self-efficacy data upon full-text review. Twenty-nine articles were included in the full-text methodological review process and included in the systematic review (Figure 2).

3.1 | Methodological quality

Table 2 displays the results of the methodological assessment using the Downs and Black quality assessment tool. Two reviewers scored the 29 studies, and were in agreement on 28. A third reviewer assessed the article for which the reviewers disagreed, and assigned a quality score. The majority of studies lacked information on the population from which their study sample came (represented in questions 7 and 8 of the Downs and Black tool) and whether the outcome

TABLE 2 Methodological quality of included studies

	Downs and Black Questions					
Study	Is the hypothesis/aim/objective of the study clearly described? 1	Are the main outcomes clearly described? 2	Are the characteristics of the patients included in the study clearly described? 3	Are the main findings clearly described? 4	Does the study provide estimates of the random variability in the data for the main outcomes? 5	Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes, except where the probability value is less than 0.001? 6
Grindley et al., 2008	1	1	1	1	1	1
Hammond et al., 1999	1	1	1	1	1	1
Nordin et al., 2016	1	1	1	1	1	1
Skolasky et al., 2008	1	1	1	1	1	1
Bearne et al., 2011	1	0	1	1	1	1
Hammond et al., 2004	1	1	1	1	1	1
Palmer et al., 2014	1	1	1	1	1	1
Stenstrom et al., 1997	1	1	1	1	1	0
Williamson et al., 2017	1	1	1	1	1	1
Baker et al., 2001	1	1	1	1	1	1
Cheung et al., 2016	1	1	1	1	1	1
Dalager et al., 2015	1	1	1	1	1	0
Gowans & deHueck, 2004	1	1	1	1	1	1
Hammond et al., 2004	1	1	1	1	1	1
Kang et al., 2007	1	1	1	1	1	1
King et al., 2008	1	1	1	1	1	1
Schachter, et al., 2003	1	1	1	1	1	1
Baxter et al., 2016	1	1	1	1	1	1
Taylor et al., 2016	1	1	1	1	1	1
Hughes et al., 2004	1	1	1	1	1	1
Hughes et al., 2006	1	1	1	1	1	1
King, et al., 2002	1	1	1	1	1	1
Levinger et al., 2017	1	1	1	1	1	1
Mannion et al., 2009	1	1	1	1	1	1
Skou et al., 2012	1	1	1	1	1	1
Oliver & Cronan, 2002	1	1	1	1	1	0
Rini et al., 2015	1	1	1	1	1	1
Andersen, 2011	1	1	1	1	1	0
Chen et al., 1999	1	1	1	1	1	0

0 = no; 1 = yes.

measures used were reliable (represented in the last question of the Downs and Black tool).

3.2 | Study characteristics

The included studies were randomized controlled trials (18), longitudinal studies (two), cohort studies (three), cross-sectional studies (two), secondary analyses of randomized controlled trials (three) or crossover studies (one). Of the 29 studies, 14 recruited from arthritic patient populations (osteoarthritis or rheumatoid arthritis), 10 from a population with musculoskeletal injury or pain, and five from a population suffering from fibromyalgia. Patient ages ranged from 20 to 86 years and adherence to rehabilitation ranged from 0% to 100% in the included studies. The extracted data are presented in Tables 3 and 4. Table 3 includes extracted data from 10 studies that used measures of self-efficacy to predict patient adherence or found relationships with adherence in musculoskeletal rehabilitation. Table 4 includes extracted data from 10 studies that specifically targeted self-efficacy in their interventions and measured self-efficacy pre- and post-intervention. Not all studies fit these two categories. Synthesis of all self-efficacy instruments are compiled in Table 5.

3.3 | Self-efficacy measures included

This investigation identified 14 scales or questionnaires that assess self-efficacy while used in conjunction with some assessment of patient adherence. Many of the self-efficacy scales used in these and other studies demonstrated adequate internal consistency values (Cronbach's α = 0.75–0.94) but lacked evidence of test–retest reliability and validity. The scales identified were primarily condition- or task-specific scales (Table 5); however, some did not fall into either of these categories. The noncondition- or task-specific scales included the General Self-Efficacy Scale, Ewart's Scale of Self-Efficacy and the Health Belief Model.

TABLE 2 Methodological quality of included studies

	Downs and Black Questions				
Study	Were the subjects asked to participate in the study r epresentative of the entire population from which they were recruited? 7	Were those subjects who were prepared to participate representative of the entire population from which they were recruited? 8	Were the statistical tests used to assess the main outcomes appropriate? 9	Were the main outcome measures used accurate (valid and reliable)? 10	Quality score
Grindley et al., 2008	1	1	1	1	10
Hammond et al., 1999	1	1	1	1	10
Nordin et al., 2016	1	1	1	1	10
Skolasky et al., 2008	1	1	1	1	10
Bearne et al., 2011	1	1	1	1	9
Hammond et al., 2004	1	1	1	0	9
Palmer et al., 2014	1	1	1	0	9
Stenstrom et al., 1997	1	1	1	1	9
Williamson et al., 2017	1	1	1	0	9
Baker et al., 2001	0	1	1	0	8
Cheung et al., 2016	0	0	1	1	8
Dalager et al., 2015	1	1	1	0	8
Gowans & deHueck, 2004	0	0	1	1	8
Hammond et al., 2004	0	0	1	1	8
Kang et al., 2007	0	0	1	1	8
King et al., 2008	0	0	1	1	8
Schachter, et al., 2003	0	0	1	1	8
Baxter et al., 2016	0	0	1	1	8
Taylor et al., 2016	0	0	1	1	8
Hughes et al., 2004	0	0	1	0	7
Hughes et al., 2006	0	0	1	0	7
King, et al., 2002	0	0	1	0	7
Levinger et al., 2017	0	0	1	0	7
Mannion et al., 2009	0	0	1	0	7
Skou et al., 2012	0	0	1	0	7
Oliver & Cronan, 2002	0	0	1	1	7
Rini et al., 2015	0	0	1	0	7
Andersen, 2011	0	0	1	0	6
Chen et al., 1999	0	0	1	0	6

TABLE 3 Studies that used self-efficacy (SE) to predict adherence

Authors	Purpose	Population	SE Scale	Adherence measure	Results	Conclusions	Odds ratios	Correlations with adherence	Regression results	LOE
Andersen (2011)	To determine the influence of exercise SE on adherence to workplace exercise among office workers	Office workers with a history of frequent neck/ shoulder pain (n = 132)	Self-Efficacy for Physical Activity	Patient self-report log	Low (odds ratio = 0.07, 95% CI: 0.02 to 0.25) to medium (odds ratio = 0.19, 95% CI: 0.07 to 0.49) exercise SE was a significant predictor of low adherence	Exercise SE was a predictor of adherence to a 10-week exercise programme	0.07			2
Chen et al. (1999)	To investigate how SE may influence compliance with HEPs	Upper extremity impairment (n = 62)	Health belief model	Patient self-report	SE was significantly associated with compliance (r = 0.30, p < 0.05), perceived barriers (r = −0.36, p < 0.01) and perceived benefits (r = 0.47, p < 0.001). A stepwise regression analysis perceived self-efficacy significantly contributed to compliance (B (SE) = 7.05 (2.60) beta = 0.33)	SE is a significant predictor of compliance with HEPs		0.3		3
Cheung et al. (2016)	To report the relationship between social cognitive theory constructs and yoga adherence	Knee OA (n = 36)	Self-Efficacy for Exercise Scale	Class attendance and self-report log	Average SEE score = 72.0 ± 16.8, indicating that participants were confident that they would be able to continue practising yoga in the face of barriers. The SEE score was positively correlated with class attendance during the intervention period (r = 0.34, p = 0.03) but not home practice (r = 0.14)	High SE scores at baseline were positively associated with class attendance		0.34		2
Dalager et al. (2015)	To analyse exercise SE for predictive values of compliance to the strength training intervention	Musculoskeletal pain of neck or shoulder (n = 573)	Self-Efficacy for Physical Activity	Self-report log	Compliant participants' SE did not change from baseline to follow-up for any group; however, when all training groups were collapsed together, those with low SE at baseline (47.7%) increased at follow-up (56.4%). A linear regression determined rating SE as high at baseline was positively associated with compliance	Exercise SE is a significant predictor of compliance			No data provided	2

(Continues)

TABLE 3 (Continued)

Authors	Purpose	Population	SE Scale	Adherence measure	Results	Conclusions	Odds ratios	Correlations with adherence	Regression results	LOE
Grindley et al. (2008)	To examine the utility of a screening tool (that includes SE) in the prediction of adherent behaviour	Musculoskeletal injury (n = 229)	SIRBS	Attendance ratio and SIRAS	The final prediction model includes SE (r = 0.39) and correctly identified 63.9% of adherent and non-adherent cases	SE differentiated between those who were more and those who were less adherent		0.39		3
Kang et al. (2007)	To examine the influence of SE to exercise on long-term adherence to an aquatic programme	RA (n = 72)	Aquatic ESE	Weekly attendance at the pool	Exercise SE in the adherent group was significantly higher (mean = 80.7 ± 14.0) compared with the non-adherent group (mean = 60.3 ± 25.7, p < 0.0001)	Exercise SE was significantly higher in the adherent group				3
Mannion et al. (2009)	To evaluate the influence of various cognitive factors and beliefs on adherence to the exercise programme	Chronic low back pain (n = 37)	ESE	Self-report log	Baseline SE was 47.4 ± 13.3 (range = 21–66). Exercise SE was found to be correlated with multidimensional adherence (Rho = 0.36, p = 0.045). A linear regression analysis of gender and SE together were significant predictors of adherence and accounted for 32% of the variance	Exercise SE was the only psychological/ beliefs variable that uniquely explained a significant proportion of the variance in individual patterns of multidimensional adherence		0.36		3
Oliver & Cronan (2002)	To identify predictors associated with the initiation and maintenance of regular exercise	FM (n = 444)	ASES (mod) and ESE	Exercise behaviour question (yes/no)	Higher exercise SE was significantly related to engaging in exercise behaviour at baseline assessment (B = 1.45, SE = 0.18, p < 0.01, exp (B) = 4.28) at 6 months (B = 1.01, SE = 0.16, p < 0.01, exp (B) = 2.74), and at 1 year (B = 1.24, SE = 0.17, p < 0.01, exp (B) = 3.44)		1.01–1.45			2
Skolasky et al. (2008)	To determine the association between baseline SE and participation in therapy postoperatively	Degenerative lumbar spinal stenosis (n = 65)	ASES (mod)	Attendance based on self-reporting	Within two regression models, SE to participate in physical therapy was the largest psychological variable to change (β-coefficient 12.04–9.07, p < 0.001)	Increased SE was associated with greater adherence to physical therapy			9.07–12.04	3

(Continues)

TABLE 3 (Continued)

Authors	Purpose	Population	SE Scale	Adherence measure	Results	Conclusions	Odds ratios	Correlations with adherence	Regression results	LOE
Stenstrom et al. (1997)	To identify predictors for compliance with the long-term home exercise regimens	Inflammatory rheumatic disease (n = 54)	Self-Efficacy for Exercise Scale	Self-report logs	Non-compliers had a lower SE for exercise (median 50 versus 85, $p < 0.01$). A logistic regression found that SE contributed significantly to the model (β = 0.0523, OR = 1.05, 95% CI: 1.02 to 1.09)	Compliance with the 1-year exercise regimen seemed to be predicted by high SE for exercise	1.05		B = 0.0523	2

Population: FM = Fibromyalgia, OA = Osteoarthritis, RA = Rheumatoid arthritis; mod = modified version.

ASES, Arthritis Self-efficacy Scale; B, logistic regression coefficient; CI, confidence interval; ESE, exercise self-efficacy; exp (B), odds ratio; FM, fibromyalgia; HEP, home exercise programme; LOE, level of evidence; OA, osteoarthritis; OR, odds ratio; RA, rheumatoid arthritis; SEE, self-efficacy for exercise; SIRAS, Sports Injury Rehabilitation Adherence Scale; SIRBS, Sports Injury Rehabilitation Beliefs Scale

TABLE 4 Studies using interventions focused on self-efficacy (SE), to improve this measure

Authors	Purpose	Study population	Intervention	SE Scale
Hammond et al. (1999)	To develop a joint protection education programme using an educational–behavioural approach based on the Health Belief Model and SE theory; to identify whether adherence with joint protection can be increased following this programme, and to identify some of the psychological factors which may influence joint protection adherence	RA (n = 35)	The joint protection group education programme consisted of four weekly 2-h sessions, plus an optional home visit within 2 weeks of the end of the programme. The educational component used the Health Belief Model and SE theory as a foundation. Practice with supervision, modelling on others and verbal persuasion were used	ASES
Hammond & Freeman (2004)	To evaluate the long-term effects of joint protection on health status	RA (n = 127)	The joint protection programme applied educational, behavioural, motor learning and SE enhancing strategies to increase adherence	ASES-pain subscale
Hughes et al. (2004)	To assess the impact of a low-cost, multicomponent physical activity intervention	Knee OA (n = 150)	Fit and strong intervention was offered for 90-min sessions, 3 times/week for 8 weeks. The first 60 min of the programme consist of resistance training and fitness walking, the last 30 min consist of an educational component. Utilized goal setting, provided systematic feedback and provided social support	ASES, Barrier Adherence Efficacy Scale
Hughes et al. (2006)		OA (n = 215)	Fit and strong intervention was offered for 90-min sessions, 3 times/week for 8 weeks. The first	

(Continues)

TABLE 4 (Continued)

Authors	Purpose	Study population	Intervention	SE Scale
	To assess the short- and long-term efficacy of and adherence to a multicomponent exercise intervention		60 min of the programme consist of resistance training and fitness walking, the last 30 mins consist of an educational component. Utilized goal setting, provided systematic feedback and provided social support	ASES, Barrier Adherence Efficacy Scale
King et al. (2002)	To examine the effectiveness of a supervised aerobic exercise programme, a self-management education programme and the combination of exercise and education on SE	FM (*n* = 152)	Four groups: exercise only, education only, exercise and education, or control. Programmes ran simultaneously for 12 weeks. Education programme incorporated components of social cognitive theory. Encouraged performance of new behaviours or skills	Chronic Pain Self-Efficacy Scale (coping subscale)
Levinger et al. (2017)	To examine the feasibility of a 3-month internet-based intervention for enhancing recovery and SE	ACL reconstruction (*n* = 32)	Internet-based intervention with standard of care. The internet-based intervention consisted of two elements – information and communication for patients. Incorporated educational self-management and social support	Knee Self-Efficacy Scale
Nordin et al. (2016)	To evaluate the effects of MMR in combination with the web behaviour change programme for activity compared with MMR in primary healthcare regarding SE	Musculoskeletal pain (*n* = 109)	Two intervention arms: MMR and web programme or MMR. MMR at minimum consisted of 2–3 times/week for 6–8 weeks and included home exercises. The web programme was used without clinician guidance and allowed the patient to choose from the programme content. Followed up at both 4 and 12 months Clinicians used cognitive behavioural therapy, and the web programme was focused on behavioural change for activity	ASES and GSE
Palmer et al. (2014)	To determine the additional effects of TENS in knee OA when combined with a 6-week group education and exercise regimen	Knee OA (*n* = 224)	Three parallel arms: TENS group, sham TENS and exercise/education group. All participants participated in a 1-h session of 30 min education and 30 min exercise for six consecutive weeks. Education programme focused on enhancing abilities to self-manage their condition	ASES
Rini et al. (2015)	To evaluate the potential efficacy of an 8-week, automated, internet-based version of pain coping skills training on SE	Knee or hip OA (*n* = 113)	Internet-based PainCOACH intervention or control group. The intervention consisted of 8, 35–45 min modules that provided interactive training on behavioural or cognitive coping skills	ASES-pain subscale
Taylor et al. (2012)	To determine the effectiveness of a novel, theoretically based group pain management support intervention	Chronic musculoskeletal pain (*n* = 652)	Experiential learning group course based on cognitive behavioural principles plus usual care. Content included cognitive behavioural approaches to manage chronic pain, an educational DVD with pain consultant answering common questions, communication skills, relationship hobbies, posture and movement, and breathing, relaxation and guided imagery	PSEQ

ACL, anterior cruciate ligament; ASES, Arthritis Self-efficacy Scale; CI, confidence interval; GSE, General Self-Efficacy Scale; LOE, level of evidence; MMR, multimodal rehabilitation; OA, osteoarthritis; PSEQ, Pain Self-Efficacy Questionnaire; RA, rheumatoid arthritis; TENS, transcutaneous electric nerve stimulation

TABLE 4 Studies using self-efficacy (SE)-focused interventions to improve self-efficacy

Authors	Pre-/initial score	Postscore/follow-up	Results/conclusions	Did SE improve? (Yes/No)	LOE
Hammond et al. (1999)	Median (interquartile range) treatment group = 5.3 (3.4–6.2), control group = 6.45 (4.28–7.13)	Median (interquartile range) treatment group = 4.6 (3.7–5.5), control group = 5.8 (4.23–7.2)	No significant changes in measures of SE occurred post-education. Those participants that changed their behaviour tended to have higher SE scores (p = 0.07) than those who did not change Education interventions may or may not aid in improving SE	N	2
Hammond & Freeman (2004)	Median (interquartile range) treatment group = 50 (38–64), control group = 50 (36–69)	Median (interquartile range) treatment group = 54 (36–76), control group = 52 (40–69)	A within-group analysis found that joint protection group had improved SE scores for pain. This approach is more effective in increasing SE and improving adherence than the control group	Y	2
Hughes et al. (2004)	Treatment group: ASES for exercise = 7.8 ± 2.6, Barrier Adherence Efficacy Scale = 73.5 ± 22.9. Control group: ASES for exercise = 6.9 ± 3.9, Barrier Adherence Efficacy Scale = 65.5 ± 22.6	6- month follow up: Treatment group: ASES for exercise = 7.9 ± 2.5, Barrier Adherence Efficacy Scale = 59.7 ± 24.1. Control group: ASES for exercise = 5.9 ± 2.8, Barrier Adherence Efficacy Scale = 50.5 ± 19.6	A significant difference was found, (p < 0.05) favouring the treatment group on the ASES at 2 and 6 months. There were no differences between groups on the Barrier Adherence Efficacy Scale, only nearing significance at 6 months, favouring the treatment group (p = 0.052) Preliminary findings suggest that this low cost, multiple component intervention can increase SE for exercise and increase exercise adherence.	Y	2
Hughes et al. (2006)	Treatment group: ASES for exercise = 7.5 ± 2.7, Barrier Adherence Efficacy Scale = 71.6 ± 23.2. Control group: ASES for exercise = 6.9 ± 2.6, Barrier Adherence Efficacy Scale = 65.8 ± 23.0	6- month follow up: Treatment group: ASES for exercise = 8 ± 2.4, Barrier Adherence Efficacy Scale = 61.7 ± 23.2. Control group: ASES for exercise = 5.9 ± 2.8, Barrier Adherence Efficacy Scale = 49.1 ± 19.6	A significant difference was found (p < 0.01) favouring the treatment group on ASES at 2, 6 and 12 months. There were no differences between groups on the Barrier Adherence Efficacy Scale	N	2
King et al. (2002)	Coping subscale: Exercise = 50.4 ± 19.8, education = 52.4 ± 20.6, education and exercise = 50.6 ± 17.0, control = 47.9 ± 17.8	Coping subscale: Exercise = 55.3 ± 18.8, education = 56.3 ± 19.7, education and exercise = 60.3 ± 22.0, control = 48.4 ± 20.5	A significant group × time interaction was reported with the compliance analysis for the SE coping subscale (p = 0.003). The exercise and education group increased their SE more than the control group	Y	2
Levinger et al. (2017)	Control group = 6.9 ± 1.4 (future function), 2.4 ± 3.2 (daily activities). Intervention group = 5.6 ± 2.6 (future function), 1.5 ± 1.5 (daily activities)	Control group = 6.3 ± 1.4 (future function), 6.0 ± 2.9 (daily activities). Intervention group = 6.1 ± 2.2 (future function), 5.8 ± 1.5 (daily activities)	Group × time interaction on both SE subscales was significant (p < 0.01). The internet intervention was a useful tool for reinforcing rehabilitation exercise and may improve SE	Y	2
Nordin et al. (2016)	ASES pain MMR and web group = 45.8 ± 21.6, MMR-only group	12-month follow-up ASES pain MMR and web group	There were no significant treatment effects over time between groups for the ASES	N	2

(Continues)

TABLE 4 (Continued)

Authors	Pre-/initial score	Postscore/follow-up	Results/conclusions	Did SE improve? (Yes/No)	LOE
	= 49.0 ± 20.4. GSE MMR and web group = 2.9 ± 0.6, MMR-only group = 2.97 ± 0.46	= 53.2 ± 22.3, MMR-only group = 46.9 ± 22.2. GSE MMR and web group = 2.93 ± 0.62, MMR-only group = 3.08 ± 0.56	pain (p = 0.04) or GSE (p = 0.30). Nor were there improvements over time for either group for ASES pain (p = 0.28) or GSE (p = 0.12)		
Palmer et al. (2014)	Median (interquartile range) TENS group = 14.6 (4.0), sham TENS group = 15.0 (3.9) and exercise/education group = 14.6 (3.5)	Median (interquartile range) TENS group = 15.8 (4.5), sham TENS group = 16.0 (4.1) and exercise/education group = 16.0 (5.5) at week 24	SE improved over time (p = 0.031), but no differences in trial arms exist. The findings of this study fail to support the use of TENS as an adjunct to a group education and exercise intervention, although SE improved over time	Y	2
Rini et al. (2015)	Control group = 6.31 and treatment group = 6.66	Control group = 6.7 and treatment group = 7.52	There was a significant effect of treatment in the treatment group, and this group reported significantly higher SE than the control group (p = 0.038). In the control group, SE did not change over time; in the intervention group SE increased significantly over time (p = 0.023). The PainCOACH internet-based behavioural intervention may promote patients' SE over time	Y	2
Taylor et al. (2012)	Control = 30.6 ± 14.1, intervention = 31.2 ± 13.8	6-month follow-up: Control = 32.7 ± 15.0, intervention = 35.5 ± 14.0	Pain-related SE was better in the intervention group at 6 months (difference 2.3, 95% CI: 0.6to 4.1). SE was improved more in the intervention group at 6 months compared with the control group but there were no sustained benefits at 12 months for pain-related SE	Y	2

TABLE 5 Self-efficacy scales

Self-efficacy measure	Authors	Study population	Response scale used	Number of Items	Score	Internal consistency (Cronbach's α)	Test–re-test reliability	Validity
Ewart's Scale of Self-Efficacy	Baker et al. (2001)	OA	0 (definitely cannot do) – 100 (definitely can do) (increments of 10)	5–7	Mean	NR	NR	NR
Arthritis Self-Efficacy Scale (Lorig et al., 1989)	Baxter et al. (2016), Bearne et al. (2011), Gowans & deHueck (2004), Hammond et al. (1999, 2004), Hammond & Freeman (2004), Hughes et al. (2004, 2006), King et al. (2008), Nordin et al. (2016), Palmer et al. (2014), Skou et al. (2012), Williamson et al. (2017) Used eight-item version- Rini et al. (2015) Used modified versions- Oliver & Cronan (2002), Skolasky et al. (2008)	RA, musculoskeletal pain, FM, OA	10 (very uncertain) – 100 (very certain)	20	Mean	0.75–0.90	0.85–0.90	Construct
Self-Efficacy for Physical Activity (Marcus et al., 1992)	Andersen (2011), Baxter et al. (2016), Dalager et al. (2015), Oliver & Cronan (2002)	Musculoskeletal pain, FM, RA	1 (not at all confident) – 11 (very confident). Or a 1–5 scale using the same anchors as above	5–7	NR	0.82	0.90	NR
Health Belief Model	Chen et al. (1999)	Upper extremity impairment	1 (strongly disagree) – 5 (strongly agree)	19 in total, only two specific to self-efficacy	Sum	NR	NR	NR
Self-Efficacy for Exercise Scale (Resnick & Jenkins, 2000)	Cheung et al. (2016), Stenstrom et al. (1997)	Inflammatory rheumatic disease, OA	10–100 Or 0 (not confident) – 10 (very confident)	9	Sum	0.92	NR	Construct
Sports Injury Rehabilitation Beliefs Scale (Taylor & May, 1996)	Grindley et al. (2008)	Musculoskeletal injury	1 (very strongly disagree) – 7 (Very strongly agree)	19 in total, only four specific to self-efficacy	Mean	0.79–0.91	NR	NR
Barriers Adherence Efficacy Scale (McAuley et al., 1993)	Hughes et al. (2004, 2006)	OA	0–100	13	Mean	0.93–0.94	NR	NR
Time Exercise Adherence Scale (McAuley et al., 1993)	Hughes et al. (2004, 2006)	OA	0–100	6	Mean	0.95–0.98	NR	NR
Aquatic Exercise Self-Efficacy Scale	Kang et al. (2007)	Arthritis	10 (no confidence) – 100 (very confident)	8	Sum	0.94	NR	Content
Chronic Pain Self-Efficacy Scale (Anderson et al., 1995)	King et al. (2002), Schachter et al. (2003)	FM	10 (very uncertain) – 100 (very certain)	20–22	Sum	0.87–0.90	NR	Construct
Knee Self-Efficacy Scale (Thomeé et al., 2006)	Levinger et al. (2017)	ACL reconstruction	0 (not at all certain) – 10 (very certain)	21	Mean	0.78–0.94	0.75	Content, construct

(Continues)

TABLE 5 (Continued)

Self-efficacy measure	Authors	Study population	Response scale used	Number of Items	Score	Internal consistency (Cronbach's α)	Test–re-test reliability	Validity
Exercise Self-Efficacy Questionnaire	Mannion et al. (2009)	Chronic low back pain	0 (not certain at all) – 66 (absolutely certain)	11	NR	NR	NR	NR
General Self-Efficacy Scale (Löve et al., 2012)	Nordin et al. (2016)	Musculoskeletal pain	1 (not at all true) – 4 (exactly true)	10	Sum	0.76–0.90	NR	Construct
Pain Self-Efficacy Questionnaire (Nicholas, 2007)	Taylor et al. (2016)	Musculoskeletal pain	0 (not confident) – 6 (completely confident)	10	Sum	0.92	0.73	Construct

ACL, anterior cruciate ligament; FM, fibromyalgia; OA, osteoarthritis; NR, not reported; RA, rheumatoid arthritis

Additional information on scale validity can be found within the text

3.4 | Condition-specific scales

The most common scale used to assess self-efficacy within the present review, and one of the more psychometrically sound instruments, was the Arthritis Self-Efficacy Scale. This 20-item scale has three subscales (pain, function and coping with other symptoms), with all questions answered on a 10- (very uncertain) to 100- (very certain) point Likert scale. The psychometric properties of this instrument have been well established, with internal consistency values ranging from 0.75 to 0.90, and test–retest reliability ranging from 0.85 to 90 (Lorig, Chastain, Ung, Shoor, & Holman, 1989). This scale has established construct validity, with significant relationships found with disability (r = −0.68 to −0.73) and concurrent validity (r = 0.61) when compared with actual performance (Lorig et al., 1989). Other condition-specific scales identified in the present review included the Knee Self-Efficacy Scale (Levinger et al., 2017; Thomeé et al., 2006), the Chronic Pain Self-Efficacy Scale (Nicholas, 2007) and the Pain Self-Efficacy Questionnaire pain (Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995). The details of the scales can be found in Table 5.

3.5 | Task-specific scales

A number of scales specific to physical activity and exercise were identified. The Self-Efficacy for Physical Activity Scale measures an individual's confidence in their ability to exercise in various situations, such as when tired, in a bad mood or when on holiday (Baxter et al., 2016; Marcus, Selby, Niaura, & Rossi, 1992). The scale has excellent test–retest reliability but does not have reported validity. General exercise self-efficacy may be assessed with either the Exercise Self-Efficacy or the Self-Efficacy for Exercise Scale. The Exercise Self-Efficacy Scale enquires about an individual's ability to continue to exercise in the future, three times per week, at moderate intensity, for 40+ min. This scale does not have reliability or validity established. The Self-Efficacy for Exercise Scale enquires about an individual's confidence to exercise for 20 min, three times per week, under varying circumstances. The Self-Efficacy for Exercise Scale has excellent internal consistency (α = 0.92) (Resnick & Jenkins, 2000) but lacks test–retest reliability. Established construct and criterion validity of the Self-Efficacy for Exercise Scale revealed a relationship between high self-efficacy and better physical and mental status (Resnick & Jenkins, 2000). Another exercise-specific self-efficacy scale is the Aquatic Exercise Self-Efficacy Scale. This scale was modified from previously developed exercise self-efficacy scales specifically for aquatic exercise, directed at fibromyalgia patients, and addresses the patient's confidence in sustaining aquatic exercise for at least 3 times a week for a period of 6 months under various conditions (Kang, Ferrans, Kim, Kim, & Lee, 2007). The internal consistency of the scale was deemed excellent (α = 0.94), with only content validity confirmed by nursing professors who were experts in aquatic exercise (Kang et al., 2007). The problem with these physical activity and exercise self-efficacy scales was that not one of them had both well-established reliability and validity, and that they were not specific to HEPs.

Hughes et al. (2004,2006) used two scales created by McAuley, Lox, and Duncan (1993) to assess self-efficacy for exercise adherence: the Time Exercise Adherence Scale and the Barriers Adherence Efficacy Scale. The Barriers Adherence Efficacy Scale measures self-efficacy for adherence to exercise in the face of barriers and has excellent internal consistency (α = 0.93) (Hughes et al., 2004). The Time Exercise Adherence Scale enquires about an individual's self-efficacy to continue exercising regularly over the following six months, and also has excellent internal consistency (α = 0.98). Validity measures have not been determined for either scale.

Less specific to general exercise and more specific to rehabilitation exercise is the Sports Injury Rehabilitation Beliefs Scale. This assesses a patient's consideration of rehabilitation following a sports-related injury. Only four of the 19 items are related to self-efficacy, with other items including injury severity, susceptibility, treatment efficacy and rehabilitation values. The internal consistency of the self-efficacy items has α values between 0.79 and 91 (Taylor & May, 1996); no other psychometric properties were found with a secondary search.

3.6 | Self-efficacy for HEPs and relationship with adherence

No scale was identified within the present review specifically to assess self-efficacy for HEPs. Although no tool was identified, Cheung, Wyman, & Savik (2016) used the Self-Efficacy for Exercise Scale to correlate class attendance and home practice with self-efficacy for exercise. They found that the scale moderately predicted class attendance (r = 0.34, p = 0.03), but not home exercise practice (r = 0.14) (Cheung et al., 2016). Table 3 displays the results for all studies that used self-efficacy to predict adherence to rehabilitation or found relationships with adherence. Due to inconsistencies in the reporting of information, not all of these scales can be compared. Self-efficacy was found to be moderately correlated (r = 0.3–0.39) with adherence when using the Exercise Self-Efficacy Scale, Health Belief Model, Self-Efficacy for Exercise Scale and the Sports Injury Rehabilitation Beliefs Scale (Chen, Neufeld, Feely, & Skinner, 1999; Cheung et al., 2016; Grindley, Zizzi, & Nasypany, 2008; Mannion, Helbling, Pulkovski, & Sprott, 2009). The strongest correlation (r = 0.39) was found using the Sports Injury Rehabilitation Beliefs Scale, using the four self-efficacy items. Researchers using a version of the Arthritis Self-Efficacy Scale and the Self-Efficacy for Exercise Scale report the odds ratios (ORs) for those with high and low self-efficacy. Those with higher exercise self-efficacy on the Arthritis Self-Efficacy Scale were more likely to engage in exercise at baseline, and at six, 12 and 18 months (Oliver & Cronan, 2002). The scores from the Self-Efficacy for Exercise Scale indicated that those who scored 10 points higher on their initial self-efficacy assessment increased the odds (OR = 1.05, 95% confidence interval = 1.02 to 1.09) of actually completing and adhering to the study by 10.5 (Stenstrom, Arge, & Sundbom, 1997).

3.7 | Self-efficacy and interventions

To address the fifth aim (e, above), Table 4 was created. Table 4 displays study characteristics and provides the self-efficacy scales used with self-efficacy-focused interventions. When the goal is to improve self-efficacy with an intervention, it is important to assess self-efficacy pre- and post-intervention, to document change. The scales currently being used to track changes in self-efficacy over time include the Arthritis Self-Efficacy Scale, Chronic Pain Self-Efficacy Scale, Ewart's Scale of Self-Efficacy, Exercise Adherence Self-Efficacy, General Self-Efficacy Scale, Knee Self-Efficacy Scale, Pain Self-Efficacy Scale and the Self-Efficacy for Physical Activity Scale. Interventions found to target and improve self-efficacy include educational sessions that incorporate the sources of self-efficacy; cognitive behavioural therapy; and interventions that incorporate goal setting and systematic feedback, and provide social support (Hughes et al., 2004; Levinger et al., 2017; Palmer et al., 2014; Rini et al., 2015).

4 | DISCUSSION

The present systematic review compiled the currently used patient self-report scales assessing self-efficacy, along with evaluation of adherence to rehabilitation exercise, to address five specific aims. To answer the first and second aims (a and b, above), 14 scales were extracted that ranged from general self-efficacy to task, symptom or even condition-specific self-efficacy (Table 5). Unfortunately, there has yet to be an assessment tool developed for self-efficacy for HEPs. As self-efficacy is task and situation specific, this lack of assessment tool poses a problem. As HEPs are prescribed often as standard care, adherence to these programmes is pivotal in successful rehabilitation. If there is no tool to measure patient self-efficacy with this task, clinicians cannot identify appropriate interventions to increase adherence when needed. To address the third aim (aim c, above), the majority of the identified scales have good-to-excellent internal consistency values and some form of validity, but few have demonstrated test–retest reliability. To address the fourth aim (aim d, above), the scales that have been used to predict or associate self-efficacy with adherence include the Arthritis Self-Efficacy Scale, Self-Efficacy for Physical Activity Scale, Self-Efficacy for Exercise Scale, Sports Injury Rehabilitation Beliefs Scale and the Exercise Self-Efficacy Scale. These self-efficacy scales have, at best, a moderate relationship with adherence. Development of a new self-efficacy scale specifically addressing HEPs may aid in strengthening this relationship.

Many of the self-efficacy scales identified in the present systematic review were condition or diagnosis specific. The most commonly used, the Arthritis Self-Efficacy Scale, was developed to measure patients' perceived self-efficacy to cope with the results of their arthritis (Lorig et al., 1989). Although the scale is comprehensive and has established psychometric properties, it does not address self-efficacy for HEPs or even general exercise. This is problematic if the goal is to determine a patient's self-efficacy for HEPs. Scales that lack task specificity are problematic. Condition-specific measures of self-efficacy are based on the diagnosis and a variety of activities of daily living, not always exercise. In addition, it is important to note that condition-specific scales capture beliefs about a patient's disease or injury during activities of daily living and are not geared towards adherence to rehabilitation.

Self-efficacy is highly task oriented; therefore, it is important to have scales developed for specific tasks. The present systematic review included a number of task-specific scales focused on exercise, including the Aquatic Exercise Self-Efficacy Scale, Self-Efficacy for Physical Activity Scale, Exercise Self-Efficacy Scale and Self-Efficacy for Exercise Scale. Items in these scales assessed the beliefs individuals hold with respect to general physical activity and exercise, and any lacking beliefs about rehabilitation exercise. Despite their value, none of the above scales are appropriate or specific enough to address self-efficacy for HEPs following a musculoskeletal injury.

As clinicians use scales in research and/or clinical practice, the psychometric properties of these instruments should not be ignored. The majority of the scales provide limited data related to psychometric properties. Internal consistency values ranged from good to excellent, and construct validity was most commonly evaluated. None of the included scales had criterion validity. Criterion validity, in this case, is difficult to evaluate as there are no gold standard measurements for these types of construct. Test–retest reliability was only established for the Arthritis Self-Efficacy Scale, Self-Efficacy for Physical Activity Scale, the Knee Self-Efficacy Scale and the Pain Self-Efficacy Scale. This psychometric property is clinically useful for clinicians administering these scales for pre- and post-testing. Without intraclass correlation coefficients, standard error of measurement and minimal detectable change values, it is difficult to know if changes in scores are meaningful beyond measurement error or valued by the patient.

When selecting a self-efficacy scale to implement, it is best to choose one with well-established reliability and validity. Unfortunately, a few of the instruments do not have reliability or validity established, so must be used with caution. Research in other healthcare domains has commonly found that some clinical measures have not been adequately validated (Chen et al., 2010; Kosowski et al., 2009; Souza, Alexandre, & Guirardello, 2017). A further concern is that modifying a scale for a particular population could invalidate previously documented psychometric properties. This has occurred in studies comparing an original scale with a modified version; prior psychometric property assumptions were violated (Bassett & Prapavessis, 2011; Bollen, Dean, Siegert, Howe, & Goodwin, 2014; Levy, Polman, & Clough, 2008). Therefore, modifying scales to fit population needs is not advisable without further validation of the scale.

Self-efficacy was reported as a relatively strong predictor of adherence to HEPs in a recent systematic review by Essery et al. (2017). A moderate relationship between self-efficacy and adherence was also indicated in the present systematic review; however, the scales were not discussed Essery et al. (2017), and did not further explore the psychometric properties of the included scales. Consequently, the need to have a scale designed specifically to assess self-efficacy for HEPs is apparent. In Bandura's chapter on constructing self-efficacy scales, he notes that the "one measure fits all" approach has limited explanatory and predictive value, with less relevance to the domain in question (Pajares, 2006). When exercise rehabilitation adherence self-efficacy is in question, scales such as the General Self-Efficacy Scale, as Bandura suggests, would have little relevance. Picha and Howell (2017) proposed that to improve adherence to HEPs using a self-efficacy framework as a scale needs to be developed specific to that task is required. A scale geared towards self-efficacy for HEPs should both correspond to and be specific to the appropriate domain – two qualities of a good self-efficacy measure (Pajares, 2006). Providing clinicians with a scale that addresses self-efficacy for HEPs is the necessary first step to improving self-efficacy from the start of treatment.

Strategies to improve self-efficacy for rehabilitation exercise have been found to be successful (Levinger et al., 2017; Palmer et al., 2014; Rini et al., 2015; Taylor et al., 2016). Although the present systematic review did not specifically focus on intervention studies, an important future step is to determine which interventions have been effective in improving self-efficacy. The fifth aim of the current review (aim e, above) sought to examine which scales have been used to measure improvements in self-efficacy over time, using interventions that specifically target self-efficacy. The successful interventions that we identified had ways of incorporating the sources of self-efficacy to increase patient beliefs in their capabilities. Future research should examine which strategies are most effective at improving outcomes for patients with musculoskeletal injury. The scales used to track these improvements in self-efficacy were important to identify, so that they can be used in future work with the knowledge of their ability to detect change. The measures included in this review have the ability to track changes over time, but the administrator needs to understand which scales are specific to the task and situation of interest.

4.1 | Strengths and limitations of the review

The present systematic review was not without limitations or the potential for bias. Firstly, the risk of publication bias was apparent as we only reviewed articles published in select databases (Altman, 1991). Secondly, the studies included were written in English, allowing for the potential of language bias. In addition, there was a possibility that studies in different languages might have yielded additional scales. Thirdly, the present review included only studies that evaluated self-efficacy in relationship to adherence to rehabilitation.

4.2 | Strengths and limitations of reviewed studies

The studies reviewed were given a level of evidence rating of 2 or 3, and quality ranged from 6 to a 10 on the Modified Downs and Black assessment (Downs & Black, 1998). Although most of the studies were rated as being of high quality, there were limitations. Researchers such as Oliver & Cronan (2002) and Skolasky, Mackenzie, Wegener, & Riley (2008), who modified an existing self-efficacy questionnaire to apply to a specific population of interest altered the integrity of the scale (Andersen, 2011; Dalager et al., 2015; Kang et al., 2007; Oliver & Cronan, 2002; Skolasky et al., 2008). The reliability and validity of these scales may have been assessed in their original form, but if modifications are made to the scale, the psychometric properties of that instrument may not hold true. The last question on the Modified Downs and Black assessment was commonly missed because of a lack of reliability and validity reporting of outcome measures, especially for the self-efficacy scales. When this information was not reported, an additional informal search to obtain it was conducted.

5 | CONCLUSION

The present systematic review sought to identify existing self-report patient scales used to assess self-efficacy for rehabilitation in patient populations with musculoskeletal injuries, pain or a disorder. A number of self-efficacy scales aimed at this patient population were found to be reliable and valid tools for assessing self-efficacy, predicting adherence to rehabilitation and assessing improvement in self-efficacy over time. However, a tool to assess self-efficacy for HEPs does not exist. As HEPs are an essential component of rehabilitation, coupled with the evidence suggesting that self-efficacy may predict adherence, a reliable and valid scale designed specifically to assess self-efficacy for HEPs is needed.

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CONFLICTS OF INTEREST

The authors do not have any conflicts of interest to disclose.

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