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The Effectiveness of Acceptance and Commitment Therapy (ACT) on Psychological Flexibility and Psychological Wellbeing Among Breast Cancer Patients With Chronic Pain

JIA HANG LIM
Universiti Kebangsaan Malaysia
MAHADIR AHMAD
mahadir@ukm.edu.my

Universiti Kebangsaan Malaysia
DITTO PRIHADI KUSUSANTO
Sunway University
Khariyah Sidek
Hospital Canselor Tuanku Muhriz

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Abstract

Purpose

Breast cancer survivors frequently live with persistent, treatment-related pain and reduced psychological wellbeing, yet structured psychological interventions are seldom integrated into Malaysian survivorship care. We tested whether a culturally adapted, group-based acceptance and commitment therapy (ACT) programme improves psychological flexibility and psychological wellbeing and reduces pain intensity, relative to standard care, and whether any gains are maintained at follow-up.

Methods

In a single-blind, parallel-group randomized controlled trial at Hospital Canselor Tuanku Muhriz, Kuala Lumpur, 44 women (aged 36–65 years) with Stage 2–3 breast cancer and chronic pain were randomized 1:1 to group ACT (n = 22) or standard care (n = 22). Psychological flexibility (Acceptance and Action Questionnaire-II, AAQ-II; lower = greater flexibility), psychological wellbeing (Psychological Wellbeing Scale, PWBS; higher = better) and pain intensity (Visual Analogue Scale, VAS; lower = less pain) were assessed at pre-intervention, post-intervention and one-month follow-up. Data were analysed using two-way mixed ANOVA under intention-to-treat.

Results

Groups were equivalent at baseline. The Time × Group interaction favoured ACT for psychological flexibility, $F(2, 42) = 70.38$, $p < .001$, $\eta p^2 = .626$; psychological wellbeing, $F(2, 42) = 6.30$, $p = .003$, $\eta p^2 = .131$; and pain intensity, $F(2, 42) = 11.08$, $p < .001$, $\eta p^2 = .209$. AAQ-II scores in the ACT group improved from 32.00 to 26.91, wellbeing rose from 74.55 to 85.32, and pain fell from 6.86 to 4.69, whereas controls showed negligible or adverse change. Gains were maintained at follow-up.

Conclusions

A culturally adapted, group-based ACT programme produced substantial, durable improvements in psychological flexibility and wellbeing and reduced pain, supporting its integration into Malaysian psycho-oncology survivorship care.

Background

Breast cancer is the most commonly diagnosed cancer among women worldwide and in Malaysia [1]. Advances in early detection and treatment have markedly improved survival, but a substantial proportion of survivors continue to live with persistent, treatment-related pain long after active treatment has ended

[2, 3]. In Malaysian breast cancer cohorts, chronic pain is common and frequently under-recognised and under-treated once oncological follow-up tapers off [4].

Chronic pain refers to pain that persists or recurs beyond three months and is now widely conceptualised as a biopsychosocial phenomenon in which biological, psychological and social processes interact to shape the pain experience [5]. In survivorship, persistent efforts to control or avoid pain often intensify distress and functional limitation. In contrast, psychological flexibility refers to the capacity to remain in open contact with the present moment and to pursue personally valued action despite discomfort—is consistently associated with better adjustment to persistent pain [6, 7].

Cognitive behavioural therapy is the psychological treatment most widely used in oncology, yet meta-analytic effects on mental-health outcomes in breast cancer are only small to moderate [8]. Acceptance and commitment therapy (ACT), a process-based, “third-wave” behavioural therapy, differs in targeting psychological flexibility rather than symptom reduction. Meta-analyses in oncology report that ACT reduces psychological distress and improves flexibility and quality of life across cancer types and delivery formats [9, 10].

Despite this promise, adequately powered randomized controlled trials with validated outcome measures, appropriate comparators and follow-up assessment remain scarce, particularly in Asian survivorship settings where cultural beliefs, collectivist family roles and spiritual coping shape adjustment and where existing evidence has called for more rigorous trials [11, 12]. Structured psychological interventions are seldom embedded within Malaysian survivorship care, in which pain management remains largely biomedical [13].

We therefore conducted a single-blind randomized controlled trial to evaluate whether a culturally adapted, group-based ACT programme, compared with standard care, improves psychological flexibility and psychological wellbeing and reduces pain intensity in breast cancer patients with chronic pain, and whether any gains are maintained at one-month follow-up.

Methods

Trial design, participants and randomization

This was a single-blind, parallel-group randomized controlled trial with 1:1 allocation, conducted in the outpatient oncology setting of Hospital Canselor Tuanku Muhriz (HCTM), Kuala Lumpur. Reporting followed CONSORT guidance for non-pharmacological trials [14]. Eligible participants were women aged 18 years or older with a confirmed diagnosis of Stage 2 or Stage 3 breast cancer, in the survivorship phase (having completed primary treatment such as surgery, chemotherapy or radiotherapy, at least six months earlier and continuing oncology follow-up at HCTM) and reporting chronic pain of at least three months' duration. Exclusion criteria were severe psychiatric illness, cognitive impairment, and inability to understand Malay or English. After written informed consent, participants were randomized 1:1 to the ACT intervention or standard care.

Forty-four women were randomized (22 per arm). Outcomes were assessed at pre-intervention (baseline, T0), post-intervention (two months, T1) and one-month follow-up (T2). To preserve single-blinding, outcome data were managed and analysed by an assessor blinded to group allocation. Analyses followed the intention-to-treat principle, retaining all randomized participants who provided outcome data.

Standard care (control condition)

Participants allocated to the control arm received usual survivorship care at HCTM, comprising routine oncology follow-up and access to standard clinical services, without any structured psychological intervention.

Intervention (ACT)

The intervention was a manualised, culturally adapted, group-based ACT programme delivered across eight weekly sessions of approximately 90 minutes. Sessions were facilitated by a registered clinical psychologist with formal training and supervised experience in ACT and addressed the six core processes of the psychological flexibility model which include present-moment awareness, acceptance, cognitive defusion, self-as-context, values clarification and committed action [7]. The programme was adapted for the local context following an earlier feasibility phase: language was simplified and locally meaningful metaphors relating to family duty, perseverance (sabar) and spiritual meaning were incorporated to improve clarity and cultural resonance [12]. Treatment fidelity was supported through close adherence to the session manual and systematic review of participant worksheets after each session.

Outcomes

The primary outcome was psychological flexibility, measured with the Acceptance and Action Questionnaire-II (AAQ-II) [15] using the validated Malay version [16]. The AAQ-II is reverse-scored, such that lower scores indicate greater psychological flexibility. Psychological wellbeing was measured with the Psychological Wellbeing Scale (PWBS), on which higher scores indicate better wellbeing [17]. Pain intensity was measured with a 0–10 Visual Analogue Scale (VAS), on which lower scores indicate less pain [18]. All three outcomes were assessed at T0, T1 and T2.

Statistical analysis

Data were analysed in SPSS [19]. Normality was assessed with the Shapiro–Wilk test, homogeneity of variance with the F-max criterion, and sphericity with Mauchly's test. Baseline equivalence between groups was examined using independent-samples t-tests, and baseline associations among the three outcomes using Pearson correlations. The intervention effect over time was tested with two-way mixed

(repeated-measures) analysis of variance (ANOVA), with Time (T0, T1, T2) as the within-subjects factor and Group (ACT vs standard care) as the between-subjects factor; the Time × Group interaction was the primary test of efficacy. Significant interactions were followed by Bonferroni-adjusted pairwise comparisons within each group. Partial eta-squared (ηp^2) is reported as the effect size.

Ethical considerations

The study followed the principles of the Declaration of Helsinki and was approved by the Research Ethics Committee of Universiti Kebangsaan Malaysia (Reference No. JEP-2024-829). All participants provided written informed consent. The trial reported was registered with the Australian New Zealand Clinical Trials Registry.

Clinical Trial number

ACTRN12624000512527, date registered 25 April 2024.

Results

Participants and baseline data

Of 72 women assessed for eligibility, 28 were excluded (not meeting inclusion criteria, declining to participate, or other reasons), and 44 women aged 36–65 years (mean age 54.0 years, SD 6.55) were randomized, 22 to ACT and 22 to standard care. Participant flow through the trial is shown in Fig. 1. Four participants in the ACT group and two in the control group discontinued the intervention; none were lost to follow-up, and all 44 randomized participants were retained in the intention-to-treat analysis. The sample was ethnically mixed which included Malay 23 (52.3%), Chinese 14 (31.8%) and Indian 7 (15.9%), predominantly married (36; 81.8%) and not in formal employment (34; 77.3%) as shown in Table 1. Baseline scores did not differ significantly between groups for psychological flexibility ($t(42) = -1.73$, $p = .091$), psychological wellbeing ($t(42) = -1.30$, $p = .199$) or pain intensity ($t(42) = 0.51$, $p = .612$), indicating successful randomization. At baseline, the three outcomes were not significantly correlated with one another (flexibility with wellbeing, $r(42) = -.10$, $p = .51$; flexibility with pain, $r(42) = .04$, $p = .78$; wellbeing with pain, $r(42) = .10$, $p = .54$).

Table 1
Sociodemographic characteristics of participants (N = 44)

Characteristic	Category	*n*	%
Age (years)	Mean 54 (range 36–65)	—	—
Gender	Female	44	100
Ethnicity	Malay	23	52.3
	Chinese	14	31.8
	Indian	7	15.9
Marital status	Married	36	81.8
	Single	8	18.2
Employment status	Employed	10	22.7
	Not employed	34	77.3

Figures are absolute numbers with percentages, except age (mean and range)

Descriptive statistics for the three outcomes across the three time points are presented in Table 2, and the two-way mixed ANOVA results in Table 3.

Table 2
Means (standard deviations) for psychological flexibility, psychological wellbeing and pain intensity across three time points by group

Outcome	Group	Baseline	Post-intervention	1-month follow-up
Psychological flexibility (AAQ-II)	ACT	32.00 (2.91)	25.41 (3.42)	26.91 (3.15)
	Control	33.60 (3.19)	38.32 (3.73)	39.04 (3.37)
Psychological wellbeing (PWBS)	ACT	74.55 (11.22)	83.45 (9.20)	85.32 (10.99)
	Control	78.41 (8.21)	78.73 (9.26)	82.23 (9.72)
Pain intensity (VAS, 0–10)	ACT	6.86 (1.52)	5.31 (2.05)	4.69 (1.93)
	Control	6.68 (2.05)	6.63 (2.21)	7.10 (2.08)

AAQ-II Acceptance and Action Questionnaire-II (lower = greater flexibility); PWBS Psychological Wellbeing Scale (higher = better); VAS Visual Analogue Scale (lower = less pain)

Psychological flexibility

Sphericity was met (Mauchly's $\chi^2(2) = 0.13$, $p = .937$). The Time × Group interaction was large and significant, $F(2, 42) = 70.38$, $p < .001$, $\eta p^2 = .626$. In the ACT group, AAQ-II scores decreased—indicating greater flexibility—from 32.00 (SD 2.91) at baseline to 25.41 (SD 3.42) post-intervention, and were largely maintained at follow-up (26.91, SD 3.15). The control group moved in the opposite direction, from 33.60 (SD 3.19) to 39.04 (SD 3.37). Within the ACT group, Bonferroni-adjusted comparisons showed significant improvement from pre- to post-intervention (mean difference 6.59, $p < .001$) and from pre-intervention to follow-up (5.09, $p < .001$), with no significant change between post-intervention and follow-up ($p = .169$), confirming that gains were maintained.

Psychological wellbeing

For psychological wellbeing, the Time × Group interaction was significant, $F(2, 42) = 6.30$, $p = .003$, $\eta p^2 = .131$. ACT participants improved from 74.55 (SD 11.22) at baseline to 83.45 (SD 9.20) post-intervention and 85.32 (SD 10.99) at follow-up, whereas the control group changed minimally (78.41 to 82.23). Within the ACT group, wellbeing was significantly higher at post-intervention (mean difference 8.91, $p < .001$) and follow-up (10.77, $p < .001$) than at baseline, with no significant difference between post-intervention and follow-up ($p = .961$). No pairwise change reached significance in the control group.

Pain intensity

For pain intensity, the Time × Group interaction was significant, $F(2, 42) = 11.08$, $p < .001$, $\eta p^2 = .209$. VAS scores in the ACT group fell progressively from 6.86 (SD 1.52) at baseline to 5.31 (SD 2.05) post-intervention and 4.69 (SD 1.93) at follow-up, whereas the control group remained essentially unchanged and was slightly higher at follow-up (6.68 to 7.10). In the ACT group, pain was significantly lower at post-intervention (mean difference 1.64, $p < .001$) and follow-up (2.27, $p < .001$) than at baseline, with no significant change between post-intervention and follow-up ($p = .445$). None of the control-group comparisons were significant (all $p \geq .897$).

Table 3
Two-way mixed ANOVA results for each outcome

Outcome	Effect	F (df)	*p*	ηp²
Psychological flexibility	Time	2.51 (2, 42)	.087	.056
	Group	128.36 (1, 42)	< .001	.753
	Time × Group	70.38 (2, 42)	< .001	.626
Psychological wellbeing	Time	16.50 (2, 42)	< .001	.282
	Group	0.26 (1, 42)	.610	.006
	Time × Group	6.30 (2, 42)	.003	.131
Pain intensity	Time	6.23 (2, 42)	.003	.129
	Group	7.32 (1, 42)	< .001	.148
	Time × Group	11.08 (2, 42)	< .001	.209

ηp² partial eta-squared

Discussion

In this single-blind randomized controlled trial, a culturally adapted, group-based ACT programme produced large improvements in psychological flexibility and significant gains in psychological wellbeing, together with meaningful reductions in pain intensity, relative to standard care. All effects were maintained one month after the intervention.

The large Time × Group interaction for psychological flexibility (ηp² = .626) supports the central proposition of ACT that flexibility is the process through which therapeutic change occurs [7]. The magnitude is consistent with meta-analytic evidence in oncology, in which ACT produced large post-intervention improvements in flexibility [9], and with findings that flexibility predicts subsequent quality-of-life and emotional outcomes among cancer survivors [20]. The absence of a main effect of time for flexibility, combined with the strong interaction, indicates that improvement did not arise from the passage of time or medical care alone but required the intentional cultivation of acceptance, defusion and values-based action [21, 22].

Improvements in psychological wellbeing followed a similar trajectory and were sustained at follow-up, echoing reports that ACT enhances wellbeing and emotional functioning in cancer populations [10, 23] and that illness acceptance underpins wellbeing in chronic disease [24]. These outcomes are coherent with Ryff's eudaimonic model, in which acceptance, purpose and self-direction support wellbeing even amid illness-related limitation [25].

Pain intensity decreased despite ACT not directly targeting nociception. This is consistent with the biopsychosocial model of pain [5] and with the ACT stance that reducing the struggle with pain—through acceptance and defusion—attenuates its perceived intensity and associated distress [6]. The direction and durability of change align with meta-analyses reporting moderate reductions in pain and improved pain acceptance following ACT [26, 27] and with oncology trials showing reduced pain-related distress and improved disease acceptance [28]. The maintenance of gains across all three outcomes is congruent with the process-based view that ACT expands adaptive behavioural repertoires rather than temporarily suppressing symptoms, and with group-based ACT trials in chronic pain that report clinically significant, maintained change [29].

The cultural adaptation may have contributed to engagement. Locally meaningful metaphors of family duty, perseverance and spiritual meaning are congruent with the collectivist, faith-oriented context of many Malaysian survivors, and adapting psychological interventions for ethnic-minority and non-Western populations tends to improve acceptability and outcomes [12]. Contrary to expectation, the three outcomes were uncorrelated at baseline. This is theoretically coherent within the ACT framework, which conceptualises psychological flexibility as a mechanism of change that exerts its influence over the course of intervention rather than as a static predictor [6]; it may also reflect the modest sample and the VAS's focus on the sensory rather than the interference dimension of pain.

Strengths and limitations

Strengths include the randomized, single-blind design with intention-to-treat analysis, use of a validated and locally adapted flexibility measure, delivery by a trained clinical psychologist with fidelity monitoring, and inclusion of a one-month follow-up. Several limitations temper interpretation. The sample was modest (n = 44) and drawn from a single tertiary centre, limiting generalizability. Follow-up extended only one month, so the durability of effects beyond this period is unknown. The comparator was standard care rather than an active psychological control, so attention and group-support effects cannot be fully separated from ACT-specific mechanisms. Pain was assessed by intensity alone; measures of pain interference and function may better capture clinically meaningful change. Larger, multi-site trials with active comparators, longer follow-up and process measures are warranted [27, 29].

Conclusions

A culturally adapted, group-based ACT programme significantly improved psychological flexibility and psychological wellbeing and reduced pain intensity among Malaysian breast cancer patients with chronic pain, with effects maintained at one-month follow-up. These findings support integrating ACT-informed psychosocial care into survivorship services and provide a foundation for larger, definitive trials [11].

Declarations

Data sharing statement

Data is available upon reasonable request.

Participation

LJH MA, DPK wrote the protocol. LJH specified the psychological part of the intervention, and MA and DPK partly educated the clinical psychologist. LJH and KS followed the intervention and held feedback sessions with clinical psychologist to ensure the intervention. LJH, MA and DPK ensured randomization and data gathering. LJH did the statistical analysis, and all authors were involved in interpretation of results and manuscript editin**g.**

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Author contribution LJH MA, DPK wrote the protocol. LJH specified the psychological part of the intervention, and MA and DPK partly educated the clinical psychologist. LJH and KS followed the intervention and held feedback sessions with clinical psychologist to ensure the intervention. LJH, MA and DPK ensured randomization and data gathering. LJH did the statistical analysis, and all authors were involved in interpretation of results and manuscript editing.

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Data availability The data are available upon request to the corresponding author.

Conflict of interest The authors declare no competing interests.

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Figures

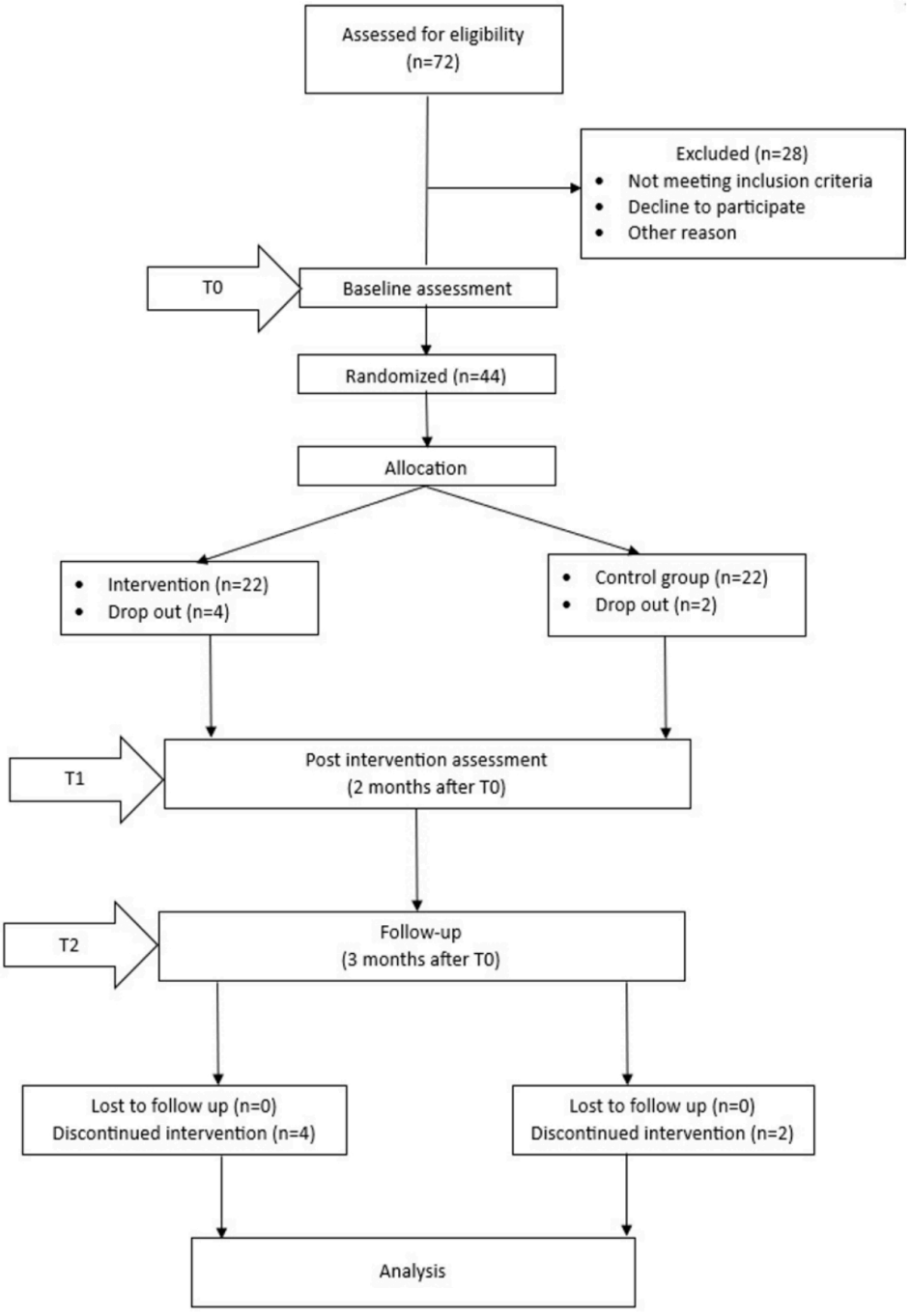


Figure 1

CONSORT flow diagram