Acupuncture and reflexology for patients undergoing chemotherapy: an observational study

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Abstract

Purpose

Around three quarters of individuals undergoing chemotherapy self-report multiple symptoms. There is clinical trial evidence of effectiveness for acupuncture for commonly experienced symptoms, and emerging evidence for reflexology, but little is known about the effects of these therapies on multiple symptoms when implemented in a real world setting during active chemotherapy treatment.

Methods

This was a single-arm observational study of participants receiving reflexology and/or acupuncture while attending chemotherapy. Participants received a 20 minute reflexology treatment or a 20 minute acupuncture treatment or a combination of both. Patient reported outcome measures were administered before and after the treatment using the Edmonton Symptom Assessment Scale (ESAS).

Results

During the study period, 330 unique participants with cancer received acupuncture and/or reflexology treatments. Participants had, on average, 5.3 symptoms each which they reported as moderate to severe ($\geq 4/10$) using the ESAS at baseline. Following treatment, participants reported 3.2 symptoms as moderate to severe. The symptom change for all participant encounters receiving any therapy was statistically significant for all symptoms, and clinically significant (a reduction of more than 1) for all symptoms except financial distress, appetite and memory. Clinically significant levels of global distress (< 3) were reduced in 72% of all participants receiving either therapy. No adverse events were recorded.

Conclusions

The results indicate that acupuncture and reflexology administered alongside chemotherapy may reduce patient reported symptom burden and patient global symptom related distress. Future research would include an active control group, and consider confounding factors such as chemotherapy stage and medication.

Introduction

Chemotherapy side effects impact quality of life, psychological wellbeing and may impact on capacity to tolerate a full dose of treatment. Around three quarters of individuals undergoing chemotherapy self-report multiple symptoms the most frequent being fatigue, anxiety, nausea and bowel disturbances [13]. Complementary therapies are increasingly being incorporated into supportive cancer care to assist patients in managing these symptoms.

Acupuncture is increasingly used globally for cancer symptoms and side effects. It is offered across all National Institutes of Health cancer centres, and incorporated in ASCO endorsed guidelines [10, 11]. Randomised controlled trials (RCT) have demonstrated benefit for anxiety, depression, insomnia, vasomotor symptoms and other symptoms experienced by patients undergoing chemotherapy [10]. Acupuncture has been shown to be safe, and may provide an option for patients.

Reflexology is a non-invasive, localised touch therapy that is an easily administered therapeutic treatment well suited to the setting of a chemotherapy day unit. Studies have shown benefit for anxiety, sleep, pain and quality of life [15, 20, 21]. Together, acupuncture and reflexology may also assist in managing chemotherapy induced peripheral neuropathy.

Symptoms experienced by patients undergoing chemotherapy often appear in clusters [23]. While there is evidence of the beneficial effects of acupuncture for individual symptom control in clinical trial settings, and emerging evidence for reflexology, little is known about the effects of reflexology and acupuncture and the treatment of multiple symptoms when implemented in a real world setting during chemotherapy treatment.

The aim of this study was to investigate if acupuncture and/or reflexology improved self-reported symptoms by patients undergoing chemotherapy.

Methods

This was a single-arm observational study of participants who utilised reflexology and/or acupuncture services while attending chemotherapy at the Chris O'Brien Lifehouse during the period of 2017 to 2020. The study received ethics approval from the Sydney Local Area Health District Ethics Committee in May 2019 (HREC/18/RPAH/519).

Participants

Patients receiving chemotherapy for solid tumours in the hospital day therapy unit were offered acupuncture or reflexology therapy. Participants could self-refer or be referred by healthcare professionals within the hospital. Treatments were provided free of charge to the patient, funded by a philanthropic grant to the hospital. Patients were excluded if they had profound neutropenia, thrombocytopenia (platelets < 50), selected skin conditions or risk of bruising due to their coagulation status.

Setting

The Chris O'Brien Lifehouse in Australia, operates as a non-for-profit cancer hospital and services over 15,000 patients per year, and has a dedicated integrative oncology service [7]. The Day Therapy unit has over 45 chemotherapy chairs with 20,000 appointments annually. The acupuncture and reflexology service is available twice a week, over a 90 minute period in the chemotherapy suite with an acupuncturist and a reflexologist, or at times both of these. Patients were treated in either their chair while having their infusion or in a multi-chair room within the day therapy unit.

Intervention

Participants received a 20 minute reflexology treatment or a 20 minute acupuncture treatment or, if requested and available, a combination of both. Where participants were undergoing an infusion through their arm that limb was typically not included in the acupuncture points selected. Acupuncture points were restricted to those that could be safely administered while the patient was seated. Therapists had a minimum of 5 years' experience working with cancer patients, and were credentialed to work within the hospital setting.

Outcome measure

Patient reported outcome measures were administered before and after the treatment using the Edmonton Symptom Assessment Scale (ESAS) [1]. The ESAS R includes nine symptoms rated on a visual analogue scale (VAS) from 0 to 10. We used a modified ESAS-17 which includes the core items with eight additional items relevant to patients with cancer (sleep, wellbeing, spiritual pain, financial distress, hot flashes, numbness/tingling, dry mouth and memory). Participants completed the initial ESAS prior to treatment and were asked to select a value that related to how they felt in the last 24 hours. Immediately after treatment, they were asked to report on how they felt "right now". The ESAS has three subscales: the physical distress score (PHS), a composite of six symptoms - pain, fatigue, nausea, drowsiness, appetite and shortness of breath (0-60); the psychological stress score (PSS), a sum of depression and anxiety (0-20); and the global distress score (GDS) a sum of the PHS, PSS and well-being (0-90)[8]. The higher the score, the more distress.

The ESAS was administered by a research assistant not providing treatment to minimise administration bias. Basic demographic data, and primary cancer diagnosis were extracted from the electronic medical record.

Statistical analysis

Statistical analysis was conducted using the statistical software R version 4.0.2 [16]. Descriptive statistics were used to analyze demographic information. In order to correct for repeat treatments, generalized estimation equation methods were used to compute means, standard deviations, and tests for changes from baseline, for the ESAS symptom scores and composite scores.

Change of ESAS scores greater than 1 are considered clinically significant. For the physical, emotional and total symptom distress subscales, clinically significant reductions are as follows: $PHS \geq 2$, $PSS \geq 2$ and $GDS \geq 3$ [8]. Degree of symptom burden was classified by 0 as 'no burden', 1-3 'mild', 4-6 'moderate' and 7-10 'severe' burden. Moderate and severe burden were further classified as 'clinically significant' [18].

A separate analysis of the mean was calculated for the different therapy groups (acupuncture, reflexology, combined). Paired t-tests were used to determine the change in scores in mean and standard deviation.

Results

During the study period, 330 unique participants with a cancer diagnosis received acupuncture and/or reflexology treatments while undergoing chemotherapy. Participants were mainly female (79%) with breast cancer (31%), and a median age of 56 (Table 1).

Baseline presenting symptoms

The most prevalent symptoms ($ESAS \geq 1$) of any therapy were poor sleep (85%), fatigue (85%) and decreased sense of well-being (95%) (Table 1). Presenting symptoms were similar across acupuncture, reflexology and acupuncture/reflexology therapies.

Table 1
Demographics and Baseline Presenting Symptoms¹

Characteristic	Overall	N	Acup	Reflex	Both
	N = 330		N = 72	N = 198	N = 60
Age (n=326)	56 (43, 65)		55 (41, 62)	57 (44, 67)	55 (45, 60)
Unknown	4		0	4	0
Gender (n=293)					
F	231 (79%)		49 (75%)	141 (82%)	41 (75%)
M	62 (21%)		16 (25%)	32 (18%)	14 (25%)
Unknown/Not stated	37		7	25	5
Diagnosis (n=330)					
Breast	100 (31%)		26 (37%)	58 (30%)	16 (28%)
Colorectal	30 (9.3%)		12 (17%)	12 (6.2%)	6 (11%)
Gynaecological	55 (17%)		9 (13%)	38 (19%)	8 (14%)
Head and Neck	21 (6.5%)		3 (4.2%)	15 (7.7%)	3 (5.3%)
Lung	32 (9.9%)		2 (2.8%)	22 (11%)	8 (14%)
Other: Skin, Brain, Prostate, Pancreatic, Sarcoma	73 (23%)		13 (18%)	46 (24%)	14 (25%)
Other	19 (9%)		7 (10%)	7 (4%)	5 (8%)
Baseline presenting symptoms²		N			
Fatigue	279 (85%)	330	60 (83%)	170 (86%)	49 (82%)
Sleep	278 (85%)	328	60 (83%)	168 (86%)	50 (83%)
Memory	235 (73%)	324	48 (67%)	140 (72%)	47 (81%)

¹Missing data: due to a changeover in electronic medical record systems within the hospital not all demographics were able to be extracted.²Where participants scored the symptom ≥ 1

Characteristic	Overall	N	Acup	Reflex	Both
Appetite	231 (71%)	327	48 (68%)	139 (71%)	44 (73%)
PSS	212 (65%)	326	45 (64%)	136 (69%)	31 (52%)
Drowsiness	210 (64%)	328	41 (57%)	129 (66%)	40 (67%)
Pain	199 (60%)	329	44 (61%)	117 (59%)	38 (63%)
Anxiety	198 (60%)	329	41 (58%)	129 (65%)	28 (47%)
Dry mouth	197 (60%)	326	44 (61%)	116 (59%)	37 (64%)
Numbness	177 (55%)	324	42 (58%)	103 (53%)	32 (56%)
Financial distress	170 (52%)	325	40 (56%)	99 (51%)	31 (52%)
Depression	166 (51%)	327	36 (51%)	104 (53%)	26 (43%)
Shortness of breath	152 (46%)	330	36 (50%)	91 (46%)	25 (42%)
Hot flashes	130 (40%)	325	29 (40%)	77 (39%)	24 (42%)
Nausea	129 (39%)	329	26 (36%)	78 (40%)	25 (42%)
Spiritual pain	120 (37%)	321	29 (41%)	69 (36%)	22 (37%)
¹ Missing data: due to a changeover in electronic medical record systems within the hospital not all demographics were able to be extracted. ² Where participants scored the symptom ≥ 1					

Symptom change in all encounters

For 330 participants, there were 809 encounters, with participants receiving an average of 2.45 (range 1-28) treatments each.

The symptom change for all participant encounters receiving any therapy was statistically significant for all symptoms. and clinically significant (a reduction of more than 1) for all symptoms except financial distress, appetite and memory (Table 2).

Clinically significant changes were noted in overall global (GDS), physical symptom distress (PHS) and psychological stress score (PSS).

Table 2
Symptom change in all participant encounters¹

	All Encounters		Acupuncture		Reflexology		Acupuncture + Reflexology	
ESAS Symptom	n	Mean change	n	Mean change*	n	Mean change	n	Mean change
Pain	545	1.62	101	1.28	297	1.61	144	1.45
Fatigue	670	1.83	128	1.88	385	1.72	155	2.01
Nausea	316	1.59	61	1.80	173	1.55	82	1.48
Depression	397	1.23	74	1.39	226	1.12	96	1.38
Anxiety	492	1.76	86	1.49	289	1.72	116	1.74
Drowsiness	513	1.24	93	1.35	292	1.18	127	1.17
Shortness of breath	368	1.73	75	1.91	190	1.53	102	1.75
Appetite	576	0.75	103	0.45	321	0.77	149	0.9
Sleep	707	1.02	133	0.87	398	1.04	173	1.12
Wellbeing	705	1.58	134	1.44	398	1.56	170	1.49
Financial distress	414	0.74	93	0.99	229	0.6	90	0.81
Spiritual pain	293	1.30	67	1.62	167	1.13	59	1.46
Hot flashes	381	1.94	77	1.86	211	1.93	93	2.14
Dry mouth	505	1.42	98	1.37	277	1.4	128	1.36
Numbness	485	1.57	95	1.49	261	1.69	127	1.36
Memory	634	0.96	115	1.00	354	0.9	162	0.97
GDS	761	8.01	141	7.31	427	7.83	190	8.36
PHS	756	5.15	143	4.87	425	4.89	185	5.68
PSS	522	2.44	95	2.15	303	2.41	123	2.3

¹All mean changes from baseline were highly significant (p<0.001) with the exception of appetite in the acupuncture group which was significant (p=0.036).

Acupuncture group

Statistically significant and clinically significant changes were experienced for all symptoms with the exception of financial distress and appetite. There was a clinically and statistically significant mean change ($p < 0.001$) on all global distress (-7.31), physical distress (-4.87) and psychological symptom scores (-2.15).

Reflexology group

Statistically significant changes were found for all reported symptoms, and these changes were clinically significant with the exception of financial distress and appetite. There was a clinically and statistically significant change on all global distress (-7.83), physical distress (-4.89) and psychological (-2.41) symptom scores.

Combined acupuncture and reflexology

Combined treatment resulted in statistically and clinically significant changes for all symptoms with the exception of financial distress and memory. There was a clinically and statistically significant change on all global distress (-8.36), physical distress (-5.68) and psychological symptom scores (-2.3). There was no significant difference in mean changes between groups (acupuncture alone, reflexology alone, both therapies).

For the ESAS sub-scales, there were clinically and statistically significant mean changes for the global distress score (-8.01), the physical (-5.15) and the emotional distress score (-2.44).

Symptom severity: Moderate to severe (≥ 4) symptoms at baseline were reported for fatigue (51%), poor sleep (51%), and poor well-being (49%) (Supplemental File: Table S1). After treatment, those reporting moderate to severe symptoms reduced in fatigue (23%), poor sleep (31%), and poor wellbeing (22%).

Number of symptoms: Participants had, on average, 5.3 moderate to severe ($\geq 4/10$) symptoms before treatment (Supplementary File: Table S1). Following treatment, participants reported 3.2 symptoms as moderate to severe.

Clinical response rates

Clinical response rates, defined in the methods, were highest for fatigue (63%) and well-being (61%) (Table 3). Pain (46%) and anxiety (43%) improvements were also experienced with a slightly higher response for pain in the reflexology group (49%v44%) and anxiety in the acupuncture group (49%vs43%).

Table 3
Clinical Response Rates for Participants¹

Characteristic	Overall	N	Acu	Both	Reflex
	N = 330		N = 64	N = 66	N = 200
Fatigue	205 (63%)	325	44 (70%)	41 (64%)	120 (61%)
Wellbeing	191 (61%)	313	36 (58%)	41 (64%)	114 (61%)
Pain	149 (46%)	326	27 (44%)	24 (37%)	98 (49%)
Anxiety	140 (43%)	326	31 (49%)	24 (37%)	85 (43%)
Sleep	121 (41%)	297	26 (46%)	27 (44%)	68 (38%)
Numbness	123 (39%)	319	29 (47%)	23 (37%)	71 (37%)
Memory	121 (39%)	314	28 (45%)	28 (44%)	65 (34%)
Drowsiness	120 (37%)	325	24 (38%)	24 (38%)	72 (36%)
Dry mouth	119 (37%)	318	21 (34%)	28 (44%)	70 (36%)
Appetite	109 (34%)	322	15 (24%)	29 (45%)	65 (33%)
Depression	97 (30%)	324	22 (35%)	14 (22%)	61 (31%)
Shortness of breath	97 (30%)	327	20 (32%)	22 (34%)	55 (28%)
Nausea	94 (29%)	325	20 (32%)	22 (34%)	52 (26%)
Hot flashes	91 (29%)	315	18 (30%)	23 (37%)	50 (26%)
Financial distress	70 (22%)	317	23 (38%)	14 (22%)	33 (17%)
Spiritual pain	69 (22%)	309	19 (34%)	12 (19%)	38 (20%)
GDS	215 (72%)	299	43 (73%)	38 (62%)	134 (75%)
PHS	186 (59%)	316	37 (61%)	36 (58%)	113 (59%)
PSS	121 (37%)	324	29 (47%)	19 (29%)	73 (37%)
¹ Clinical response rate: a 1-point decrease or more on ESAS individual symptoms; 2-point decrease or more on the ESAS PSS; 3-point decrease or more on the ESAS PHS and GDS.					

Reduced fatigue was reported by 70% of patients in the acupuncture group, and 61% of the reflexology group. However, differences between groups were not statistically different. Global distress was improved in 72% of all patients receiving any therapy or combination of therapy.

No adverse events were reported.

Discussion

This is one of the first observational studies to examine the effects of acupuncture and reflexology on patient reported symptom burden while undergoing chemotherapy in a routine care setting. Overall, patients receiving either or both therapies were likely to experience a clinically significant change in all symptoms except appetite, financial distress and memory. Clinically significant reductions in global distress (a reduction of more than 3 points) was reported in 72% of all participants using any therapy, with a mean reduction of 8 on the 90-point scale. There was no statistically significant difference between the responses to the therapies participants were given.

The most prevalent symptoms in our study for those presenting for acupuncture were sleep disturbance, fatigue and reduced appetite, and are consistent with frequently reported symptoms in other studies of cancer patients using acupuncture in a hospital setting [6, 9].

To date most studies directed at reducing the symptom burden of patients undergoing chemotherapy, have focused on self-help, nurse-led intervention, psychoeducation and cognitive behavioural therapies with mixed results [3, 5, 22]. Other non-pharmacological approaches specifically for symptom clusters in patients undergoing chemotherapy have included self-acupressure, and guided imagery [2].

Our study indicates that the use of reflexology for reducing the symptom burden of patients during chemotherapy may provide benefit. This is consistent with other studies, however, evidence limitations include small sample size and quasi-experimental designs [20].

Several studies have investigated acupuncture and reflexology specifically for a single symptom such as nausea and/or vomiting but few on the use of either acupuncture or reflexology for the reduction of several symptoms during chemotherapy [4, 12, 17, 19]. Reflexology and acupuncture may be an option for patient to address multiple symptoms or symptom clusters with the flexibility to address changes over the course of treatment[14].

Limitations

This study was undertaken at a single cancer centre and may not be generalizable to other settings. Without a control group it is difficult to predict the placebo effect or the effect of simply being in a quiet, reclining environment for 20 minutes. This study did not control patient interaction with other staff, patients or friends during intervention and more accurately reflects real world practice.

We did not control for supportive care medications and this may have impacted on self-report symptoms. We also cannot eliminate selection bias. Participants were free to choose if they were interested in the intervention, and which intervention they preferred.

Although the service was initially offered only for 90 minutes one day a week, we expanded to two days and these days remained fixed. The reflexology service was available more frequently than the

acupuncture.

Future research would include an active control group, factor in statistical measures for selection bias and consider confounding factors such as chemotherapy stage and medication. Research may also consider quality of life following chemotherapy, impact on dose delays, dose reductions, and reduced relative dose intensity (RDI) rates, and medication rates.

Conclusion

Acupuncture and reflexology can safely be administered alongside chemotherapy in the chemotherapy chair/suite to produce a clinically significant reduction in patient global symptom distress, physical and psychological distress and reported symptom burden. The results of the current study support the importance of advancing the investigation of acupuncture and reflexology for the management of individual symptoms and symptom clusters that occur within the context of cancer treatments.

Declarations

Funding

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Conflicts of interest/Competing interests

None

Availability of data and material

Deidentified data set

Code availability

Not applicable

Authors' contributions

SG and GS conceived the study. SG, GS, JL and LR designed the study. SG, GS, VC, EW, KK and AB contributed to the data, data collection and cleaning. GH and SG performed the analysis. All members contributed to writing the final paper.

Ethics approval

The study received ethics approval from the Sydney Local Area Health District Ethics Committee in May 2019 (HREC/18/RPAH/519).

Consent to participate

Consent to participate as per Ethics approval.

Consent for publication

Not applicable

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Supplementary Tables

Table S1
Symptom severity of participants¹

	Pre				Post			
Symptom	none	mild	mod	severe	none	mild	mod	severe
Anxiety	120	90	56	29	153	70	29	6
Appetite	89	86	88	32	96	85	58	19
Depression	144	98	38	15	170	60	24	4
Drowsiness	109	84	64	38	113	85	45	15
Dry mouth	118	85	60	32	133	82	31	12
Fatigue	46	82	108	59	86	97	61	14
Financial distress	137	79	43	36	144	69	27	18
Hot flashes	171	55	45	24	181	46	19	12
Memory	80	86	94	35	89	79	77	13
Nausea	184	66	32	13	183	55	16	4
Numbness	135	60	55	45	127	74	41	16
Pain	114	90	60	31	135	85	31	7
Shortness of breath	159	80	36	20	187	54	12	5
Sleep	43	83	98	71	63	94	66	35
Spiritual pain	183	61	39	12	193	47	15	3
Wellbeing	31	103	114	47	77	110	56	15
Average number of symptoms per patient								
	6.3	4.4	3.5	1.8	8.3	4.6	2.4	0.8
¹ Degree of symptom burden was classified by 0 as 'no burden', 1-3 'mild', 4-6 'moderate' and 7-10 'severe' burden. Moderate and severe burden were further classified as 'clinically significant'								