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The Self-Efficacy for Home Exercise Programs Scale: Development and Psychometric Properties

Adherence to medical recommendations is essential to successful patient outcomes in rehabilitation.[27,47] Home exercise programs (HEPs) act as a crucial adjunct to in-clinic rehabilitation, as they defer the cost of supervised physical therapy sessions while still providing a high level of care.[20,27] Hayes et al[25] found that patients who had rotator cuff repair demonstrated comparable outcomes whether they were allocated to individualized physical therapy or performed an unsupervised HEP. Despite the benefits of rehabilitative exercise, adherence is low. In the clinic, patient adherence is approximately 50%,[32] and rates of HEP adherence are even lower.[6,12] With the rising cost of health care, prescription of HEPs may lower the financial burden associated with injury by reducing the number of clinic visits. However, nonadherence to prescribed HEPs may diminish the benefits of physical therapy.[46]

Low self-efficacy is one of several barriers to rehabilitation exercise adherence and an important predictor of patient behavior.[3,4,35] Self-efficacy refers to the beliefs individuals hold about their capability of successfully performing particular tasks. Those with higher levels of self-efficacy in performing exercise have been found to be 50% more likely to engage in exercise prescription.[43] Numerous studies have shown that self-efficacy is a robust predictor of exercise behavior and effort.[8] Self-efficacy is not a trait characteristic; rather, individuals revise their perceived efficacy when facing different situations or tasks. Environmental circumstances can raise or lower individuals' self-efficacy. For example, behavioral intervention programs that target self-efficacy for exercise have revealed higher adherence rates (13%–30%) compared to controls.[1,52]

Though low self-efficacy is a known psychological barrier to rehabilitation exercise adherence, self-efficacy is not always assessed or addressed within the standard clinical practice for musculoskeletal rehabilitation. Patients with low self-efficacy may present with characteristics such as fear of failure, fear of risks or uncertainty, and low aspirations.[3] On

⊙ **BACKGROUND:** The Self-Efficacy for Home Exercise Programs Scale (SEHEPS) was developed to help clinicians evaluate patients' self-efficacy for performing prescribed home exercise programs. Prior to clinical adoption, the scale's psychometric properties need to be examined.

⊙ **OBJECTIVE:** To determine the psychometric properties of the SEHEPS.

⊙ **METHODS:** Eighty-one patients (32 men, 49 women; mean ± SD age, 42 ± 17 years) with varying musculoskeletal conditions participated in this cohort study. Patients were given a home exercise program at the initial physical therapy visit and completed the SEHEPS and a modified Self-Efficacy for Exercise (SEE) scale. The SEHEPS is a 12-item patient-reported questionnaire designed to assess self-efficacy for prescribed home exercise. Patients rated their confidence on a 7-point scale that ranged from 0 (not confident) to 6 (very confident). Total scores ranged from 0 (low self-efficacy) to 72 (high self-efficacy). We assessed the internal consistency of the SEHEPS using Cronbach's alpha and its test-retest reliability using an intraclass correlation coefficient. Convergent validity between the SEHEPS and SEE scale was evaluated with a Spearman correlation.

⊙ **RESULTS:** High internal consistency (α = .96) and good test-retest reliability (intraclass correlation coefficient = 0.88; SEM, 4; minimal detectable change at the 95% confidence level, 12) were demonstrated. The SEHEPS was strongly correlated with the SEE scale (ρ = 0.83, $P<.01$), indicating strong convergent validity.

⊙ **CONCLUSION:** The SEHEPS demonstrates excellent internal consistency and convergent validity with the SEE scale. Overall, the SEHEPS is a clinically useful tool to evaluate a patient's self-efficacy in home-based musculoskeletal exercise programs. This scale can be used prior to prescribing a home exercise program for patients with musculoskeletal conditions.

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⊙ **KEY WORDS:** *orthopaedics, rehabilitation, social cognitive theory, therapeutics*

the other hand, patients with high self-efficacy often demonstrate self-confidence and can quickly recover after failing or having a setback with a task.[3] The clinician's ability to recognize patients with low self-efficacy is important, as self-efficacy contributes to patient adherence to HEPs.

A variety of patient self-efficacy scales have been developed, and researchers have offered evidence of their reliability and validity for certain contexts. For instance, self-efficacy scales have been useful in identifying patients with low self-efficacy in cardiac rehabilitation[50] and in arthritic populations.[36] However, few, if any, scales have specifically assessed self-efficacy for HEPs among patients with musculoskeletal disorders. A proximate measure, the Self-Efficacy for Exercise (SEE) scale, has been previously correlated with in-clinic exercise (r = 0.34, P = .03), but not for home exercise (r = 0.14),[14] indicating that this measure may not be the best choice to assess self-efficacy for HEPs.

Self-efficacy is situation and task specific, meaning that a general all-purpose measure may not give specific-enough information to the clinician.[2] Using a proximate measure limits the value of the information collected, as the relevance to HEPs is not assessed in available measures.[2] In addition, Bandura[2] suggested that self-efficacy scales should be designed to specifically address activity domains and evaluate the multiple ways self-efficacy functions within a domain. To date, no scale has specifically addressed self-efficacy for HEPs. Developing an evaluation tool that clinicians could use to screen patients based on their self-efficacy in adhering to HEPs is necessary to further individualize patient care and overcome this barrier.

To date, no tool exists to evaluate self-efficacy in patients who are prescribed an HEP. The first aim of this study was to develop and evaluate a tool for assessing self-efficacy in adhering to an HEP, the Self-Efficacy for Home Exercise Programs Scale (SEHEPS). The researchers hypothesized that the SEHEPS would

demonstrate (1) good-to-excellent internal consistency (α≥.80), (2) acceptable test-retest reliability (intraclass correlation coefficient [ICC]>0.70), and (3) a significant positive relationship with 2 related measures, the SEE scale and the Pain Self-Efficacy Questionnaire (PSEQ). A secondary aim of this study was to determine a cutoff score that could identify nonadherent patients. The researchers hypothesized that self-efficacy for HEPs would positively correlate with reported adherence rates.

METHODS

Scale Development

THE SEHEPS WAS MODIFIED FROM the SEE scale.[51] As self-efficacy beliefs are linked to specific realms of functioning,[2] a scale to assess self-efficacy for HEPs in musculoskeletal patients is essential. Item generation began by modifying the SEE scale from asking patients, "How confident are you right now that you could exercise 3 times per week for 20 minutes if . . . ?" to "How confident are you that you could perform the prescribed exercises correctly . . . ?" in relation to their prescribed HEP. To eliminate hypothetical thinking and acknowledge the presence of potential barriers, the word *if* was changed to *when*. The 9 items in the SEE scale were revised specifically to address questions related to HEPs, and 3 questions were added. These new questions were (1) "How confident are you that you could perform the prescribed exercises correctly as often as prescribed by your clinician?" (2) "How confident are you that you could perform exercises correctly when you are given written exercise instruction?" and (3) "How confident are you that you could perform exercises correctly when you do not have supervision or clinician feedback?"

Focus groups consisting of athletic trainers, physical therapists, and a self-efficacy expert reviewed the scale to provide evidence of face and content validity. The decision was made to modify the response scale from 11 points (0-100,

increasing in 10-point increments) to 7 points (0-6), which reduced the levels of discrimination in the scale as well as the cognitive burden on respondents.[40,49] The descriptors of "not confident," "somewhat confident," and "very confident" were also included. Scale anchors ranged from 0 (not confident) to 6 (very confident).

Previous literature has indicated that a similar response-scale format provides comparable results to a 0-to-100 scale.[44,49] Other self-efficacy scales have also used this rating system.[42] Upon scale finalization, a pilot test of the SEHEPS was conducted on a convenience sample of 10 patients in a physical therapy clinic. Pilot test results confirmed that patients understood scale items and could complete them in a reasonable time.

Survey Measures

The SEHEPS (**APPENDIX**, available at www.jospt.org) was designed to evaluate a patient's self-efficacy toward his or her prescribed HEP. This scale is a guide for clinicians to individualize patient care when HEPs are utilized. The 12-item questionnaire takes approximately 2 minutes to complete. A patient's self-efficacy score was calculated as the raw sum score of the 12 self-efficacy items (possible range, 0-72). Patients completed the SEHEPS at 2 time points: the initial visit and 24 to 48 hours following the initial visit.

The SEE Scale was designed to examine the barriers to exercise self-efficacy in adults. This 9-item scale asks individuals to rate their confidence that they can exercise for 20 minutes, 3 times a week, under certain conditions. Typically, responses are rated on a 0-to-10-point Likert scale, but the response options were reduced to a 7-point Likert scale for this study to keep formatting consistent across scales and thereby eliminate patient confusion.[57] The SEE scale was created to assess sedentary adults' perceived capability to take part in various exercises (ie, biking, rowing, and walking) in the presence of barriers.[51] The 10-point SEE scale has been identified as reliable and

valid within the older adult population.[51] Stronger self-efficacy expectations detected on this scale have been associated with better physical and mental health status.[51] This scale was administered only at the initial visit to examine convergent validity between the SEHEPS and SEE scale.

The PSEQ is applicable to many patients suffering from persistent pain.[42] This scale was developed to examine individuals' confidence in their ability to complete activities while experiencing pain. The PSEQ has high internal consistency (α = .92) and test-retest reliability (ICC = 0.73).[42] Pain-related disability and coping strategies are correlated with the PSEQ.[42] Researchers have also examined the effects of a cognitive behavioral intervention on chronic pain with the PSEQ.[55] This scale was administered only at the initial visit to examine convergent validity between the SEHEPS and the PSEQ.

The Global Rating of Change question is a 1-item questionnaire that determines meaningful change in a patient's condition on a Likert scale ranging from −5 (much worse) to +5 (much better).[29,30,58] This measure was used to determine whether patients perceived their health status to have changed at 24 to 48 hours post treatment, before a change in health status could hinder their ability to complete their prescribed HEP. Patients who scored between −2 and +2 were considered to be in the same condition that they were in the previous day and were asked to complete the SEHEPS questionnaire again to evaluate its test-retest reliability.[39] Patients outside this range were not analyzed. The global rating of change question has been determined to be reliable and valid.[29,30]

Participants

This study included 81 patients who were being treated for a musculoskeletal condition. Participants were between 18 and 70 years of age, prescribed an HEP, and expected to receive treatment for at least 2 weeks. Patients were excluded if they did not intend to return for follow-up visits or were unable to read English.

Study Design and Procedures

This study examined the psychometric properties of the SEHEPS in a clinical cohort. Patients were recruited at their initial physical therapy visit at 1 of 2 outpatient orthopaedic clinics, by 1 of 3 trained raters. After participants were informed about the study and provided verbal and written consent (per protocol 17-0413-P3K approved by The University of Kentucky Institutional Review Board), they were administered the SEHEPS, SEE scale, and PSEQ. Following the prescription of an HEP, the 3 questionnaires took approximately 10 minutes to complete. Patients received an exercise log in which to record their prescribed HEP over 2 to 4 weeks by checking a box (yes or no) to indicate whether they had completed the prescribed exercises. The adherence percentage was calculated as (days HEP was completed/days HEP was prescribed) × 100. The period of 2 to 4 weeks was based on the 30-day window for physical therapy progress reports, leaving time to follow up when a patient was discharged prior to the progress report. Participants were given instructions on how to fill out the exercise log and asked to return the log at the end of the study.

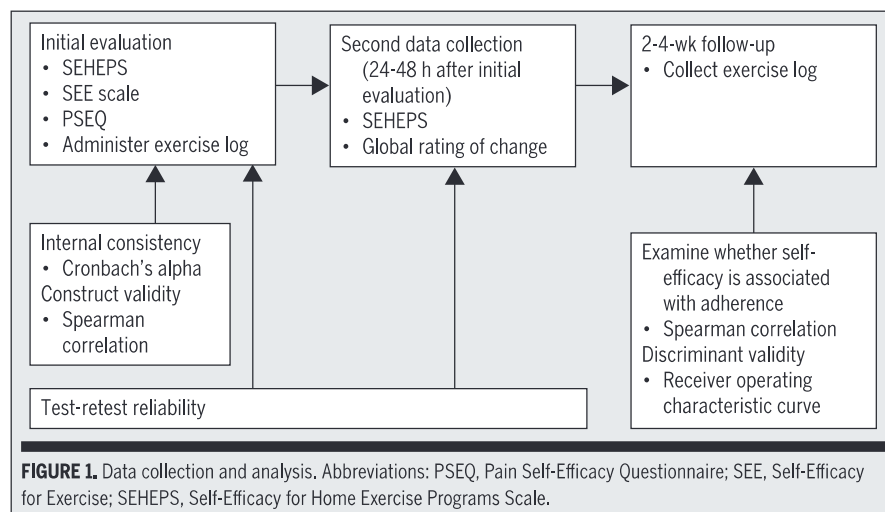The following day, patients received an e-mail requesting that they complete the global rating of change question and the SEHEPS within 24 to 48 hours of their initial visit. The survey was completed via Research Electronic Data Capture (REDCap; Vanderbilt University, Nashville, TN), a secure, web-based application designed to support data capture for research studies.[24]

The last follow-up occurred between 2 and 4 weeks after re-evaluation, when patients returned their exercise logs to complete the study. **FIGURE 1** presents the timing of data collection and analysis.

Statistical Analysis

The psychometric properties of the SEHEPS were examined from several perspectives. Cronbach's alpha was used to evaluate internal consistency of the item responses. Test-retest reliability of the SEHEPS was determined using ICC model 2,1[54] between the first and second assessment. Evidence for convergent validity was obtained by examining the correlation between scale scores obtained at the initial visit. Relationships between the 3 initial self-efficacy scores were examined with a Spearman rho, with correlations categorized as weak or low (below 0.50), moderate (0.50-0.70), or strong (above 0.70).[26]

The second aim of the study, to determine a cutoff score for nonadherence, was achieved with a receiver operating characteristic curve to differentiate patients at a 70% HEP adherence rate, which

FIGURE 1. Data collection and analysis. Abbreviations: PSEQ, Pain Self-Efficacy Questionnaire; SEE, Self-Efficacy for Exercise; SEHEPS, Self-Efficacy for Home Exercise Programs Scale.

represents the high end of patient adherence.[7,32,53] The receiver operating characteristic curve plotted sensitivity by 1 minus specificity for SEHEPS scores. The balance point, maximizing both sensitivity and specificity, determined the cut score for likely nonadherence, which could only be calculated from returned exercise logs. The P value for the area under the curve was set at .05. All statistical analysis was completed using SPSS statistical software (Version 24.0; IBM Corporation, Armonk, NY).

RESULTS

Patient Characteristics and Descriptive Statistics

EIGHTY-ONE PATIENTS WITH MUSCULOskeletal conditions volunteered to participate. Participants were contacted several times via e-mail, text, or phone call to encourage them to return their exercise logs, resulting in a response rate of 39.5% (n = 32). Patients were asked to report whether they had completed the HEP prescribed by their physical therapist and no other details regarding exercise performance. Of those who returned their logs, the average adherence rate was 76%. **TABLE 1** includes patient characteristics and compares the demographics between patients who returned their exercise logs and those who did not. Independent t tests were used to evaluate differences between continuous variables (age and previous rehabilitation).

Chi-square tests assessed dichotomous and categorical variables (sex, race, insurance, socioeconomic status, and previous rehabilitation). Socioeconomic status was determined by zip code, using the 2017 Distressed Communities Index,[15] with scores ranging from 1 to 100, with a higher score indicating a more distressed community. Typically, the Distressed Communities Index scores are categorized into 5 groups: prosperous (below 20), comfortable (20-40), mid-tier (40-60), at risk (60-80), and distressed (over 80). Due to the small sample size of this cohort, some of the demographic catego-

ries had to be combined, as indicated in **TABLE 1**. For example, because some categories of socioeconomic status included only 1 patient, the mid-tier, at-risk, and distressed groups were combined into 1 more-distressed group for analysis.

No differences in age, sex, race, socioeconomic status, or condition were detected between those who returned their exercise log and those who did not

(**TABLE 1**). Patient diagnoses are displayed in **TABLE 2**. Statistical analysis was then performed only on the 32 individuals who returned their exercise log to evaluate the relationship between adherence to home exercise and self-efficacy at the initial visit. The Spearman rho correlation coefficient between the SEHEPS at the initial visit and program adherence was significant (n = 32, ρ = 0.38, P = .03).

TABLE 1	PATIENT CHARACTERISTICS*			
Characteristic	**All (n = 81)**	**Log Returned (n = 32)**	**No Log Returned (n = 49)**	**P Value**
Age, y	42 ± 17	44.2 ± 17.4	40.4 ± 17.5	.35
Sex, n				.39
Male	32	11	21	
Female	49	21	28	
Race, n				.62
Caucasian	66	27	39	
Other	12	4	8	
Not reported	3	0	2	
Insurance, n				.60
Private	65	25	40	
Public	12	6	6	
Not reported	4	1	3	
Socioeconomic status, n[†]				.16
Prosperous	24	13	11	
Comfortable	28	8	20	
Less than comfortable (from mid-tier to distressed)	25	9	16	
Postsurgical patient, n				.45
Yes	32	11	21	
No	49	21	28	
Previous rehabilitation, n[‡]				.23
Yes	48	22	26	
No	20	6	14	
Not reported	13	4	9	
SEHEPS initial score	50.8 ± 13.6	52.6 ± 11.6	49.7 ± 14.7	.34
Range	20-72			
SEE scale score	37.3 ± 10.8	38.9 ± 9.5	35.9 ± 11.3	.21
Range	10-54			
PSEQ score	42.1 ± 13.7	43.9 ± 13.1	40.6 ± 13.9	.29
Range	8-70			

Abbreviations: PSEQ, Pain Self-Efficacy Questionnaire; SEE, Self-Efficacy for Exercise; SEHEPS, Self-Efficacy for Home Exercise Programs Scale.
*Values are mean ± SD unless otherwise indicated.
†Based on the 2017 Distressed Communities Index.[15]
‡"Previous rehabilitation" refers to patients who attended rehabilitation in the past for the same or a different musculoskeletal condition.

Reliability

The internal consistency estimate for the items in the SEHEPS was deemed to be high (α = .96) among all 81 participants at the initial visit. Test-retest reliability was calculated using the SEHEPS score at the initial visit and at the 24- to 48-hour follow-up. The test-retest reliability analysis, which included 20 of the 81 participants, found the SEHEPS to be reliable between days (ICC = 0.88; SEM, 4; minimal detectable change at the 95% confidence level [MDC_{95}], 12).

Validity

Convergent validity was strong between the SEHEPS and SEE scale (ρ = 0.83, P<.01) (**FIGURE 2**) and low between the SEHEPS and PSEQ (ρ = 0.31, P<.01) (**FIGURE 3**). The correlation for the assessment of convergent validity was significant, but slightly weaker, between the SEE scale and PSEQ (ρ = 0.28, P<.01) (**FIGURE 4**). In a secondary analysis, independent t tests assessed initial SEHEPS scores between patients who had surgery and those who did not. There were no differences in SEHEPS scores between nonsurgical (50.8 ± 12.2) and surgical (50.7 ± 15.7) groups (P>.05), supporting the external validity of the instrument in both patient populations.

Cutoff Scores

The SEHEPS cutoff score to identify patients who were not adherent to their prescribed HEP at the 70% level was determined by receiver operating characteristic curve analysis (**FIGURE 5**). The area under the curve was 0.78, with a standard error of 0.08, which was significant (P = .008). The cutoff score was 59 points, with a sensitivity of 92% (95% confidence interval [CI]: 66%, 99%) and specificity of 55% (95% CI: 40%, 60%). The positive likelihood ratio of 2.0 (95% CI: 1.1, 2.5) indicates that those who scored below 59 points on the SEHEPS were twice as likely to be nonadherent than adherent to their HEP.

Missing Data

Seven patients chose the "not applicable" option on the initial SEHEPS at least once, 2 of whom returned their exercise logs. To handle missing data, the authors ran analyses on the relationship between self-efficacy and HEP adherence with (n = 30) and without (n = 32) missing data. Results were not altered (if included, r = 0.38 and P = .03; if excluded, r = 0.39 and P = .04). Therefore, a raw score could be used when only 1 to 2 responses were missing, with the understanding that the total score should be reduced by 6 points per unanswered question. If more than 2 items were left unanswered, scores should be used with caution.

DISCUSSION

PATIENT ADHERENCE TO HEPs HAS been reported to be as low as 13%.[16,53] The assessment of patient barriers, such as low self-efficacy, is essential for improving and individualizing care. This study provides a newly developed scale with strong psychometric properties to aid in assessing patients' self-efficacy for HEPs. Results of this study demonstrate that the SEHEPS is a reliable and valid tool to assess self-efficacy in both musculoskeletal surgical and nonsurgical patient populations participating in HEPs. Clinically, assessment of self-efficacy using this scale may aid in identifying which patients may not be adherent to their HEPs.

Items on the SEHEPS have excellent internal consistency. This scale should be used with caution, as acceptable Cronbach's alpha values vary between research and clinical use.[10] A Cronbach's alpha of .96 suggests that this scale is suitable for both research and clinical application,

| TABLE 2	Patient Diagnoses
Diagnosis	**n**
Surgical	
ACL reconstruction	11
Meniscus repair	5
Shoulder repair	5
Loose-body removal from knee	4
Total lower extremity arthroplasty	4
Medial patellofemoral ligament reconstruction	1
Metacarpal fracture with percutaneous pinning	1
Total	31
Nonsurgical	
Shoulder pain	14
Back pain	7
Ankle sprain	5
Knee pain	6
Hip pain	5
Ankle/foot fracture	3
Neck pain	3
Achilles tendinopathy	1
Patellar dislocation	1
Compartment syndrome	1
Clavicular fracture	1
Ankle osteoarthritis	1
Lateral epicondylitis	1
Wrist pain	1
Total	50
Abbreviation: ACL, anterior cruciate ligament.	
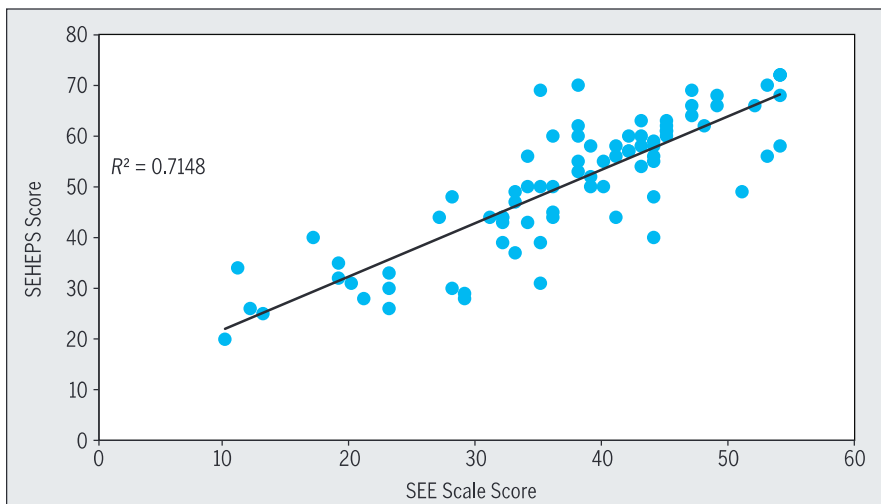
FIGURE 2. Correlation between initial SEHEPS score and SEE scale score. Abbreviations: SEE, Self-Efficacy for Exercise; SEHEPS, Self-Efficacy for Home Exercise Programs Scale.
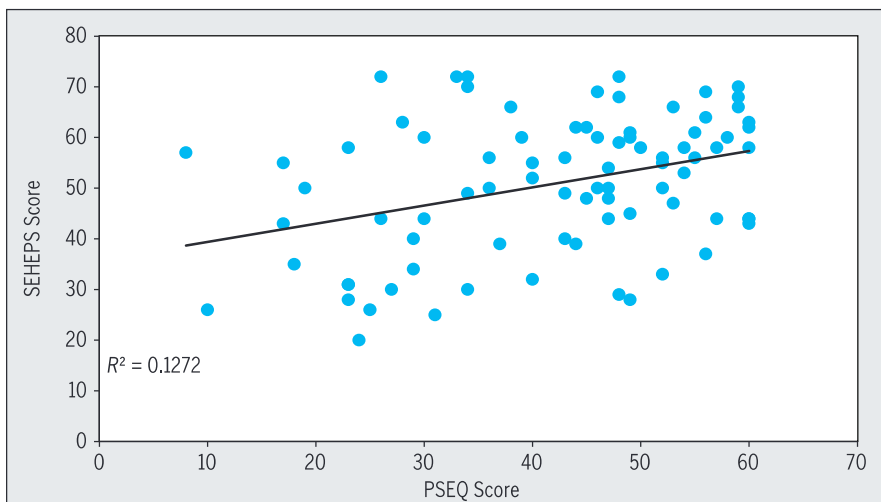

FIGURE 3. Correlation between initial SEHEPS score and PSEQ score. Abbreviations: PSEQ, Pain Self-Efficacy Questionnaire; SEHEPS, Self-Efficacy for Home Exercise Programs Scale.

though it is slightly higher than that obtained with related self-efficacy scales, which may indicate that the items in the scale do not provide enough variability or that reduction of items may be possible. Future studies may reduce the items in this scale using a factor-analysis technique. A scale with fewer items would save both the patient and clinician time, yet provide valuable information for further individualization of care. Other self-efficacy measures, such as the SEE scale and the PSEQ, also have excellent internal consistency (.92),[42,51] but this is the first scale to specifically assess self-efficacy for HEPs.

Evaluation of test-retest reliability of the SEHEPS separates this scale from other self-efficacy assessment tools such as the SEE scale, which do not report this psychometric property. Only 4 self-efficacy scales used within the musculoskeletal literature provided a value for test-retest reliability.[36,38,42,56] The test-retest reliability of the SEHEPS is considered to be good[48] and is higher than that of the PSEQ (ICC = 0.73) and similar to that of the Arthritis Self-Efficacy Scale (ICC = 0.85-0.90).[36] This finding indicates that

the SEHEPS is a stable assessment of self-efficacy for HEPs.

It is important that clinicians have reliable measures to assess patient self-efficacy for HEPs, as they may help to individualize care. The SEM of 4 and MDC_{95} of 12 do not exceed 10% error of the total score of the instrument, which is consistent with other patient-reported scales to assess musculoskeletal injury.[18,19,22,41] Establishing these values is important to researchers who may use this scale to assess the effectiveness of a self-efficacy intervention to improve functional outcomes or exercise adherence. These findings suggest that, when utilizing this tool to assess a patient's self-efficacy for an HEP, a 7-point change in total score indicates real change.

This study establishes evidence for the face, content, and convergent validity of the SEHEPS. A strong, positive correlation was detected between the SEHEPS and the SEE scale, which is consistent with our hypothesis. A weaker correlation was found between the SEHEPS and PSEQ. This may be because PSEQ questions relate to pain during other activities besides exercise alone, whereas the SEHEPS is specific to HEPs. A secondary analysis found that the SEE scale had a similar relationship to the PSEQ, which may also be a result of the different tasks in question. These results provide support for the SEHEPS as measuring the construct of self-efficacy relating to exercise rather than to pain.

This scale was created with the intent of specifically measuring self-efficacy as it pertains to HEPs to help clinicians better decipher who may be nonadherent to prescribed programs. At the initial visit, patients who scored less than 59 points (the cutoff score) on the SEHEPS were 2 times less likely to adhere to their HEPs. The relationship between reported HEP adherence and SEHEPS score at the initial visit is significant but low ($\rho = 0.38$) (**FIGURE 6**), similar to that found in previous studies of self-efficacy for different tasks or situations. Although a small sample might have contributed to this
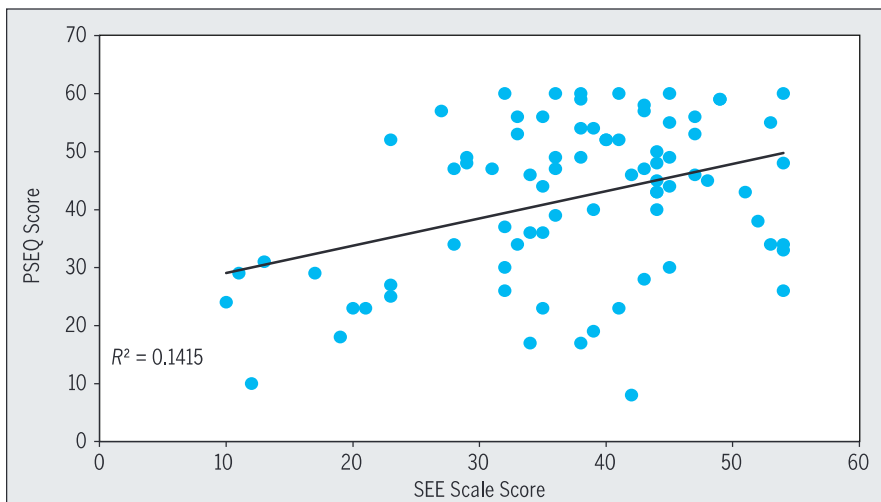
FIGURE 4. Correlation between SEE scale score and PSEQ score. Abbreviations: PSEQ, Pain Self-Efficacy Questionnaire; SEE, Self-Efficacy for Exercise.
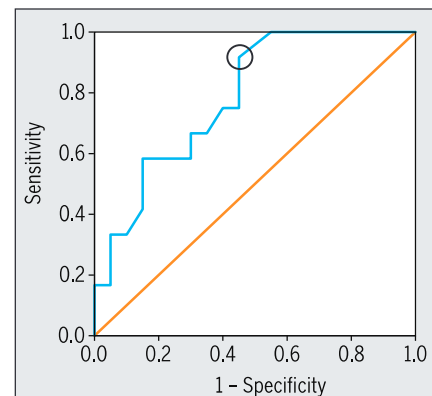

FIGURE 5. Receiver operating characteristic curve for the Self-Efficacy for Home Exercise Programs Scale. The point closest to the top left corner (circle) is the cutoff score that demonstrates the best balance between sensitivity and specificity of those patients likely to be nonadherent to their home exercise program.
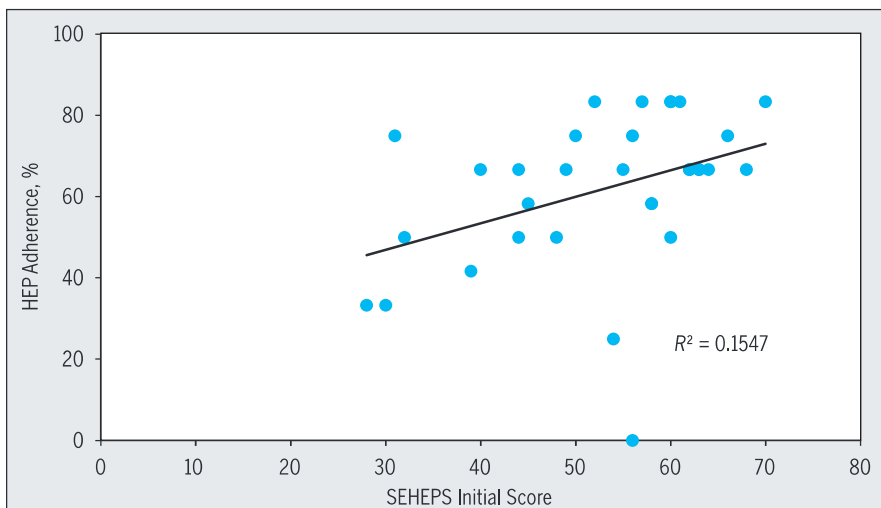

FIGURE 6. Correlation between initial SEHEPS score and adherence to the HEP. Abbreviations: HEP, home exercise program; SEHEPS, Self-Efficacy for Home Exercise Programs Scale.

correlation, it is in line with a similar finding from Mannion et al,[37] who reported a slightly weaker correlation ($r = 0.36$) between adherence to home exercise and self-efficacy (assessed via the Exercise Self-Efficacy Scale). The relatively low correlation may be due to the specificity of the task (prescribed HEPs) inquired about in the new scale.

Other studies of the relationship between exercise self-efficacy and adherence have found positive yet weak to moderate relationships ($r = 0.30$-0.39).[13,14,21,37] Many of these studies used a Pearson correlation coefficient to examine these relationships, whereas this study used a Spearman correlation coefficient, due to nonnormal data distribution.[9] The use of the Spearman correlation coefficient may have produced slightly different values from those obtained via the Pearson correlation coefficient.

Lower self-efficacy may result in decreased adherence to both clinic-based exercise and attendance at physical therapy treatments.[11] These results illustrate that self-efficacy is a construct that may impact maintenance and adherence to rehabilitative exercise.[34] The current study provides a more task-specific scale for assessing self-efficacy for HEPs.

When making clinical decisions regarding patient adherence to HEPs, the SEHEPS may help clinicians discriminate between those who may and may not be at least 70% adherent. The balance point of sensitivity and specificity on the SEHEPS identified a cutoff score of 59, classifying 22 out of 32 patients correctly. These results may help clinicians pursue early interventions to improve patient self-efficacy or modify HEPs to ensure exercise adherence. For the average patient who scores 50 points on the SEHEPS, an improvement of as little as 7 points would come closer to the 59-point cutoff score, making the patient less likely to be nonadherent. Previous studies have found that goal setting, providing systematic feedback and additional social support through text messages or e-mail, and education to enhance behavioral change or self-management have increased patient self-efficacy and, in turn, adherence.[17,28,31,33,45] After the administration of the SEHEPS at the initial visit, any of these interventions may be easily incorporated into the standard of care.

Study Limitations

Without the patients' exercise logs, we were unable to determine whether the

results were skewed between self-efficacy at the initial visit and adherence to the prescribed HEP. Despite numerous attempts to obtain these logs, patients claimed to have lost their logs or no longer wished to participate. Another construct to consider in social cognitive theory to account for low return of exercise logs is self-regulation. Bandura[5] has suggested that self-regulation is a key factor in one's life outcomes and that "people are not eager to shoulder the burdens of responsibility."[5] Whether completing an HEP or returning an exercise log, some individuals may not self-regulate or manage such tasks as they should to improve their condition. Low response rates are a common problem in human research,[23] and this study was no exception. However, the data collected at the initial visit were not affected by this, as internal consistency and validity were not reliant on response rate.

The authors did not control for other possible sources of variation, such as care provided by clinicians, progression of therapy, or patient diagnosis. Future studies should account for these variables, as some patients may respond better to self-efficacy interventions. The purpose of the present study was to examine the use of this instrument in standard physical therapy care in a musculoskeletal setting for prescribed home exercise only. Consequently, other essential aspects of a home program, such as activity modification and ergonomic changes, are not addressed. This is a limitation that should be considered in future studies.

This scale should be refined with further research through factor analysis, item reduction, and confirmatory factor analysis. Use of this scale when implementing a self-efficacy intervention to stratify patients into groups based on level of self-efficacy should also be considered.

CONCLUSION

THIS STUDY DEVELOPED AND TESTED a new tool to help clinicians assess patients' self-efficacy when completing HEPs. The SEHEPS had strong evidence of internal consistency, test-retest reliability, and convergent validity, providing support for its use in a musculoskeletal patient population. The SEHEPS may be a clinically useful tool for evaluating patient self-efficacy for HEPs, as a score below 59 points indicated twice the risk of nonadherence. This scale provides a first step toward facilitating a patient's adherence to exercise prescription, which may improve rehabilitation outcomes. ◉

◼ KEY POINTS

FINDINGS: The Self-Efficacy for Home Exercise Programs Scale (SEHEPS) was developed to assist clinicians in the assessment of patient self-efficacy for home exercise programs (HEPs). The SEHEPS is a reliable and valid tool that can be implemented in clinical practice.
IMPLICATIONS: Patients who scored below 59 points on the SEHEPS were 2 times more likely to be nonadherent to their prescribed HEP. Clinicians may consider using the SEHEPS to intervene early in the plan of care.
CAUTION: This study had a small sample of exercise logs returned, making it difficult to determine whether the results were skewed between self-efficacy at the initial visit and adherence to HEPs.

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APPENDIX

SELF-EFFICACY FOR HOME EXERCISE PROGRAMS SCALE

Please circle your level of confidence in completing your prescribed exercises at home.

How confident are you that you could perform the prescribed exercises correctly...		Not Confident			Somewhat Confident		Very Confident	
...as often as prescribed by your clinician?	NA	0	1	2	3	4	5	6
...when you are bored by the program?	NA	0	1	2	3	4	5	6
...when you feel pain when exercising?	NA	0	1	2	3	4	5	6
...when you have to exercise alone?	NA	0	1	2	3	4	5	6
...when you do not enjoy it?	NA	0	1	2	3	4	5	6
...when you are given written exercise instruction?	NA	0	1	2	3	4	5	6
...when you are too busy with other activities?	NA	0	1	2	3	4	5	6
...when you are given video exercise instruction?	NA	0	1	2	3	4	5	6
...when you feel tired?	NA	0	1	2	3	4	5	6
...when you feel stressed?	NA	0	1	2	3	4	5	6
...when you feel depressed?	NA	0	1	2	3	4	5	6
...when you do not have supervision or clinician feedback?	NA	0	1	2	3	4	5	6

Abbreviation: NA, not applicable.