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Adapted emotional freedom techniques (EFT) for managing kinesiophobia in patients with rheumatoid arthritis: a feasibility study

Yan Li You^{1,2}, Vimala Ramoo^{1,4*}, Nor Aziyan Yahaya¹, Fariz Yahya³, Xiao Fei Shi², Xue Ying Shang² and DanDan Jiao^{2*}

Abstract

Background Up to 70% of patients with rheumatoid arthritis (RA) experience kinesiophobia, a debilitating fear of movement that exacerbates physical limitations and psychological stress. However, effective interventions remain limited, particularly in resource-constrained settings. This study evaluated the feasibility, safety, and acceptability of an adapted Emotional Freedom Techniques (EFT) intervention for Chinese patients with RA.

Methods A two-phase design was used. Phase 1 involved protocol validation and adaptation through the Delphi method. Phase 2 was a single-arm feasibility study involving 20 RA patients with kinesiophobia. The 4-week intervention included a 2-week supervised inpatient phase and a 2-week self-practice phase supported via WeChat. Feasibility (adherence, safety, satisfaction) and secondary outcomes (kinesiophobia, pain, pain anxiety, patient activation, and quality of life) were assessed. Data analysis included paired *t*-tests and thematic analysis of patient feedback.

Results The adapted EFT protocol achieved expert consensus ($I-CVI \geq 0.80$). Among participants, 80% met adherence criteria, no adverse events were reported, and 75–85% expressed satisfaction with the intervention. EFT was perceived as simple and accessible. Kinesiophobia scores decreased by 6.5 points (a 12.7% reduction; Hedges' $g = 1.36$), with moderate to large effects also seen for pain and anxiety.

Conclusions This adapted EFT intervention proved feasible, safe, and acceptable for Chinese RA patients with kinesiophobia. These findings support the potential for larger randomized controlled trials to rigorously evaluate effectiveness and long-term impact.

Clinical trial registration Chinese Clinical Trial Registry, ChiCTR2300076013. Date of registration: 21 September 2023.

Keywords Rheumatoid arthritis, Kinesiophobia, Emotional freedom techniques (EFT), Chronic pain, Cultural adaptation, Feasibility study, Delphi method

*Correspondence:

Vimala Ramoo
vimala@um.edu.my
DanDan Jiao
jdd201304@163.com

¹Department of Nursing Science, Faculty of Medicine, Universiti Malaya, Kuala Lumpur 50603, Malaysia

²Rheumatology Unit, The First Affiliated Hospital, and College of Clinical Medicine of Henan University of Science and Technology, Luoyang, Henan, PR China

³Rheumatology, Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Malaysia

⁴Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, Karnataka, India



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Background

Rheumatoid arthritis (RA) is a common chronic autoimmune disease characterized by persistent joint inflammation, pain, muscle weakness, and functional impairment [1]. The prolonged course of the disease significantly reduces patients' quality of life and has a profound impact on mental health [2, 3]. Kinesiophobia—defined as an irrational fear of physical activity—affects up to 70% of patients with RA, making it a prevalent concern [4, 5]. Often driven by chronic pain, kinesiophobia is explained by the fear-avoidance model, wherein misconceptions about pain exacerbation due to movement lead to heightened fear, creating a self-perpetuating cycle of pain, fear, and avoidance [6, 7]. This cycle restricts physical activity, increases psychological distress, and undermines both disease management and adherence to treatment [8, 9].

Managing kinesiophobia is vital for improving the quality of life in RA patients, yet existing interventions face practical barriers. Traditional approaches, such as exercise rehabilitation and psychological therapies like cognitive-behavioral therapy (CBT) and acceptance and commitment therapy (ACT), have shown some effectiveness in reducing kinesiophobia [10, 11]. However, their high costs, dependence on professional therapists, and low patient adherence limit their feasibility, especially in resource-constrained settings [12, 13]. This highlights an urgent need for a low-cost, easily accessible psychological intervention that patients can independently implement to address these challenges.

Emotional Freedom Techniques (EFT) integrate Traditional Chinese Medicine (TCM) meridian theory with modern psychological practices, employing methods such as acupoint tapping, verbal affirmations, and mindfulness exercises to address both psychological and physiological symptoms [14, 15]. By potentially reducing sympathetic nervous system activity, alleviating pain, and weakening negative emotional associations, EFT offers a pathway to relieve psychological distress [16, 17]. Requiring no expensive equipment or specialized resources, EFT is straightforward for patients to learn and practice independently following basic training [18, 19]. EFT has developed into a widely applicable set of techniques and has been validated as an “evidence-based” practice according to the criteria published by the American Psychological Association (APA) Division 12 Task Force on Empirically Validated Therapies [20]. Moreover, empirical studies continue to demonstrate that EFT is highly effective in reducing anxiety, depression, and chronic pain [21, 22].

Furthermore, Chinese patients' cultural acceptance of TCM principles may enhance receptivity to EFT, potentially improving engagement and adherence. However, the use of EFT specifically for managing kinesiophobia in RA populations has not been adequately studied.

To address this gap, we conducted a feasibility study to explore the acceptability, implementation, and practicality of a culturally adapted, low-cost, and patient-led EFT intervention among Chinese patients with RA. The study also included a qualitative component to explore patient satisfaction and implementation experience. Findings from this exploratory investigation provide critical insights to refine the intervention protocol and lay a solid foundation for the design of a fully powered randomized controlled trial.

Methods

Study design

The study employed a two-phase mixed-methods design. Phase 1 focused on validating and adapting the EFT protocol using the Delphi method. Phase 2 evaluated the feasibility of the adapted intervention through a single-arm trial. The study adhered to the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) Statement [23].

Study participants

Expert panel

Ten experts in rheumatology, psychology, TCM, and nursing were recruited in November 2023 to validate the EFT protocol. Eligibility required a bachelor's degree or higher, at least ten years of relevant experience, and willingness to complete two rounds of Delphi consultation.

Patient group

Patients with RA were recruited between December 2023 and February 2024 from a tertiary hospital rheumatology center. Inclusion criteria were: age ≥ 18 years, diagnosis based on the 2010 American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) RA criteria [24], a Tampa Scale for Kinesiophobia-17 (TSK-17) score > 37 [25, 26], and provision of written informed consent. Exclusion criteria included a Mini-Mental State Examination (MMSE) score ≤ 24 [27], skin lesions or inflammation at acupuncture points, severe comorbidities, or concurrent participation in other non-pharmacological treatments.

Phase 1: adaptation and validation

Adaptation

To tailor the EFT protocol for Chinese patients with RA, the intervention was developed based on the classic EFT Basic Recipe as described in *The EFT Manual* (4th edition, Church, 2018) [15]. The Basic Recipe comprises 4 core ingredients: (1) Setup – establishing an acceptance phrase that acknowledges the problem while affirming self-acceptance, e.g., “Even though I have this problem, I deeply and completely accept myself.” (2) Sequence – tapping on a series of acupoints while repeating the

acceptance phrase. (3) 9-Gamut Procedure – a set of eye movements, humming, and tapping designed to stimulate both brain hemispheres. (4) Repeat Sequence – a second round of tapping through the sequence to reinforce emotional regulation.

Building upon this structure, the research team conducted two rounds of expert focus group discussions in October 2023, involving specialists in rheumatology, psychology, TCM, and nursing. Based on the clinical needs and cultural context of Chinese RA patients, a six-step structured adaptation was developed, including Emotion Focusing, Initial Assessment, Psychological Unblocking, Acupoint Stimulation, Neurolinguistic Relief, and Reassessment. To ensure intervention fidelity, an operation manual, training procedures, and video demonstrations were developed and overseen by the expert team.

Validation

The adapted EFT protocol was validated using the Delphi method, involving ten experts with senior professional titles in rheumatology, psychology, TCM, and nursing. Experts evaluated the protocol across four dimensions using an exercise plan evaluation form [28]: simplicity (ease of understanding operational descriptions), safety (minimizing adverse reactions for RA patients), suitability (addressing patients' needs), and helpfulness (improving kinesiophobia and associated symptoms). Scoring was conducted on a four-point Likert scale, with items scoring below three requiring modifications.

Two rounds of consultation were conducted via email with a two-week interval. In the first round, experts scored the draft and provided feedback, which was used to revise the protocol. In the second round, experts re-evaluated the revised protocol, achieving consensus when the content validity index (CVI) reached ≥ 0.80 . A finalized structured and culturally adapted EFT protocol was established as the foundation for subsequent intervention studies.

Phase 2: interventions

The intervention was delivered by two registered rheumatology nurses and two TCM therapists, each with over five years of clinical experience. The principal investigator completed certification through EFT Universe (eft-international.org), while all interventionists underwent a two-week training program covering EFT theory, the six-step operational process, the two-phase implementation plan, and adverse reaction management.

During the Inpatient Phase (2 weeks), patients attended two supervised EFT sessions daily (10–15 min each) in a ward classroom with live demonstrations, video tutorials, and guided exercises. In the Post-Discharge Phase (2 weeks), patients practiced EFT independently twice daily,

logging activities via a WeChat group with regular feedback and guidance from the research team.

Patients maintained their usual diet, social activities, and prescribed antirheumatic medications, with temporary use of nonsteroidal anti-inflammatory drugs (NSAIDs) or narcotics allowed for pain exacerbation.

Outcome measures

Primary outcomes Primary outcomes included adherence, safety, and satisfaction

Adherence was defined as completing at least 90% of sessions during the inpatient phase and at least three weekly sessions lasting 15–20 min during the post-discharge phase. Safety was assessed by recording adverse events such as interruptions due to pain, anxiety exacerbation, or physical discomfort. Satisfaction was assessed using the 10-point Cantril Ladder Scale across seven dimensions (e.g., session frequency, clarity of guidance, confidence in skill mastery), with higher scores indicating greater satisfaction.

Secondary outcomes *Tampa Scale for Kinesiophobia (TSK-17)* [25] The TSK-17 is a standardized 17-item questionnaire widely used to evaluate the level of kinesiophobia in patients. It is scored on a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree), with total scores ranging from 17 to 68. Higher scores indicate greater kinesiophobia. The Chinese version of TSK-17 has demonstrated high internal consistency (Cronbach's $\alpha = 0.883$) [29].

Brief Pain Inventory-Short Form (BPI-SF) [30] The BPI-SF is a tool designed to evaluate pain presence, intensity, and interference with daily life. Scores range from 0 to 10 (0 = no pain/no interference; 10 = worst pain/maximal interference). This study focused on worst pain intensity and pain interference scores. The Chinese version of BPI-SF demonstrated strong reliability, with Cronbach's $\alpha = 0.894$ for pain intensity and Cronbach's $\alpha = 0.915$ for pain interference [31].

Pain Anxiety Symptoms Scale (PASS) [32] The PASS is a 20-item scale used to assess anxiety related to pain. It is scored on a 6-point Likert scale (0 = never, 5 = always), with total scores ranging from 0 to 100. Higher scores indicate greater anxiety. The Chinese version of PASS exhibited excellent internal consistency (Cronbach's $\alpha = 0.920$) [33].

Patient Activation Measure (PAM) [34] The PAM is a 13-item scale that evaluates patients' knowledge, skills, and confidence in self-management. Scores range from 0 to 100, with higher scores indicating greater activation. The Chinese version of PAM demonstrated high internal consistency (Cronbach's $\alpha = 0.920$) [35].

World Health Organization Quality of Life-BREF (WHOQOL-BREF) [36] The WHOQOL-BREF is a 26-item scale used to measure quality of life across four domains: physical health, psychological health, social relationships, and environmental conditions. Scores for each domain range from 0 to 100, with higher scores reflecting better quality of life. The Chinese version of the WHOQOL-BREF showed excellent reliability ($ICC \geq 0.75$).

Data collection

Adherence data were monitored through patient logs and observational records. Adverse events were documented throughout the intervention. Satisfaction and qualitative data were collected at the end of the 4-week intervention. Secondary outcomes were assessed via questionnaires at baseline and post-intervention.

Data analysis

Sample size determination The sample size of 20 participants was calculated based on feasibility study guidelines by Whitehead et al. [37] and Zhang et al. [38], incorporating confidence interval calculations with a statistical power of 0.85. Assumptions included a minimum adherence threshold of 50%, a target feasibility goal of 75%, and a Type I error rate of 0.05, with a margin of error of approximately $\pm 22\%$. The intervention was considered feasible if at least 15 participants met adherence criteria; otherwise, reassessment or redesign was required.

Data management All data were anonymized and entered into an electronic capture system accessible only to research assistants and the principal investigator. Unique identifiers were stored securely, and missing data were addressed using multiple imputation or the last observation carried forward (LOCF) method.

Statistical analysis SPSS version 26.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. Descriptive statistics summarized demographic information, adherence rates, and satisfaction scores. Continuous variables were reported as means \pm SD or as medians with interquartile ranges, depending on distributional normality assessed using the Shapiro-Wilk test. Categorical variables were presented as frequencies and percentages. Content validity index (CVI) was calculated to assess expert consensus, with $CVI \geq 0.80$ indicating good agreement [39, 40].

Pre–post changes in primary outcomes were analyzed using paired *t*-tests or Wilcoxon signed-rank tests, depending on data normality. Statistical significance was set at $p < 0.05$. Percentage changes in mean scores and

Hedges' *g* effect sizes were reported to enhance clinical interpretability in this small-sample feasibility study.

Qualitative data collection and analysis

Semi-structured interviews were conducted in a private room within the hospital by a trained qualitative researcher with a psychology background and no prior relationship with the participants. Each interview lasted approximately 30–45 min. Participants were purposively selected from those who completed the post-intervention phase, ensuring diversity in age, sex, and baseline kinesiophobia levels. Recruitment continued until thematic saturation was reached, with no new codes emerging in the final two interviews.

The interview guide was informed by literature review and expert consultation, focusing on perceived acceptability, ease of use, implementation barriers, and suggestions for improvement. All interviews were audio-recorded and transcribed verbatim. Two researchers independently coded the transcripts using Braun and Clarke's six-step thematic analysis framework [41], with discrepancies resolved through discussion. Reflexivity was maintained by examining preunderstandings and potential biases throughout the analysis. Richness was ensured by encouraging participants to elaborate on their experiences.

Ethical considerations Ethical approval was obtained from the Ethics Committee of the First Affiliated Hospital of Henan University of Science and Technology (approval number: 2023–687). The study was prospectively registered with the Chinese Clinical Trial Registry (ChiCTR2300076013) on September 21, 2023. All participants were informed about the study both verbally and in writing prior to enrollment, and informed consent was obtained from each participant.

Results

Delphi expert validation

The EFT protocol underwent two rounds of Delphi consultations. In the first round, Steps 3 (psychological unblocking), 4 (acupoint stimulation), and 6 (reassessment) did not meet the minimum CVI threshold of 0.80 for simplicity, suitability, or helpfulness (Table 1). Based on expert feedback, several modifications were made. The stimulation technique for the Hou Xi (SI3) acupoint in Step 3 was changed to a "hammering method," involving rhythmic, fist-like tapping to provide stronger somatosensory input, a common practice in traditional Chinese therapeutic approaches [42]. In addition, the Bai Hui (DU20) acupoint, located at the top of the head, was incorporated into the protocol using gentle palm tapping. Bai Hui is traditionally regarded as a point associated with mental clarity and emotional regulation,

Table 1 Content validity index (CVI) for the EFT procedure (Round 1 and 2)

Procedure	Simplicity		Safety		Suitability		Helpfulness	
	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
Step 1	1	1	1	1	1	1	1	1
Step 2	1	1	1	1	1	1	1	1
Step 3 ^a	1	1	1	1	0.80	1	0.70	1
Step 4 ^a	1	1	1	1	1	1	0.70	1
Step 5	1	1	1	1	1	1	1	1
Step 6 ^a	0.60	0.80	1	1	0.40	0.80	0.70	0.90
Average-I CVI	0.93	0.97 ^b	1	1 ^b	0.87	0.97 ^b	0.85	0.98 ^b

Keys: I-CVI item-level content validity index

^a Steps identified in round 1 Delphi to be below the minimum I-CVI (0.80)

^b Achieving the required average I-CVI in round 2

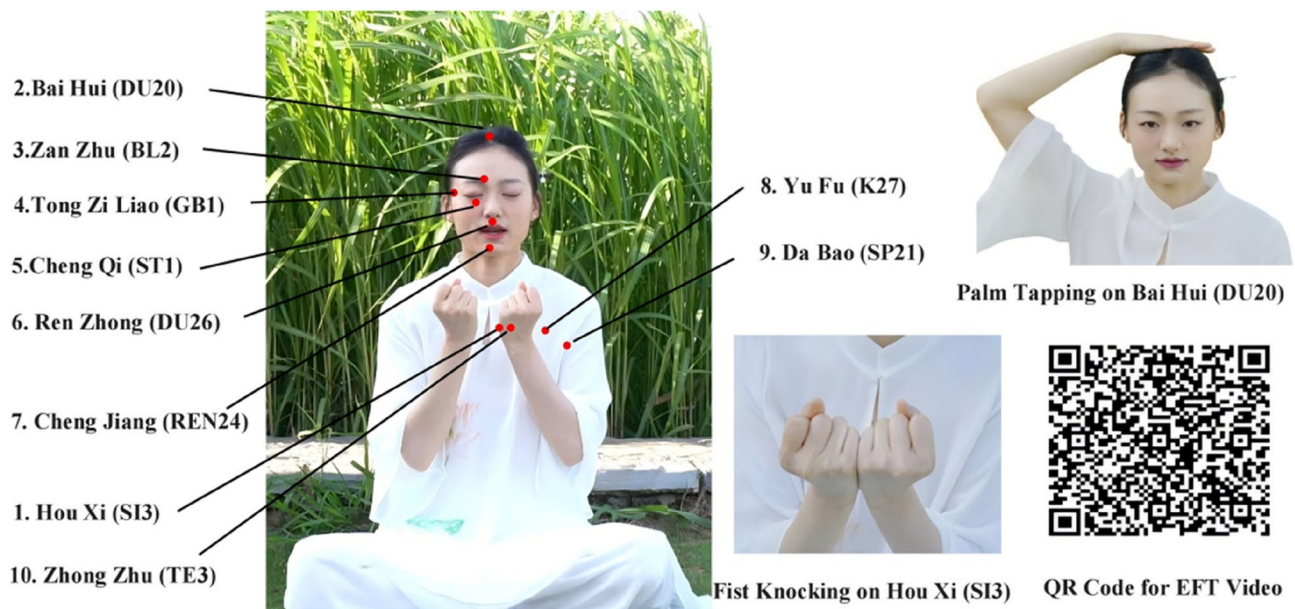


Fig. 1 Emotional Freedom Techniques (EFT) Tapping Points and QR Code for Instructional Video

and its inclusion aimed to further enhance relaxation and emotional balance [42, 43]. Clear endpoint criteria were established for Step 6 (reassessment), defining a Subjective Units of Distress Scale (SUDS) score of ≤ 2 as the treatment goal. If scores remained above 2, Steps 1–6 were repeated as necessary. Patient support was also strengthened by scheduling the initial training session within 1–3 days of hospital admission and providing ongoing post-discharge guidance through a WeChat group.

In the second round of consultation, all steps achieved a mean CVI of ≥ 0.80 , and the final protocol was unanimously approved. Figure 1 illustrates the 10 key acupoints used in the protocol with QR codes for video demonstrations, while Table 2 outlines the six-step operational process and Table 3 details the two-phase implementation plan.

Primary outcomes

Of the 24 patients recruited, four (16.7%) withdrew from the study: two became unreachable shortly after discharge, one developed a new comorbidity during the early post-discharge period, and one experienced unexpected work-related travel. Figure 2 summarizes participant flow throughout recruitment, allocation, follow-up, and analysis.

Among the 20 participants who completed the study, 18 achieved $\geq 90\%$ adherence during the inpatient phase; two fell short due to time conflicts but continued in the post-discharge phase. During the two-week follow-up, 17 participants completed at least three sessions per week. Overall, 16 participants (80%) met the predefined adherence criteria, exceeding the feasibility benchmark of $\geq 75\%$. No adverse events were reported, and all participants tolerated the intervention well without pain, anxiety exacerbation, or other interruptions.

Table 2 Details of the Six-Step emotional freedom techniques (EFT) process

Step	Name	Operation Content
Step 1	Emotion Focusing	Patients recall the specific situations and distress state when the emotional problem occurred.
Step 2	Initial Assessment	Patients use the Subjective Units of Distress Scale (SUDS) ranging from 0 to 10 to determine their level of distress, where 10 is the highest intensity and 0 is no intensity.
Step 3	Psychological Unblocking	Patients establish a fixed-format phrase based on their main concern, such as “Even though I have [specific problem], I deeply and completely accept myself.” Patients perform a fist-to-fist hammering motion on the Hou Xi (SI3) point while reciting the phrase three times.
Step 4	Acupoint Stimulation	Using the palm, patients tap the Bai Hui (DU20) point, followed by the index and middle fingers tapping sequentially at the Zan Zhu (BL2), Tong Zi Liao (GB1), Cheng Qi (ST1), Ren Zhong (DU26), Cheng Jiang (REN24), Yu Fu (K27), and Da Bao (SP21) points. The tapping rhythm is maintained consistently across all acupoints, with the phrase continuously recited throughout the tapping process.
Step 5	Neurolinguistic Relief	Patients perform nine actions: close eyes, open eyes, look down right, look down left, rotate eyes clockwise, rotate eyes counter-clockwise, hum a song, count from 1 to 5, and hum the song again, while continuously tapping the Zhong Zhu (TE3) point.
Step 6	Reassessment	Patient re-assesses their level of distress using the SUDS. If the score is ≤ 2, the process is stopped. If the score is > 2, the fixed phrase is changed to “Even though I still have some issues about [specific problem], I deeply and completely accept myself.” The process is then repeated from Step 1 until the score is ≤ 2, at which point the process is stopped.

Note Acupoint names are provided in pinyin with their corresponding international codes for clarity and standardization

Satisfaction ratings indicated high overall acceptability. Specifically, 85% of participants expressed satisfaction or higher with the clarity of guidance and their confidence in mastering EFT skills. Only one participant reported strong dissatisfaction with the overall duration of the intervention. Full satisfaction results are presented in Fig. 3.

Participant characteristics

The mean age of participants was 46.8 years (SD = 10.40). The majority were female (70.8%), married (79.2%), and had a monthly household income below 2000 RMB (58.4%). Regarding education level, 33.3% had completed primary school or below, and only 8.4% had attended university or higher. Most participants were unemployed

Table 3 Implementation Schedule for the Emotional Freedom Techniques (EFT) Program

Stage	Time	Leader	Methods	Intervention Details
Phase 1 (2weeks)	Day 1–3 after admission	Nurse and TCM Therapist	Group-based face-to-face	- Introduce EFT concepts via PPT and video (15 min). - Teach self-management diary use (5 min). - Add patients to the WeChat support group.
	During hospitalization	Nurse	Supervised practice	- Live demonstrations with video guidance. - Supervise practice twice daily (10–15 min/session, morning and afternoon).
Phase 2 (2Weeks)	Post-discharge	Nurse	Online monitoring and guidance	- Supervise practice 3+ times weekly (10–15 min/session). - Provide consultation and answer questions through WeChat.
	1–2 weeks post-discharge	Nurse	Individual meetings	- Review self-management diaries (10 min). - Provide feedback and personalized guidance.

Notes TCM Therapist Traditional Chinese Medicine Therapist

(87.5%). About one-third (33.3%) were receiving biological therapies. The mean disease duration was 108.2 months, and the mean SOFI score was 4.3. Based on DAS28 scores, most participants had moderate (41.7%) or high (25.0%) disease activity (Table 4).

Quantitative results

The EFT intervention led to substantial improvements in key outcomes. Kinesiophobia (TSK-17) scores decreased by an average of 6.5 points (from 51.0 ± 5.3 to 44.5 ± 4.2), representing a 12.7% reduction and a large effect size (Hedges’ g = 1.36, p < 0.001). Pain intensity (BPI-SF) reduced by 1.9 points on average, corresponding to a 34.7% decrease (p = 0.001). Pain interference dropped by

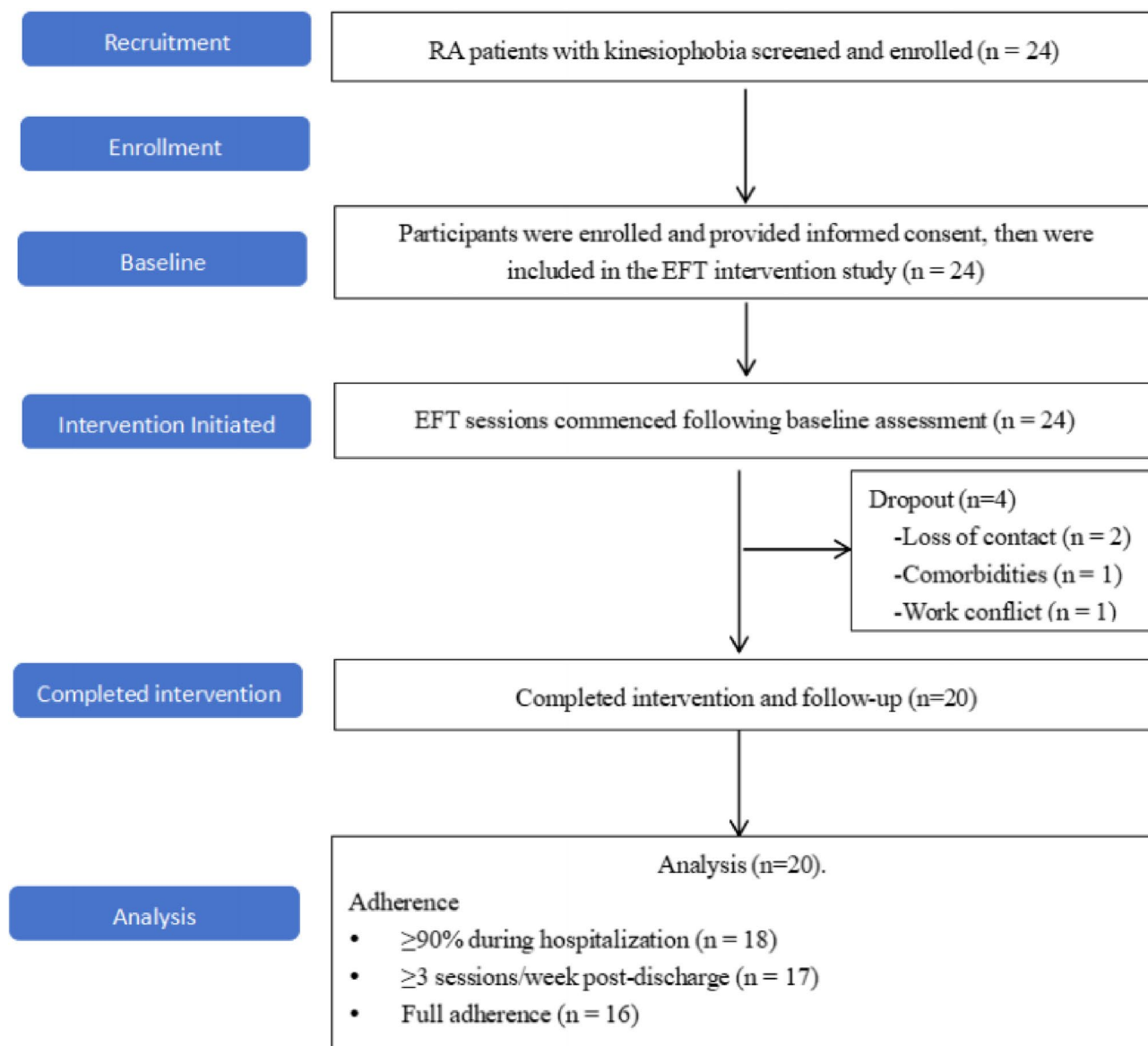


Fig. 2 CONSORT Flow Diagram of Participant Enrollment, Retention, and Adherence

more than half (50.3%), with a moderate-to-large effect size (Hedges’ $g = 0.89$, $p = 0.011$). Pain-related anxiety (PASS) decreased by 37.3% ($p = 0.022$), indicating clinically meaningful improvement. No significant changes were found in PAM or WHOQOL-BREF domains (all $p > 0.6$). Detailed results are summarized in Table 5.

Qualitative findings

Twelve participants from varied backgrounds took part in semi-structured interviews. Thematic analysis of their feedback revealed five key themes that captured their experiences and perceptions of the EFT intervention.

Simplicity and accessibility

Participants consistently described the intervention as easy to learn and practice, particularly appreciating its suitability for self-use at home. The integration of traditional Chinese medicine concepts also enhanced cultural resonance and acceptance. “It’s easy to learn even at my age, and the connection with Chinese medicine makes it more relatable.”

Physical and psychological benefits

Many participants reported noticeable improvements in both physical and emotional well-being, including reductions in pain, anxiety, and fear of movement. The immediate emotional relief following tapping sessions was

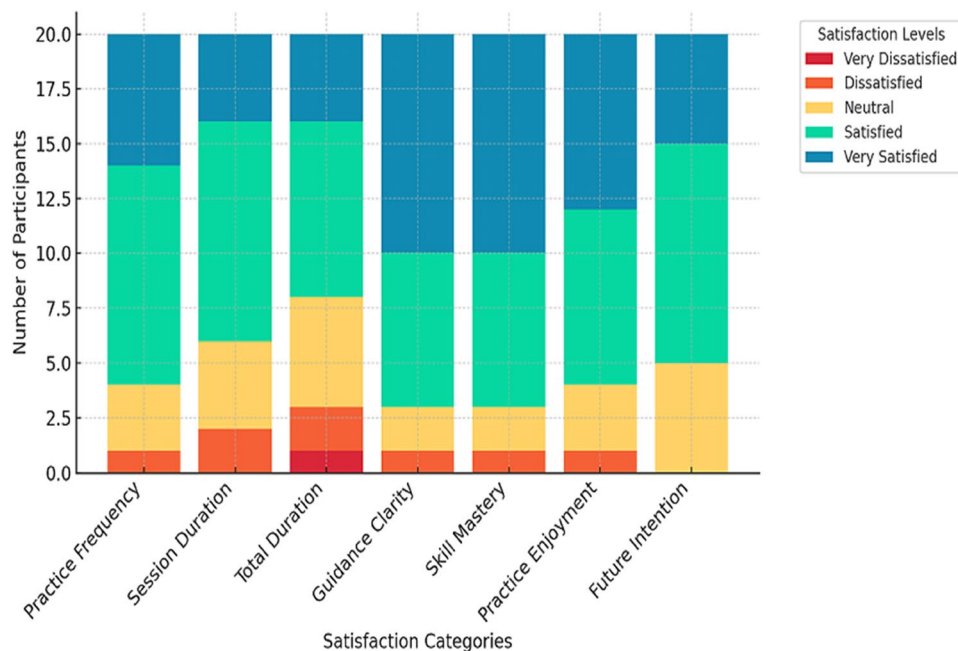


Fig. 3 Patient Satisfaction Ratings of the Emotional Freedom Techniques Program

especially emphasized. “My joint pain eased, and I felt emotionally lighter after practice.”

Quality of guidance

While participants appreciated the clarity of instructions and group-based delivery, several expressed a desire for more tailored support to address individual concerns. “I’d like more one-on-one consultation to address my specific issues.”

Suggestions for time flexibility

Although the overall structure was well received, some participants encountered conflicts between session timing and medical routines, suggesting the need for increased flexibility in future implementations. “Sometimes the session clashed with hospital checkups. Flexible scheduling would be better.”

Willingness for long-term practice

Most participants expressed a strong intention to continue using EFT beyond the study period, citing relaxation, empowerment, and perceived symptom relief as motivating factors. “EFT makes me feel relaxed and helpful; I plan to use it long-term.”

Discussion

This feasibility study demonstrated that a culturally adapted EFT program was acceptable, safe, and well-received by patients with RA in a resource-constrained, non-Western setting. Although only 20 out of 24 participants (83.3%) completed all assessments, attrition was

primarily due to comorbidities or scheduling conflicts rather than intervention-related factors, indicating good acceptability and tolerability. Among those who completed the program, adherence reached 80%, supported by a structured protocol and cultural tailoring. Participants consistently emphasized the simplicity, accessibility, and relevance of the EFT approach.

Notable improvements were observed in several quantitative outcomes. Kinesiophobia scores (TSK-17) decreased from 51.0 ± 5.3 to 44.5 ± 4.2 , representing a 12.7% reduction. These results are consistent with findings from previous studies, including Bordeleau et al.’s (2022) systematic review on the efficacy of psychological interventions for chronic musculoskeletal pain [10], and Cai’s (2018) trial demonstrating CBT’s effectiveness in reducing kinesiophobia following total knee arthroplasty [44]. Pain intensity (BPI-SF) declined from 5.5 to 3.6, pain interference nearly halved, and pain-related anxiety also improved significantly. These findings align with research by Stapleton et al. confirming EFT’s efficacy in managing chronic pain through both guided and self-applied formats [45].

The mechanisms underlying these improvements likely involve a combination of physiological and psychological processes. Physiologically, stimulation of acupoints may modulate autonomic nervous system activity and reduce sympathetic overarousal, which is commonly associated with chronic pain states [16]. Neuroimaging evidence also suggests that EFT is associated with functional changes in brain regions involved in emotional regulation and pain processing, such as the amygdala and prefrontal

Table 4 Demographic and clinical characteristics of participants (N = 24)

Variables	Category	n (%) / (Mean ± SD)
Age (year)		46.83 ± 10.40
Gender	Male	7 (29.2)
	Female	17 (70.8)
BMI	Underweight	4 (16.7)
	Normal weight	13 (54.2)
	Overweight	5 (20.8)
	Obesity	2 (8.3)
Marital status	Married	19 (79.2)
	Other	5 (20.8)
Education level	Primary school and below	8 (33.3)
	Junior middle school	11 (45.8)
	Senior middle school	3 (12.5)
	University and above	2 (8.4)
Employment status	Employed	3 (12.5)
	Retired	11 (45.8)
	Other	10 (41.7)
Monthly household income (RMB)	< 2000	14 (58.4)
	2000–4000	5 (20.8)
	> 4000	5 (20.8)
Pharmacotherapy	Biologicals	8 (33.3)
	Non-biologicals	16 (66.7)
History of falls	No	20 (83.3)
	Yes	4 (16.7)
Morning stiffness	None	14 (58.3)
	Present	10 (41.7)
SOFI		4.3 ± 5.5
Disease duration (months)		108.17 ± 86.26
DAS28 classification	Low disease activity	8 (33.3)
	Moderate disease activity	10 (41.7)
	High disease activity	6 (25.0)

Keys: BMI Body Mass Index, RMB Chinese Yuan (Renminbi), SOFI Signals of Functional Impairment, DAS28 Disease Activity Score using 28 Joints

Data are shown as mean ± SD for continuous variables and n (%) for categorical variables

cortex [17]. Psychologically, the intervention may have facilitated cognitive reframing and reduced maladaptive beliefs about pain and movement, thereby diminishing kinesiophobia and pain-related anxiety [46].

Although limited by its single-arm design and small sample size, this feasibility study provides preliminary evidence supporting psychological intervention for kinesiophobia and pain-related outcomes in RA. The outcome measures selected were also found to be sensitive to change and well tolerated, reinforcing their suitability for future trials.

In contrast, quality of life and patient activation measures showed less variation. This may reflect the limited duration of the intervention or broader contextual challenges—such as low educational levels (approximately 80% had junior middle school or below), long disease duration (mean 108.17 months), and socioeconomic strain. These realities may have constrained participants’ capacity to activate health-related behaviors or experience substantial quality-of-life changes within the brief timeframe [47, 48].

A strength of this study is the culturally informed adaptation of the EFT protocol, which retained its core therapeutic elements while enhancing feasibility and perceived trustworthiness in the Chinese healthcare context. By integrating TCM concepts—such as the Bai Hui (DU20) acupoint, associated with calming the mind, and adapting Hou Xi (SI3) stimulation into a more familiar hammer-style tapping—the intervention gained greater cultural legitimacy and emotional resonance. These modifications appeared to improve participant engagement, foster psychological safety, and increase trust in the method. This aligns with previous findings that culturally congruent interventions enhance engagement, particularly in non-Western populations [49].

Importantly, post-intervention TSK scores remained within the moderate-to-high range, suggesting that while

Table 5 Results of patient self-comparisons before and after intervention (N = 20)

Domain scores	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Percentage change (%)	P value	Hedges’ g
TSK-17	51.00 ± 5.30	44.52 ± 4.17	12.71	< 0.001	1.359
BPI-SF					
Pain Intensity	5.50 ± 1.90	3.59 ± 1.10	34.73	0.001	1.230
Pain Interference	18.50 ± 11.49	9.20 ± 9.43	50.27	0.011	0.885
PASS	34.00 ± 16.01	21.32 ± 16.25	37.29	0.022	0.786
PAM	58.58 ± 10.14	59.25 ± 9.64	1.14	0.833	0.068
WHOQOL-BREF					
Physical Health	55.60 ± 8.83	56.80 ± 8.70	2.16	0.670	0.137
Psychological Health	55.10 ± 14.08	56.40 ± 14.32	2.36	0.775	0.092
Social Relationships	68.40 ± 10.91	69.00 ± 9.03	0.88	0.852	0.060
Environment	59.60 ± 8.77	60.20 ± 8.39	1.01	0.827	0.070

TSK-17 Tampa Scale of Kinesiophobia – 17, BPI-SF Brief Pain Inventory-Short Form, PASS Pain Anxiety Symptoms Scale, PAM Patient Activation Measure, WHOQOL-BREF World Health Organization Quality of Life Brief Version; Percentage change was calculated using the following formula: (Post-intervention mean – Pre-intervention mean)/Pre-intervention mean × 100%

*Statistical analysis performed using paired t-tests

some reduction was achieved, fear of movement remains a substantial concern. This may be attributed to the entrenched and multifaceted nature of kinesiophobia in RA, shaped by chronic pain and longstanding functional limitations [4, 5]. The current intervention duration and intensity may not have been sufficient to fully disrupt these patterns, indicating the need for more comprehensive or sustained strategies to yield greater behavioral change.

Before proceeding to a randomized controlled trial, several refinements may be considered, including extending the post-discharge practice period, integrating behavioral strategies such as gradual movement exposure, and enhancing self-monitoring via structured diaries with regular feedback. Digital support tools (e.g., scheduled WeChat reminders, brief follow-up videos) may also sustain practice without increasing resource burden. Moreover, involving patients in intervention design and refinement could improve relevance, acceptability, and long-term adherence.

Limitations of this study

This was a single-center, single-arm pre-post study without a control group, which limits the generalizability of findings and precludes causal inferences. The small sample size reduced statistical power, particularly for secondary outcomes such as quality of life and patient activation. The 4-week duration may have been insufficient to detect meaningful change in these domains. Additionally, disease activity and concurrent treatments were not assessed or controlled, which may have influenced individual responses. Finally, patient involvement in the development of the intervention was not included, which may have limited the relevance of certain components.

Conclusion

This feasibility study provides preliminary evidence supporting the cultural adaptability, safety, and acceptability of a brief, home-based EFT program for managing kinesiophobia, pain, and anxiety in Chinese patients with RA. High adherence and positive feedback suggest strong implementation potential. The integration of traditional Chinese medicine elements enhanced cultural relevance and participant engagement. While the intervention showed promise in reducing kinesiophobia and pain-related distress, broader improvements in quality of life may require longer duration and more intensive support. These findings support the feasibility of the program and offer guidance for refining its components. A full-scale randomized controlled trial is warranted to further assess its efficacy and long-term applicability.

Abbreviations

EFT	Emotional freedom techniques
RA	Rheumatoid arthritis

TSK-17	Tampa Scale for Kinesiophobia-17
BPI-SF	Brief pain inventory-short form
PASS	Pain Anxiety Symptoms Scale
PAM	Patient Activation Measure
WHOQOL-BREF	World health organization quality of life brief version
SUDS	Subjective units of distress scale
TCM	Traditional chinese medicine
BMI	Body mass index
DAS28	Disease activity score in 28 joints
ACR/EULAR	American college of rheumatology/european league against rheumatism
RMB	Renminbi

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Authors' contributions

YLY, VR, NAY, FY, XFS, XYS, and DDJ contributed to the manuscript writing. XYS prepared the tables. All authors reviewed and approved the final manuscript.

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Data availability

The data used and analyzed during this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study involving human participants was approved by the Ethics Committee of the First Affiliated Hospital of Henan University of Science and Technology (approval number: 2023–687). The study followed the ethical principles outlined in the 1964 Declaration of Helsinki and its subsequent amendments. Written informed consent was obtained from all participants before data collection.

Consent for publication

Written informed consent for publication of their image was obtained from the participant. A copy of the consent form is available for review by the Editor of this journal.

Competing interests

The authors declare no competing interests.

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References

- Smolen JS, Aletaha D, McInnes IB. Rheumatoid arthritis. *Lancet*. 2016;388(10055):2023–38. [https://doi.org/10.1016/S0140-6736\(16\)30173-8](https://doi.org/10.1016/S0140-6736(16)30173-8).
- Radu AF, Bungau SG. Management of rheumatoid arthritis: an overview. *Cells*. 2021;10(11):2857. <https://doi.org/10.3390/cells10112857>.
- Fang LK, Huang CH, Xie Y, Liu Q, Wang XQ, He DY, et al. Clinical features of rheumatoid arthritis in China. *Zhonghua Nei Ke Za Zhi*. 2020;59(10):772–80. <https://doi.org/10.3760/cma.j.cn112138-20200807-00734>.
- Öztürk İB, Garip Y, Sivas F, Parlak Özden M, Bodur H. Kinesiophobia in rheumatoid arthritis patients: relationship with quadriceps muscle strength, fear of falling, functional status, disease activity, and quality of life. *Arch Rheumatol*. 2021;36(3):362–9. <https://doi.org/10.46497/ArchRheumatol.2021.8432>.
- Baday-Keskin D, Ekinçi B. The relationship between kinesiophobia and health-related quality of life in patients with rheumatoid arthritis: a controlled cross-sectional study. *Joint Bone Spine*. 2022;89(2):105275. <https://doi.org/10.1016/j.jbspin.2021.105275>.
- Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear-avoidance model of musculoskeletal pain: current state of scientific

- evidence. *J Behav Med.* 2007;30:77–94. <https://doi.org/10.1007/s10865-006-9085-0>.
7. Vlaeyen JW, Crombez G, Linton SJ. The fear-avoidance model of pain. *Pain.* 2016;157(8):1588–9. <https://doi.org/10.1097/j.pain.0000000000000574>.
 8. Reinoso-Cobo A, Losa-Iglesias ME, Palomo-Lopez P, Becerro-de-Bengoa-Vallejo R, Rodriguez-Sanz D, Calvo-Lobo C, et al. Relationship between kinesiophobia, foot pain and foot function, and disease activity in patients with rheumatoid arthritis: a cross-sectional study. *Medicina (B Aires).* 2023;59(1):147. <https://doi.org/10.3390/medicina59010147>.
 9. Luque-Suarez A, Martinez-Calderon J, Falla D. Role of kinesiophobia on pain, disability and quality of life in people suffering from chronic musculoskeletal pain: a systematic review. *Br J Sports Med.* 2019;53(9):554–9. <https://doi.org/10.1136/bjsports-2017-098673>.
 10. Bordeleau M, Vincenot M, Lefevre S, Dupont A, Seggio L, Breton T, et al. Treatments for kinesiophobia in people with chronic pain: a scoping review. *Front Behav Neurosci.* 2022;16:933483. <https://doi.org/10.3389/fnbeh.2022.933483>.
 11. Naderi A, Fallah Mohammadi M, Dehghan A, Baker JS. Psychosocial interventions seem to reduce kinesiophobia after anterior cruciate ligament reconstruction but higher level of evidence is needed: a systematic review and meta-analysis. *Knee Surg Sports Traumatol Arthrosc.* 2023;31(12):5848–55. <https://doi.org/10.1007/s00167-023-07630-6>.
 12. Wu XM, Ma N, Chen RZ, Li ZY, Lu L. Current status of mental health prevention and management institutions in mainland China. *Chin J Public Health.* 2023;4:485–8.
 13. Goldsmith ES, Kobayashi N, Chen CY, Kim M, Lee HJ, Garcia I, et al. Barriers and facilitators of evidence-based psychotherapies for chronic pain in adults: A systematic review. *J Pain.* 2023;24(5):742–69. <https://doi.org/10.1016/j.jpain.2023.02.026>.
 14. Feinstein D. Acupoint stimulation in treating psychological disorders: evidence of efficacy. *Rev Gen Psychol.* 2012;16(4):364–80. <https://doi.org/10.1037/a0028602>.
 15. Church D. *The EFT manual.* 4th ed. Fulton, CA: Energy Psychology; 2018.
 16. Bach D, Groesbeck G, Stapleton P, Sims R, Blickheuser K, Church D. Clinical EFT (emotional freedom techniques) improves multiple physiological markers of health. *Journal of Evidence-Based Integrative Medicine.* 2019;24:2515690X18823691. <https://doi.org/10.1177/2515690X18823691>.
 17. Peta S, Oliver B, Tom O, Bhuta S. Neural changes after emotional freedom techniques treatment for chronic pain sufferers. *Complement Ther Clin Pract.* 2022;49:101653. <https://doi.org/10.1016/j.ctcp.2022.101653>.
 18. Church D, Feinstein D. The manual stimulation of acupuncture points in the treatment of post-traumatic stress disorder: a review of clinical emotional freedom techniques. *Med Acupunct.* 2013;25(5):398–409. <https://doi.org/10.1089/acu.2013.0976>.
 19. Shang XY, Zhang LL, Li LL, Xu W, Zhao Y. Research progress on the application of emotional freedom techniques in patients with chronic diseases. *Nurs Res.* 2022;36(18):3324–7. <https://doi.org/10.12102/j.issn.1009-6493.2022.18.024>.
 20. Church D, Stapleton P, Vasudevan A, O'Keefe T. Clinical EFT as an evidence-based practice for the treatment of psychological and physiological conditions: A systematic review. *Front Psychol.* 2022;13:951451. <https://doi.org/10.3389/fpsyg.2022.951451>.
 21. Clond M. Emotional freedom techniques for anxiety: A systematic review with meta-analysis. *J Nerv Ment Dis.* 2016;204(5):388–95. <https://doi.org/10.1097/NMD.0000000000000483>.
 22. Nelms J, Castel L. A systematic review and meta-analysis of randomized and non-randomized trials of emotional freedom techniques (EFT) for the treatment of depression. *Explore.* 2016;12(6):416–26. <https://doi.org/10.1016/j.explore.2016.08.001>.
 23. Des Jarlais DC, Lyles C, Crepaz N, TREND Group. Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. *Am J Public Health.* 2004;94(3):361–6. <https://doi.org/10.2105/ajph.94.3.361>.
 24. Aletaha D, Neogi T, Silman AM, Funovits J, Felson DT, Bingham CO, et al. 2010 rheumatoid arthritis classification criteria: an American college of rheumatology/european league against rheumatism collaborative initiative. *Ann Rheum Dis.* 2010;69(9):1580–8. <https://doi.org/10.1136/ard.2010.138461>.
 25. Vlaeyen JW, Kole-Snijders AM, Boeren RG, van Eek H. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. *Pain.* 1995;62(3):363–72. [https://doi.org/10.1016/0304-3959\(94\)00279-N](https://doi.org/10.1016/0304-3959(94)00279-N).
 26. Roelofs J, Goubert L, Peters ML, Vlaeyen JW, Crombez G. The Tampa scale for kinesiophobia: further examination of psychometric properties in patients with chronic low back pain and fibromyalgia. *Eur J Pain.* 2004;8(5):495–502. <https://doi.org/10.1016/j.ejpain.2003.11.016>.
 27. Chinese Society of Neurology Neuropsychology Group. Expert consensus on the clinical application of commonly used neuropsychological cognitive assessment scales. *Chin J Neurol.* 2018;51(2):135–46. <https://doi.org/10.3760/cma.j.issn.1006-7876.2019.03.002>.
 28. Chen KM, Tseng WS, Chang YH, Huang HT, Li CH. Feasibility appraisal of an elastic band exercise program for older adults in wheelchairs. *Geriatr Nurs.* 2013;34(5):373–6. <https://doi.org/10.1016/j.gerinurse.2013.05.001>.
 29. Wei X, Xu X, Zhao Y, Hu W, Bai Y, Li M. The Chinese version of the Tampa scale for kinesiophobia was cross-culturally adapted and validated in patients with low back pain. *J Clin Epidemiol.* 2015;68(10):1205–12. <https://doi.org/10.1016/j.jclinepi.2015.07.003>.
 30. Tan G, Jensen MP, Thornby JI, Shanti BF. Validation of the brief pain inventory for chronic nonmalignant pain. *J Pain.* 2004;5(2):133–7. <https://doi.org/10.1016/j.jpain.2003.12.005>.
 31. Wang XS, Mendoza TR, Gao SZ, Cleeland CS. The Chinese version of the brief pain inventory (BPI-C): its development and use in a study of cancer pain. *Pain.* 1996;67:407–16. [https://doi.org/10.1016/0304-3959\(96\)03147-8](https://doi.org/10.1016/0304-3959(96)03147-8).
 32. McCracken LM, Dhingra L. A short version of the pain anxiety symptoms scale (PASS-20): preliminary development and validity. *Pain Res Manag.* 2002;7:45–50. <https://doi.org/10.1155/2002/517163>.
 33. Zhou XY, Xu XM, Wang F, Zhu Q, Wu M, Li Z, et al. Validations and psychological properties of a simplified Chinese version of pain anxiety symptoms scale (SC-PASS). *Med (Baltim).* 2017;96:e5626. <https://doi.org/10.1097/MD.00000000000005626>.
 34. Hibbard JH, Mahoney ER, Stockard J, Tusler M. Development and testing of a short form of the patient activation measure. *Health Serv Res.* 2005;40(6 Pt 1):1918–32. <https://doi.org/10.1111/j.1475-6773.2005.00438.x>.
 35. Zeng H, Jiang R, Zhou M, Wu L, Tian B, Zhang Y, et al. Measuring patient activation in Chinese patients with hypertension and/or diabetes: reliability and validity of the PAM13. *J Int Med Res.* 2019;47(12):5967–76. <https://doi.org/10.1177/0300060519868327>.
 36. The WHOQOL Group. Development of the world health organization WHOQOL-BREF quality of life assessment. *Psychol Med.* 1998;28(3):551–8. <https://doi.org/10.1017/S0033291798006667>.
 37. Whitehead AL, Julious SA, Cooper CL, Campbell MJ. Estimating the sample size for a pilot randomised trial to minimise the overall trial sample size for the external pilot and main trial for a continuous outcome variable. *Stat Methods Med Res.* 2016;25(3):1057–73. <https://doi.org/10.1177/0962280215588241>.
 38. Zhang Y, Wang J, Hu Y, Shao B, Fu Z, Liu J. Determining sample size of pilot trials in traditional Chinese medicine. *J Tradit Chin Med.* 2021;62(4):307–11. <https://doi.org/10.13288/j.11-2166/r.2021.04.008>.
 39. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. *Res Nurs Health.* 2006;29(5):489–97. <https://doi.org/10.1002/nur.20147>.
 40. Yusoff MSB. Abc of content validation and content validity index calculation. *Educ Med J.* 2019;11(2):49–54. <https://doi.org/10.21315/eimj2019.11.2.6>.
 41. Braun V, Clarke V, Hayfield N, Terry G. Thematic analysis. In: *Handbook of research methods in health social sciences.* Springer; 2019. p. 843–60. https://doi.org/10.1007/978-981-10-5251-4_103.
 42. Deadman P, Al-Khafaji M, Baker K. *A manual of acupuncture.* Hove, East Sussex: Journal of Chinese Medicine; 2001.
 43. World Health Organization (WHO). WHO standard acupuncture point locations in the Western Pacific region. Geneva: World Health Organization; 2008.
 44. Cai L, Gao H, Xu H, Wang Y, Lyu P, Liu Y. Does a program based on cognitive behavioral therapy affect kinesiophobia in patients following total knee arthroplasty? A randomized, controlled trial with a 6-month follow-up. *J Arthroplasty.* 2018;33(3):704–10. <https://doi.org/10.1016/j.arth.2017.10.035>.
 45. Stapleton P, Wilson C, Uechtritz N, Stewart M, McCosker M, O'Keefe T, et al. A randomized clinical trial of emotional freedom techniques for chronic pain: live versus self-paced delivery with 6-month follow-up. *Eur J Pain.* 2025;29(3):e4740. <https://doi.org/10.1002/ejp.4740>.
 46. Church D, Stapleton P, Yang A, O'Neill D, Stauffer L, Reinhardt S, et al. Is tapping on acupuncture points an active ingredient in emotional freedom techniques? A systematic review and meta-analysis of comparative studies. *J Nerv Ment Dis.* 2018;206(10):783–93. <https://doi.org/10.1097/NMD.0000000000000886>.
 47. Katchamart W, Narongroeknawin P, Chanapai W, Thweerattakul P. Health-related quality of life in patients with rheumatoid arthritis. *BMC Rheumatol.* 2019;3:34. <https://doi.org/10.1186/s41927-019-0080-9>.
 48. Bounabe A, Elammare S, Janani S, Ouabich R, Elarrachi I. Effectiveness of patient education on the quality of life of patients with rheumatoid arthritis: a

systematic review and meta-analysis. *Semin Arthritis Rheum*. 2024;69:152569. <https://doi.org/10.1016/j.semarthrit.2024.152569>.

49. Li S, Xi Z, Barnett P, Saunders R, Shafran R, Pilling S. Efficacy of culturally adapted interventions for common mental disorders in people of Chinese descent: a systematic review and meta-analysis. *Lancet Psychiatr*. 2023;10(6):426–40. [https://doi.org/10.1016/S2215-0366\(23\)00118-9](https://doi.org/10.1016/S2215-0366(23)00118-9).

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