Self-administered acupressure for knee osteoarthritis: a randomised controlled trial (abridged secondary publication)

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KEY MESSAGES

1. Two 2-hour sessions of self-administered acupressure training was effective in alleviating knee pain and improving mobility in older adults with knee osteoarthritis.
2. Participants trained in self-administered acupressure reported significantly lower pain scores at weeks 4, 8, and 12, compared with participants receiving knee health education.
3. The self-administered acupressure training programme demonstrated high acceptability and compliance and was cost-effective.

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Introduction

Knee osteoarthritis (OA) affects 16% of people aged ≥45 years. It leads to reduced physical fitness and quality of life and increased healthcare utilisation. Acupuncture is an effective treatment for knee OA pain. Acupressure, a non-invasive variant, stimulates the same acupoints using fingers, hands, or elbows. We conducted a randomised controlled trial to evaluate the short- and medium-term effects of self-administered acupressure (SAA) on alleviating knee OA pain in older adults.

Methods

Between September 2019 and May 2022, older adults with knee OA were recruited to participate in either SAA training or knee health education (KHE). Participants attended two 2-hour sessions, held 1 week apart. They were instructed to practise SAA or follow KHE guidance nightly during the 12-week study period and to record their adherence in a logbook.

Participants were assessed at baseline, week 4, week 8, and week 12 by a single research assistant who was blinded to group allocation. The primary outcome measure was the numerical rating scale for pain ranging from 0 (no pain) to 10 (worst pain imaginable). Secondary outcome measures included the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) subscales for pain, stiffness, and physical function; the Short-Form Six Dimensions (physical functioning, role limitations, social functioning, pain, mental health, and vitality); the timed up and go test; and gait speed.

Results

In total, 314 participants were randomly assigned to receive either SAA (n=157) or KHE (n=157) [Table 1]. All participants attended all sessions; they reported high willingness to attend similar training courses, with scores of 9.5 and 9.3, respectively. Of the 146 participants in the SAA group who returned their logbooks, 116 performed acupressure at least 4 days per week throughout the 12-week period. The mean duration of self-practice at home was 16.5 minutes per day.

Compared with the KHE group, the SAA group reported lower pain scores at week 4 (P<0.01), week 8 (P<0.01), and week 12 (P=0.015) [Table 2]. The SAA group also performed better in the timed up and go test at week 8 (P=0.03) but not at week 12. Additionally, the SAA group exhibited greater improvement in Short-Form Six Dimensions scores at week 12 (P=0.03).

The quality-adjusted life year, as measured by Short-Form Six Dimensions scores from baseline to week 12, in the SAA group was 0.1651, which was 0.0042 higher than the 0.1609 observed in the KHE group. However, this difference was not significant (P=0.101). The mean cost of the SAA training per participant was higher than KHE (HK$698 vs HK$652, P=0.002). The incremental cost-effectiveness ratio for SAA in knee OA was

TABLE 1. Baseline characteristics of participants

Variable	All (n=314)*	Self-administered acupressure (n=157)*	Knee health education (n=157)*	P value
Age, y	62.7±4.54	62.6±4.72	62.8±4.36	0.710
Women	246 (78.3)	123 (78.3)	123 (78.3)	1.000
Education level				0.798
Primary or below	28 (8.9)	14 (8.9)	14 (8.9)	
Secondary 1-3	60 (19.1)	32 (20.4)	28 (17.8)	
Secondary 4-7	122 (38.9)	63 (40.1)	59 (37.6)	
Degree or above	104 (33.1)	48 (30.6)	56 (35.7)	
Marital status†				0.911
Single	40 (12.8)	19 (12.2)	21 (13.5)	
Cohabitation	14 (4.5)	8 (5.1)	6 (3.8)	
Married	222 (71.2)	113 (72.4)	109 (69.9)	
Divorced	19 (6.1)	8 (5.1)	11 (7.1)	
Widowed	17 (5.4)	8 (5.1)	9 (5.8)	
Employment status				0.397
Professional/semi-professional	31 (9.9)	18 (11.5)	13 (8.3)	
Skilled worker	17 (5.4)	9 (5.7)	8 (5.1)	
Non-skilled worker	7 (2.2)	2 (1.3)	5 (3.2)	
Retired	169 (53.8)	82 (52.2)	87 (55.4)	
Housewife	69 (22)	35 (22.3)	34 (21.7)	
Unemployed	8 (2.5)	2 (1.3)	6 (3.8)	
Others	13 (4.1)	9 (5.7)	4 (2.5)	
Body mass index, kg/m²	23.5±2.87	23.4±2.91	23.5±2.84	0.793
Presence of health problem	220 (70.1)	120 (76.4)	100 (63.7)	0.014
Knee pain duration, mo	7.3±7.58	7.5±7.02	7.1±8.13	0.584
Current use of painkillers for knee pain	43 (13.7)	20 (12.7)	23 (14.6)	0.622
Previous knee osteoarthritis management				
Western medicine	140 (44.6)	76 (48.4)	64 (40.8)	0.173
Physiotherapy	119 (37.9)	56 (35.7)	63 (40.1)	0.415
Chinese medicine (internal use)	42 (13.4)	22 (14)	20 (12.7)	0.740
Chinese medicine (external use)	55 (17.5)	25 (15.9)	30 (19.1)	0.458
Supplements	218 (69.4)	109 (69.4)	109 (69.4)	1.000

* Data are presented as mean ± standard deviation or No. (%) of participants
† Missing data of two participants

HK$10 873.6. A non-parametric cost-effectiveness acceptability curve indicated a 80% probability that SAA would be cost-effective at a willingness-to-pay threshold of HK$44 000, and >90% probability at a threshold equivalent to one gross domestic product per capita (Fig).

Discussion

A brief SAA training, combined with a short KHE session, effectively alleviates knee pain in older adults with knee OA. SAA outperformed KHE in alleviating knee pain throughout the 12-week study period. Participants in the SAA group demonstrated significantly better performance in the timed up and go test and achieved a higher quality of life at week 8. The high acceptability and compliance observed in the SAA group further support its feasibility. However, SAA did not result in a significantly greater quality-adjusted life year improvement. Nevertheless, SAA remains a cost-effective intervention.

SAA training led to significant improvements in knee pain. Although both groups exhibited reductions in WOMAC scores, no significant between-group difference was observed. This finding is consistent with a previous study that

TABLE 2. Comparison of outcomes between groups across four timepoints

Outcome	Self-administered acupressure (n=157)*	Knee health education (n=157)*	Between-group difference in change (95% confidence interval)	Effect size	P value
Numerical rating scale for pain					
Baseline	5.140±0.151	5.146±0.154	-	-	-
Week 4	3.742±0.153	4.333±0.156	-0.585 (-0.96 to -0.21)	0.35	0.002
Week 8	3.436±0.156	4.105±0.158	-0.662 (-1.08 to -0.24)	0.35	0.002
Week 12	3.034±0.156	3.575±0.154	-0.535 (-0.97 to -0.10)	0.27	0.015
Western Ontario and McMaster University Osteoarthritis Index					
Pain					
Baseline	6.822±0.260	7.586±0.276	-	-	-
Week 4	5.655±0.264	6.638±0.278	-0.219 (-0.81 to 0.37)	0.08	0.464
Week 8	5.068±0.268	6.237±0.280	-0.404 (-1.09 to 0.28)	0.13	0.246
Week 12	5.031±0.267	5.859±0.281	-0.064 (-0.78 to 0.65)	0.02	0.860
Stiffness					
Baseline	2.497±0.127	2.987±0.133	-	-	-
Week 4	2.022±0.129	2.651±0.134	-0.138 (-0.46 to 0.18)	0.10	0.396
Week 8	1.886±0.131	2.302±0.135	0.075 (-0.28 to 0.43)	0.05	0.677
Week 12	1.914±0.131	2.216±0.135	0.188 (-0.17 to 0.55)	0.12	0.295
Physical function					
Baseline	21.924±0.907	25.376±0.978	-	-	-
Week 4	18.546±0.919	21.501±0.982	0.497 (-1.33 to 2.32)	0.06	0.593
Week 8	16.291±0.930	20.067±0.989	-0.323 (-2.49 to 1.85)	0.03	0.773
Week 12	16.168±0.931	19.250±0.994	0.371 (-1.92 to 2.66)	0.04	0.749
Timed up and go test, s					
Baseline	10.781±0.155	10.992±0.148	-	-	-
Week 4	9.791±0.165	10.361±0.154	-0.358 (-0.73 to 0.02)	0.21	0.053
Week 8	9.337±0.173	10.014±0.162	-0.466 (-0.88 to -0.05)	0.25	0.030
Week 12	9.483±0.169	9.765±0.161	-0.069 (-0.48 to 0.34)	0.04	0.737
Gait speed, m/s					
Baseline	3.833±0.077	3.809±0.058	-	-	-
Week 4	3.906±0.085	3.802±0.06	0.08 (-0.13 to 0.29)	0.08	0.494
Week 8	3.849±0.091	3.826±0.063	-0.001 (-0.22 to 0.21)	0.00	0.928
Week 12	3.674±0.088	3.722±0.062	-0.071 (-0.28 to 0.14)	0.07	0.523
Short Form-Six Dimension					
Baseline	0.691±0.009	0.685±0.009	-	-	-
Week 4	0.714±0.009	0.700±0.009	0.008 (-0.01 to 0.03)	0.08	0.459
Week 8	0.724±0.009	0.702±0.009	0.017 (-0.01 to 0.04)	0.15	0.164
Week 12	0.739±0.009	0.707±0.009	0.027 (0.00 to 0.05)	0.24	0.030

* Data are presented as mean ± standard error

demonstrated significant improvements in pain scores for both verum SAA and sham SAA groups compared with usual care.[1] However, verum SAA significantly reduced WOMAC pain and function scores compared with usual care, which contrasts with the results of the present study. This discrepancy may be attributed to differences in the comparison groups; the present study used KHE as a comparator. Decreasing trends were observed in knee pain, WOMAC scores for pain, stiffness, and functional limitations, as well as in the timed up and go test for both groups from baseline to post-intervention.

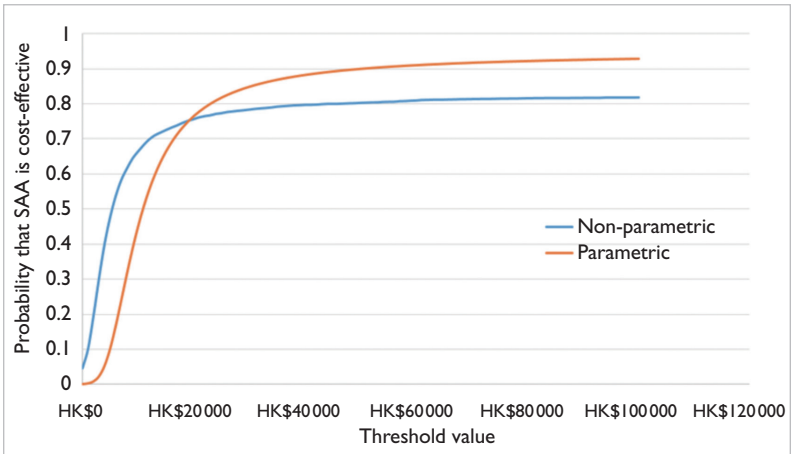

FIG. Cost-effectiveness acceptability curves of self-administered acupressure for knee osteoarthritis

The use of KHE as a comparator avoided differences in contact time between the instructor and participants relative to SAA training. Any observed improvement in pain may be partially related to non-specific effects arising from this interaction. In contrast, care-as-usual or waitlist controls do not adjust for such non-specific effects and may inadvertently induce nocebo effects due to the perception of 'not being treated'.[2] The use of sham controls in acupuncture-related trials remains contentious because the characteristics of the intervention itself may contribute to non-specific treatment effects.[3] These effects are not always readily distinguishable. Accordingly, the present study utilised KHE of equivalent duration to standardise contact hours between the instructor and participants.

SAA is a reliable and well-tolerated non-pharmacological intervention.[4] The most frequently reported adverse effect is finger joint pain, which may result from prolonged pressing of acupoints using fingers or improper techniques.[5] Other reported adverse effects include pain or bruising at the stimulation sites, pricking pain sensations in the legs, and muscle spasms. Most adverse effects are mild, self-resolving, and preventable with proper acupressure techniques to minimise finger overuse or by using acupressure rods.

The present study had several limitations. First, the absence of a sham control group limited the ability to distinguish the specific effects of SAA. Second, the lack of objective measures to assess knee swelling or range of motion may weaken the validity of the study outcomes. Third, participants in the KHE group may have performed SAA, leading to potential underestimation of the treatment effect size.

Conclusion

A brief SAA training, combined with a short KHE session, effectively alleviated knee pain in older adults with knee OA. Participants exhibited high acceptability and compliance with the SAA programme. SAA remains a cost-effective intervention although it did not result in a significantly greater quality-adjusted life year.

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Disclosure

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