Characteristics and Symptom Burden of Patients Accessing Acupuncture Services at a Cancer Hospital

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Abstract

Background: Patients with cancer are often impacted by a significant symptom burden. Cancer hospitals increasingly recognize the value of complementary and integrative therapies to support the management of cancer related symptoms. The aim of this study is to provide a better understanding of the demographic characteristics and symptoms experienced by cancer patients who access acupuncture services in a tertiary hospital in Australia. **Methods:** A retrospective audit was conducted of patients that presented to the acupuncture service at Chris O'Brien Lifehouse between July 2017 and December 2018. Edmonton Symptom Assessment Scale (ESAS) and Measure Yourself Concerns and Wellbeing (MYCaW) outcome measures were used. The quantitative data was analyzed using descriptive statistics and Principal Component Analysis. **Results:** A total of 127 inpatients and outpatients (mean age 55, range 19-85) were included with 441 individual surveys completed (264 ESAS, 177 MYCaW). Patients were predominantly female (76.8%) and breast cancer was the most prevalent primary diagnosis (48%). The most prevalent symptoms in the ESAS were sleep problems (88.6%), fatigue (88.3%), lack of wellbeing (88.1%), and memory difficulty (82.6%). Similarly, symptoms with the highest mean scores were numbness, fatigue, sleep problems and hot flushes, whilst neuropathy, and hot flashes were scored as the most severe (score ≥7) by patients. Cluster analysis yielded 3 symptom clusters, 2 included "physical symptoms" (pain, sleep problems, fatigue and numbness/neuropathy), and (nausea, appetite, general well-being), whilst the third included "psychological" symptoms (anxiety, depression, spiritual pain, financial distress). The most frequent concerns expressed by patients (MyCaW) seeking acupuncture were side effects of chemotherapy (24.6%) and pain (20.8%). **Conclusion:** This audit highlights the most prevalent symptoms, the symptoms with the greatest burden and the types of patients that receive acupuncture services at an Australian tertiary hospital setting. The findings of this audit provide direction for future acupuncture practices and research in hospital settings.

Keywords

integrative oncology, acupuncture, ESAS, patient report outcome measures, cancer, symptom clusters

Introduction

Cancer patients experience an average of 8 symptoms, with common symptom clusters identified in various cancer groups.[1] Symptoms may be acute, occurring during treatment, but also include long term and late effects of treatment, with 58% of cancer survivors requiring care for at least 1 comorbid symptom.[2-4] Good symptom management improves quality of life, functional status, and in some instances, survival of cancer patients.[5] While symptom management may be adequate in some cases, many patients continue to report inadequate relief of symptoms with conventional treatment methods.[6] The last 2 decades have seen an increasing number

of cancer patients and survivors seeking complementary therapies for symptom management.[7]

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Table 1. Integrative Oncology and Integrative Medicine.

Integrative Oncology: refers to a patient-centered, evidence-informed field of cancer care that utilizes mind and body practices, natural products, and/or lifestyle modifications from different traditions alongside conventional cancer treatments.[13]
Integrative medicine: refers to the practice of medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic approaches, healthcare professionals, and disciplines to achieve optimal health and healing.[14]

In Australia, an average of 43% of people with cancer use complementary therapies, and as many as 88% in certain groups such as those with breast cancer.[8,9] Reasons for using complementary therapies include relieving side effects of conventional care, increasing quality of life and to improve self-efficacy.[7,10] In response to this increasing demand for complementary therapies, hospitals have begun to provide integrative oncology (IO) care as part of their services.[11] Integrative oncology, and more generally integrative medicine, refer to the merging of conventional healthcare with complementary therapies to optimize health and healing (see Table 1). The scope of therapies offered differs considerably across hospitals. A recent survey identified 71 out of 275 cancer treatment centers were providing some form of complementary therapy, but few offer a comprehensive, integrated service.[12]

Acupuncture was identified as the most commonly used IO therapy (74%) in US National Cancer Institute designated comprehensive cancer centers.[11] In 2012, Australia formally recognized Traditional Chinese Medicine (TCM) practitioners by setting minimum standards for registration including the practice of acupuncture. Acupuncture has demonstrated effectiveness in treating common cancer related symptoms including chemotherapy induced nausea and vomiting, pain, fatigue, xerostomia, postoperative ileus, sleep problems, hot flashes, mood changes, and peripheral neuropathy.[15,16] Other advantages of acupuncture include the minimally invasive methods and the low occurrence of adverse events.[17]

Few studies have investigated the demographic characteristics, types of symptoms, symptom clusters and level of symptom burden of cancer patients that use acupuncture services in cancer hospital setting, and to our knowledge, no studies to date on Australian cancer patients.[17,18] Understanding the reasons that people with cancer present for acupuncture can help plan future services. This study aims to identify the demographic characteristics, symptom burden and main presenting concerns of patients receiving acupuncture services at an Australian tertiary cancer center.

Methods

Patient Selection and Data Collection

This report is a retrospective audit of patients who accessed acupuncture services at the Chris O'Brien Lifehouse during the period of June 2017 to December 2018.

The Chris O'Brien Lifehouse is a not for profit, leading cancer center in Australia which services around 15 000 inpatients and outpatients per year. The "Living Room," where the IO unit is located, houses 8 consultation rooms, a medical consultation room, a gym, a group therapy room, and psycho-oncology consultation rooms. The IO unit consists of the Supportive Care Physician (SCP), acupuncturists, exercise physiologists, reflexologists, mindfulness teachers, yoga and tai chi instructors, oncology massage therapists, physiotherapists, and lymphoedema therapists. Patients can be referred for acupuncture by their specialist doctor, the SCP, or self-refer.[19] Patients pay out of pocket for their acupuncture treatment, those with private health insurance may receive a partial rebate. For patients experiencing financial distress there are capped subsidized and free acupuncture sessions available. Patients are advised of the availability of acupuncture at various time points of their cancer treatment.

The records of eligible patients were reviewed to extract basic demographic data, tumor type, and patient reported outcome measures (PROMs). The study received ethics approval from the Sydney Local Area Health District Ethics Committee (HREA AU/1/6BE837).

Acupuncture Therapy

Treatment was primarily provided in the individual consultation rooms at the Living Room. Some services were provided at the inpatient's bedside or in chemotherapy chairs. All services were provided by experienced TCM acupuncturists with at least 7 years of experience. For each initial consultation, the acupuncturists explained the benefits and risks of acupuncture, answered any questions and received written informed consent to proceed with treatment. Treatment plans were individualized after review of the patients' previous health history and medical records. Each consultation lasted approximately 40 minutes with the needles retained for 20 to 30 minutes. Laser and electrical stimulation were added at the therapist's discretion. Electrical stimulation uses a machine, with leads attached to 2 needles, to pass a mild electric current between these needles during treatment. Low Level Laser Therapy (LLLT) is a low intensity light therapy where the light triggers biochemical changes with cells.[20]

Patient Reported Outcome Measures

Patients attending an acupuncture treatment are routinely invited to complete an Edmonton Symptom Assessment Scale (ESAS) and the Measure Yourself Wellness and Concerns (MYCaW) instrument ESAS and/or MYCAW by the receptionist or the clinician prior to their treatment. The ESAS and MYCAW are used by the acupuncturists to guide the treatment and future treatment planning. Patients who had a recorded acupuncture consultation but no record of either ESAS or MYCaW surveys were excluded from the study.

The ESAS includes 9 predetermined symptoms rated on a numerical rating scale (NRS) from 0 to 10. The ESAS is a validated tool for monitoring symptoms in cancer patients.[21,22] A modified ESAS (ESAS-17) questionnaire was used in this Cancer Hospital, similar to the ESAS used in the integrative oncology department at MD Anderson Cancer Hospital.[17] The ESAS-17 includes the core 9 items with 8 additional items relevant to patients with cancer including sleep, wellbeing, spiritual pain, financial distress, hot flashes, numbness/tingling (neuropathy), dry mouth, and memory difficulty.

Most patents completed the ESAS-17 survey but due to the nature of the study being retrospective, 74 completed a shorter version with only 15 items. Both versions shared all core 9 ESAS items with the ESAS-15 including hot flashes while the ESAS-17 included sadness, vomiting, and financial distress.

The MYCaW asks the patient to prioritize 2 chief concerns in their own words and rate the severity of these concerns from 0 to 6 (with 0 being negligible and 6 being intolerable). Patients also rated their general wellbeing on the same scale. The MYCaW has been validated in cancer patients.[23] Both the ESAS and MYCAW are used in IO settings.[24]

Statistical Analysis

Statistical analysis was conducted with the IBM Statistical Package for the Social Science (SPSSv25). Basic descriptive statistics were used to analyse the demographic data, primary cancer diagnosis and the stage of cancer. A one sample *t*-test was used to determine the mean and standard deviation of the individual items in the ESAS and MYCAW subcategories.

ESAS items with scores of 1 to 3 were grouped as "mild," 4 to 6 "moderate" and 7 to 10 "severe" symptom burden. Scores were considered "clinically significant" if they were ≥4 and were calculated separately.[25] Many patients completed multiple ESAS questionnaires, so generalized estimating equations were used to calculate summary statistics. This method takes into account the within-patient correlation inherent in repeated measures data.

We planned to conduct sub-group analyses on the ESAS data according to tumor type where numbers were sufficient. Due to small numbers overall, we were able to do this separate analysis for the breast cancer population, only.

Principal component analysis (PCA) was used for cluster analysis to reduce the number of variables under consideration into a few, interpretable linear combinations of data. Each combination then corresponds to a principal component. In this case, there would be too many symptoms to fit to a single model, therefore PCA would be used to reduce the questionnaire outcomes into 3 or 4 components to model instead. Components are interpreted based on how the symptoms are clustered. PCA was conducted using the VARIMAX rotation. Significant components were selected if they have an eigenvalue >1 and each component explained >10% of the variance. Symptoms were assigned to each factor based on the highest loading score assigned to them and were only considered if the loading score was >60%. The following symptoms were used for PCA: fatigue, sleep, appetite, pain, drowsiness, anxiety, depression, shortness of breath, financial distress, memory difficulty, spiritual pain, neuropathy, dry mouth, well-being, and nausea.

The qualitative data generated by the MYCAW was categorized according to 5 super-categories and sub-categories.[26] All concerns were scored on a scale of 0 to 6.

Results

A total of 156 patients were seen for acupuncture during our analysis period from July 2017 to December 2018. Data were missing for 18 patients, and a further 11 patients did not complete an ESAS and were excluded. As such a total of 127 patients were included in our analysis.

Patients presenting for acupuncture were predominantly female, with a mean age of 55 (see Table 2).

Breast cancer was the most common type of primary diagnosis (48%), followed by lung (14%), and head and neck (12%), and colorectal (10%). People using acupuncture were more likely to have advanced cancer (59%) then early stage cancers (41%).

Symptom Prevalence

A total of 264 ESAS questionnaires were completed. Most patients (n=80, 63%) completed 1 questionnaire, 16 (13%) patients completed 2, 14 (11%) patients completed 3, and the remaining 17 (13%) patients completed between 4 and 9 questionnaires.

Sleep problems were the most prevalent symptom (90%), followed by fatigue (89%), memory difficulty (83%), and pain (77%) (Figure 1).

Table 2. Characteristics of Patients Receiving Acupuncture at a Tertiary Cancer Hospital.

Gender	No. of patients (%)
Male	30 (24%)
Female	97 (76%)

Age	No. of patients (range)
Mean	55.4 (19-85)

Type of cancer*	No. of patients (%)
Breast	61 (48%)
Lung	18 (14%)
Head and neck	15 (12%)
Colorectal	13 (10%)
Blood	9 (7%)
Gynecological	7 (6%)
Other (Skin, brain, prostate, pancreatic)	4 (3%)

Stage of cancer	No. of patients (%)*
Early (Stage I, II)	48/117 (41%)
Advanced (Stage III, IV)	69/117 (59%)

*Missing data: stage of cancer was only available for 117 patients as it was not noted on the EMR, blood cancers are staged differently.

Symptom Severity

The worst overall mean scores were found for neuropathy (4.88) fatigue (4.85), sleep (4.66), and hot flashes (4.51) (Table 3).

Among patients reporting clinically significant symptoms (scores of ≥4 on the ESAS), fatigue (68%) was the most prevalent, followed by appetite (65%), neuropathy (63%), sleep disturbance (60%), and hot flashes (58%).

Symptoms that were scored as equal to or greater than 7 on the ESAS scale are considered clinically severe (Table 3). Neuropathy (38%) and hot flashes (30%) represented the most prevalent severe symptoms across the cohort, followed by sleep disturbance (26%), fatigue (26%), and pain (24%).

A subgroup analysis of breast cancer patients (ESAS) did not show much variation in comparison to the entire cohort (Figure 2).

Patient Concerns (MYCaW)

Of the 127 participants in our cohort, 81 participants completed MYCAW questionnaires. The majority of patients completed the MYCAW only once (n=48, 59%). A total of 33 patients completed more than 1 questionnaire, with a total of 177 MYCAW questionnaires completed.

"Physical concerns" were the most prevalent, followed by "cancer treatment concerns," "psychological and emotional concerns" and "concerns about wellbeing" (Figure 3).

These 4 most commonly identified concerns account for more than 70% of the total concerns. Within "physical concerns," "pains/aches" were the most commonly reported sub-category. Similarly, within "cancer treatment concerns," "side effects of chemotherapy" were most common.

Overall, "side effects of chemotherapy" was the most frequently expressed concern (77/313), followed by "pain/aches" (65/313) and "side effects of surgery" (42/313). Investigating the main concerns expressed within the sub-category of "side effects of chemotherapy," the main issue reported by patients was chemotherapy-induced peripheral neuropathy.

Symptom Cluster Analysis

Using ESAS data, the following symptoms were included in the symptom cluster analysis: fatigue, sleep, appetite, pain, drowsiness, anxiety, depression, shortness of breath, financial distress, memory difficulty, spiritual pain, numbness/neuropathy, dry mouth, well-being, and nausea. A total of 123 observations had information on all the listed symptoms. Table 4 shows the symptom clusters that were identified. The primary purpose of this analysis is descriptive. Cluster analysis yielded 3 symptom clusters, 2 included "physical symptoms" (pain, sleep problems, fatigue and numbness/neuropathy), and (nausea, appetite, general wellbeing), whilst the third included "psychological" symptoms (anxiety, depression, spiritual pain, financial distress). The decision of which symptoms should be included in each factor needs to be in line with what would give a good description of the data. Therefore, the decision of what corresponds to an "important" correlation is not necessarily a statistical decision.

Discussion

Two patient reported outcome measures (ESAS and MYCaW) routinely utilized at an Australian comprehensive cancer center were reviewed in this audit of patients presenting for acupuncture. Used together, the ESAS provides a comprehensive review of a wide range of symptoms and the MYCaW allows the patients to specify the chief presenting concerns. The patients presenting for acupuncture were more likely to be female, nearly half of the cohort had breast cancer, and there were slightly more patients with advanced stage cancer. This is consistent with other studies.[17]

Sleep problems were most prevalent (ESAS), followed by fatigue, memory difficulty, and pain. However, prevalence does not equate to symptom severity or burden. For those patients with neuropathy, 38% experienced severe symptoms. Hot flashes were also experienced as severe by 30% of those who reported this symptom
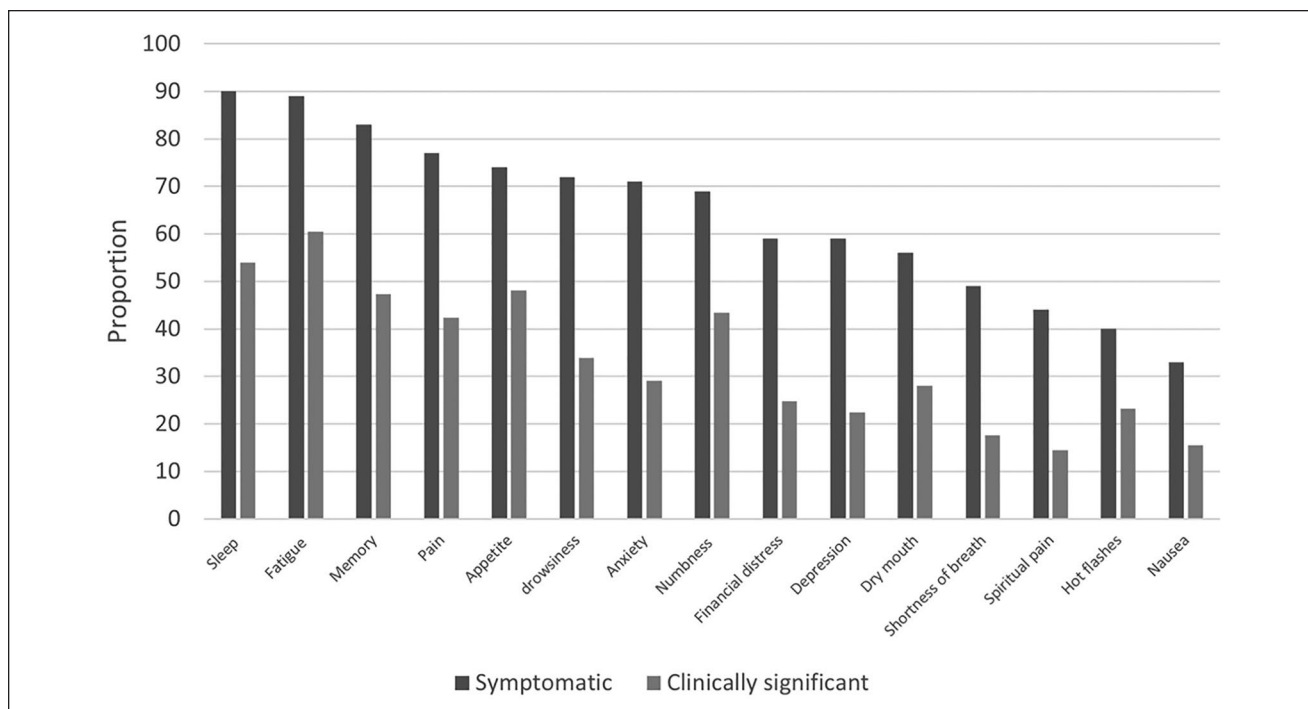
Figure 1. Comparison of prevalence of ESAS symptoms and severity.

Table 3. Symptom Severity and Mean ESAS Scores.

			Symptomatic patients only*			
	Symptomatic	Clinically significant	Mild	Moderate	Severe	Mean score
Symptom	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	Mean (95% CI)
Sleep	90% (85, 94)	60% (53, 68)	40% (32, 47)	33% (26, 39)	26% (18, 33)	4.66 (4.21, 5.10)
Fatigue	89% (83, 94)	68% (60, 76)	32% (24, 40)	41% (34, 49)	26% (19, 33)	4.85 (4.45, 5.25)
Memory	83% (77, 88)	57% (48, 66)	43% (34, 52)	35% (28, 43)	19% (13, 25)	4.30 (3.87, 4.74)
Pain	77% (69, 84)	55% (46, 64)	45% (36, 54)	31% (23, 39)	24% (17, 31)	4.36 (3.94, 4.79)
Appetite	74% (66, 81)	65% (56, 74)	35% (26, 44)	50% (41, 58)	14% (9, 20)	4.23 (3.84, 4.62)
Drowsiness	72% (65, 79)	47% (39, 56)	53% (44, 61)	27% (20, 35)	19% (13, 26)	3.99 (3.56, 4.41)
Anxiety	71% (63, 79)	41% (32, 49)	59% (51, 68)	26% (19, 33)	14% (8, 20)	3.57 (3.14, 4.00)
Numbness (neuropathy)	69% (62, 77)	63% (53, 73)	37% (27, 47)	24% (17, 32)	38% (29, 47)	4.88 (4.37, 5.40)
Financial distress	59% (51, 68)	42% (32, 52)	58% (48, 68)	30% (21, 39)	12% (5, 19)	3.56 (3.09, 4.03)
Depression	59% (51, 67)	38% (28, 47)	62% (53, 72)	30% (22, 39)	7% (2, 12)	3.12 (2.71, 3.53)
Dry mouth	56% (48, 64)	50% (40, 61)	50% (39, 60)	31% (21, 41)	19% (10, 28)	4.01 (3.46, 4.56)
Shortness of breath	49% (42, 57)	36% (26, 46)	64% (54, 74)	26% (17, 34)	10% (4, 16)	3.44 (2.91, 3.97)
Spiritual pain	44% (36, 52)	33% (23, 44)	67% (56, 77)	20% (12, 28)	12% (4, 20)	3.15 (2.59, 3.70)
Hot flashes	40% (31, 49)	58% (46, 71)	42% (29, 54)	28% (17, 40)	30% (19, 41)	4.51 (3.86, 5.16)
Nausea	33% (26, 40)	47% (35, 59)	53% (41, 65)	33% (22, 44)	15% (6, 24)	3.70 (3.12, 4.27)

*Mild: 1-3. Moderate: 4-6. Severe: ≥7.

Our research findings on the symptom burden of people seeking acupuncture in cancer center were similar to an audit of acupuncture patients undertaken by MD Anderson Cancer Centre in the US. MD Anderson reported the highest scores were poor sleep (4.52), neuropathy (4.48), hot flashes (4.42), and fatigue (4.15) compared to our cohort with neuropathy (4.88), fatigue (4.85), poor sleep (4.66), and hot flashes (4.51).
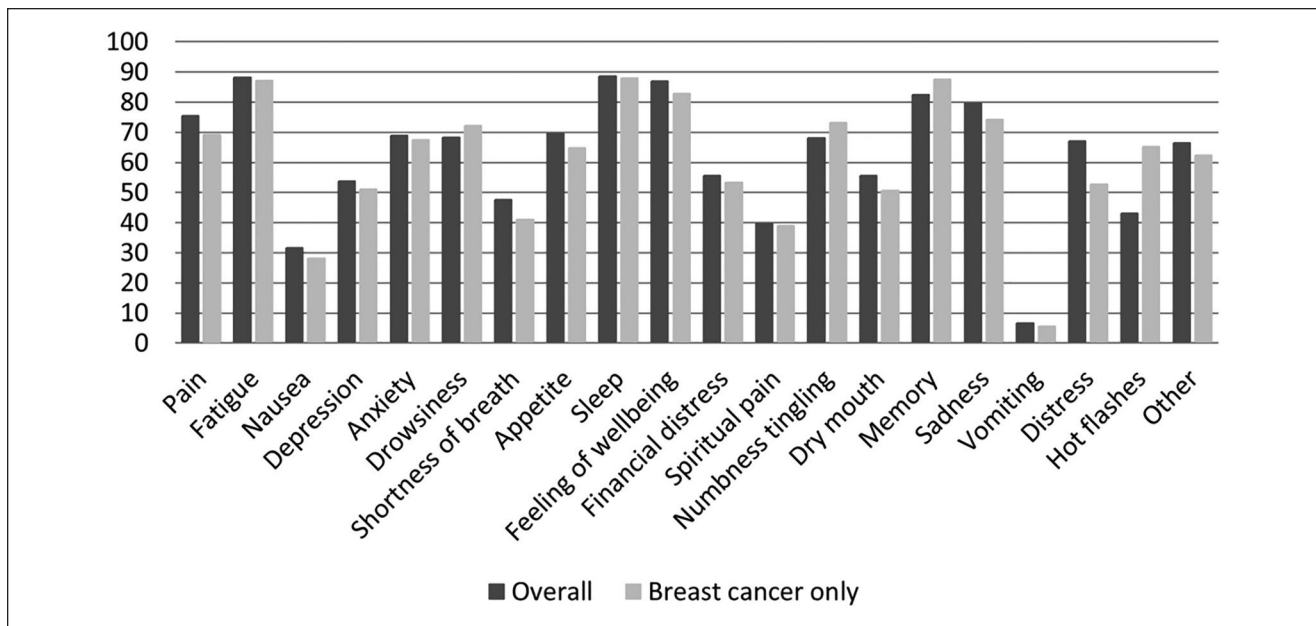
Figure 2. Comparison of symptom prevalence* (ESAS) in people with breast cancer and entire cohort.
*prevalence refers to where a patient scored ≥1.

Interestingly, the reported ESAS symptoms differed to what patients reported when they were asked to write their 2 main concerns using the MYCaW. Rather than sleep or fatigue as the most prevalent concern, the most prevalent were "side effects of chemotherapy" (especially chemotherapy induced peripheral neuropathy), and "pain/aches." Whereas, sleep problems were not prevalent as a patient written symptom in the MYCaW data. This may be due to a limited understanding of the role of acupuncture in addressing sleep problems. Or, sleep problems may not have been 1 of the top 2 priorities for patients attending acupuncture. Alternatively, sleep problems may have been part of a symptom cluster or by-product of their main complaints such as pain or hot flashes.

In our study, when examining the MYCaW super-categories, patients presenting for acupuncture were 4 times more likely to prioritize physical concerns over psychological and emotional concerns. In a study where MYCaW was collected at UK integrative cancer support centers, the main presenting concerns were psychological and emotional (45%); seeking an integrative approach (32.3%), herbs/supplements (31.9%), nutrition (20.4%).[27] This could either suggest that patients who attended acupuncture at our center experienced more physical concerns, or while psychological and emotional concerns existed, physical concerns were more severe and thereby prioritized, or physical concerns were perceived to be more relevant for treatment with acupuncture. To our knowledge, no other study has used MYCaW to assess reasons why people with cancer present for acupuncture.

There is reasonable evidence that acupuncture may be able to help with many of the symptoms reported in our patient cohort. For example, acupuncture was favorable in improving sleep compared to conventional drug therapy.[28] There is emerging evidence that acupuncture may be effective in the treatment of cancer-related fatigue.[29,30] Lastly, there is considerable evidence for the use of acupuncture in treating chemotherapy induced nausea and vomiting (CINV),[31,32] and is included in several treatment guidelines.[33] In a number of smaller studies positive effects of acupuncture on CIPN have been suggested.[34-37] But it's effectiveness is still unclear and more adequately powered studies are underway to build on these findings.[38] Research on the effectiveness of acupuncture in treating cancer pain specifically, is also emerging.[39,40] But small sample size and other methodological biases undermine the results.

Several studies suggest there is an inter-relationship between certain symptoms, often being observed together in "clusters."[41,42] Research recommends that these symptom clusters be addressed as a whole for better therapeutic effect.[42] The concept of symptom clusters or the use of the understanding of the inter-relationships between symptoms in the treatment and diagnosis of disease state is a familiar concept in acupuncture. Acupuncture is a treatment modality utilized in Traditional Chinese Medicine which incorporates the use of syndrome diagnosis, in which multiple symptoms are cross-examined to arrive at the underlying syndrome; which is the common variable or mechanism. For example, certain pain, combined with difficulty falling asleep, emotional outbursts, and hot flashes may be diagnosed as *Liver Qi*
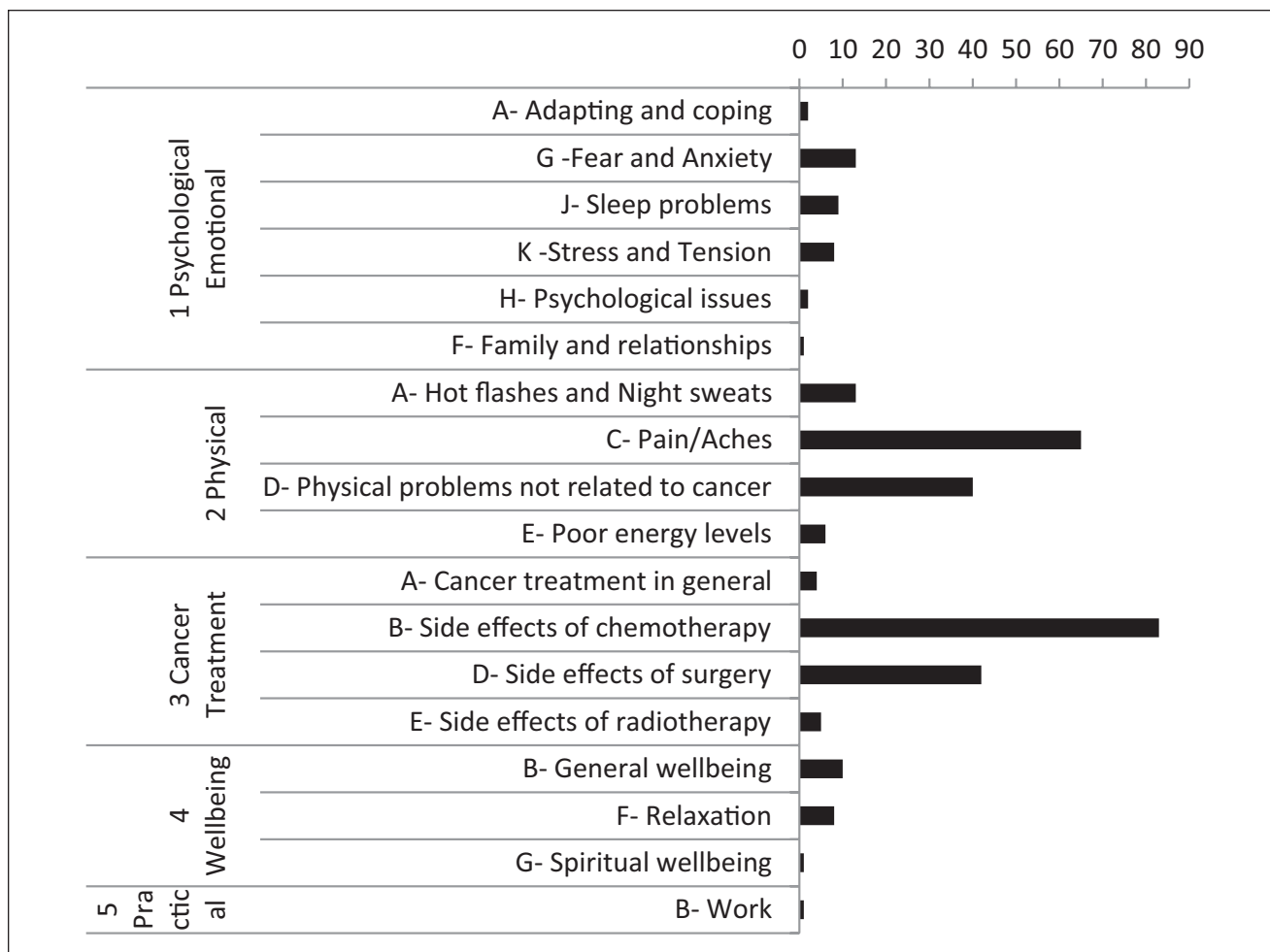
Figure 3. Prevalence (%) of sub-categories MYCaW.

Table 4. Symptom Clusters as Determined by PCA.

	Factor	Coefficient	Cronbach's alpha*
Depression	1	0.80	0.82
Spiritual pain		0.78	
Anxiety		0.78	
Financial distress		0.70	
Numbness/neuropathy	2	0.74	0.74
Pain		0.67	
Sleep		0.65	
Fatigue		0.63	
Nausea	3	0.78	0.77
Appetite		0.82	
General well-being		0.62	

*Cronbach's alpha is a measure of internal consistency – how well a group of variables relate to each other. In most situations, an alpha > 0.7 is classed as "acceptable." In this instance, the 3 factors showed acceptable internal consistency.

Stagnation in Traditional Chinese Medicine. Acupoints are selected to treat the underlying TCM diagnosis not just the symptoms. While the comprehensive comparative analysis of symptom clusters remains yet incomplete, the value of

acupuncture (which aims to treat multiple inter-related symptoms by addressing the underlying common mechanism) may still be found in its incorporation into symptom cluster treatment regimes. Our acupuncture service at the hospital will utilize these findings to include the Chinese Medicine diagnosis in the patient record for future analysis around symptom clusters. We will also seek to better communicate and research the way in which acupuncture may be used to address symptom clusters.

Our study has several limitations. The sample draws on a single observational, retrospective cohort collected from a single cancer center in Australia. Another limitation of the study was the different versions of ESAS questionnaires used: 14 of the 17 items were the same but 1 version (ESAS-15) included hot flashes, whilst the other (ESAS-17) included sadness, distress, and vomiting. We were also not able to extract the number of occasions of acupuncture service where there was no ESAS or MYCAW was completed and as such the sample may be skewed.

Conclusion

Many cancer patients are exploring acupuncture as an adjunct to conventional therapy for cancer related symptom management. With the findings from this study, future acupuncture services may consider focusing research, evidence translation and communication on the most prevalent and severe primary concerns and symptoms. Future acupuncture research in supportive cancer care may be well placed to investigate the usefulness of acupuncture in managing the side effects of chemotherapy, specifically neuropathy, pain, common symptom clusters, in adequately powered sample sizes and developing strategies to translate existing evidence into practice.[43-45]

Declaration of Conflicting Interests

Funding

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