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A Prospective Cohort Study on the Impact of Reflexology in Patients With Breast Cancer Using the MYCaW Scale

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Abstract

We studied the effects of reflexology quantitatively in 52 patients using the "Measure Yourself Concerns and Wellbeing" questionnaire. There was a statistically significant overall improvement of 44.2% in patient concerns, 41.2% in well-being, and 42.4% in Measure Yourself Concerns and Wellbeing scores for all patients. Patients with poor energy level, sleep problems, stress, and hot flushes and sweats experienced the most improvement.

Introduction: Breast cancer treatment and recovery remain physically and psychologically challenging for patients. Reflexology has been studied as a complementary therapy to help relieve patients of the physical and psychological stresses involved with breast cancer. As a result of recent positive evidence, we studied its effects quantitatively from 2015 to 2016. **Patients and Methods:** Fifty-two patients completed pre- and post-reflexology intervention 'Measure Yourself Concerns and Wellbeing' (MYCaW) questionnaires. Patients were subdivided into breast cancer (BC) and non-breast cancer (NBC) groups. Concerns raised were subdivided in subcategory groups as per MYCaW guidelines and analyzed for improvements in each domain. **Results:** Thirty (57.7%) patients in the BC group and 22 (42.3%) patients in the NBC group were analyzed. In the BC group, there was a 46.2% improvement in patients' concerns, and in the NBC group, a 41.4% improvement in concerns were noted. Overall, the symptoms improved by 44.2% ($P < .0001$). There was an improvement of 43.4% in patient well-being in the BC group, and a 37.8% change in the NBC group, signifying a total improvement in well-being of 41.2%. There was an improvement of 46.4% in the MYCaW scores; 46.4% in the BC group and 42.6% in the NBC group, signifying a combined average improvement of 42.4%. Patients with poor energy level, sleep problems, stress and tension, and hot flushes and sweats experienced the most improvement in their concerns. **Conclusions:** Our findings show that reflexology has significantly improved patient-reported outcomes using the MYCaW scale. These findings are encouraging and reflect that increased attention to strategies focusing on improving psychological well-being can help patients in managing their symptoms.

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Background

It is widely accepted that practices akin to reflexology have been employed since ancient times; modern reflexology, however, dates back to the work of William Fitzgerald in the 20th century, the practice of which was further developed in the 1930s by Eunice Ingham who named the practice "Reflexology". The technique is based on the principle that 'reflex' areas or points on the feet and hands connect to corresponding areas and organs throughout the body. Reflexologists stimulate these areas by various compression techniques, akin to massage, with the intention of bringing about a state of relaxation as well as to stimulate the body's natural healing processes. It is not a diagnostic or curative therapy but aims to create the opportunity and state to facilitate well-being.[1,2]

The first real published evidence on the effects of reflexology for patients with cancer was in 2000 by Stephenson et al. Anxiety and pain were studied in 23 patients with breast and lung cancer who served as their own control. All patients experienced decreased anxiety following the intervention, and patients with breast cancer specifically experienced decreased pain as well.[3] A follow-up study by the same group looked at the effects on partner-delivered foot reflexology in 42

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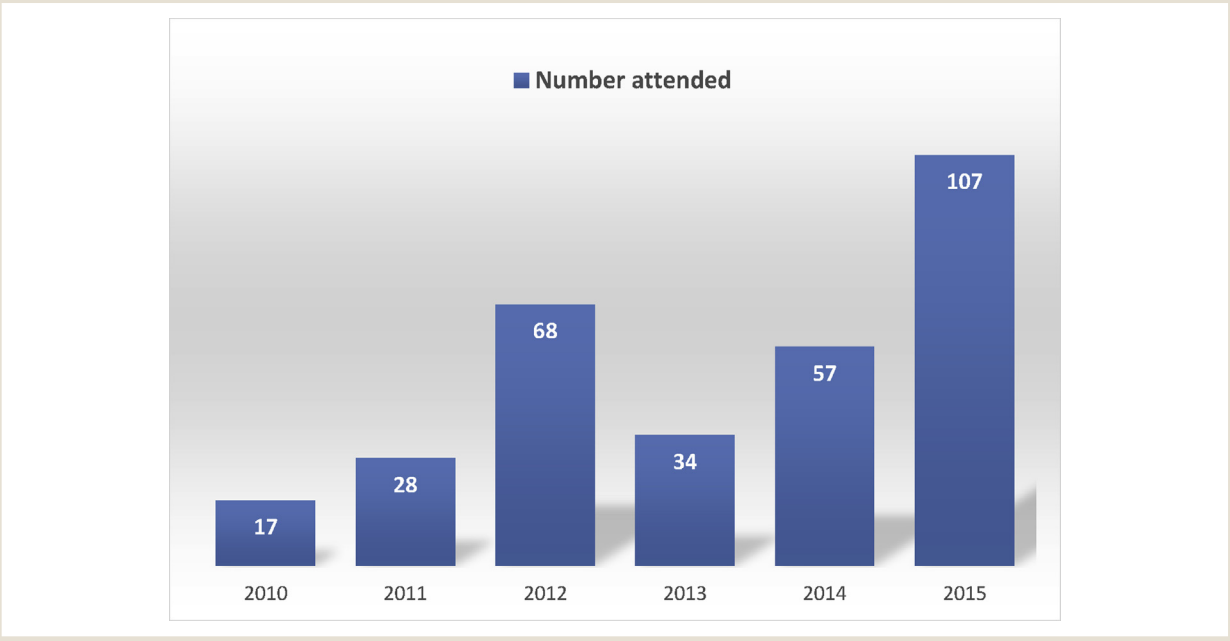
Figure 1 Number of Patients Attending for Reflexology per Annum. Note the Increase in Patients Attending the Reflexology Service per Annum With 107 Patients Attending in 2015 Compared With 17 in 2010



patients compared with 44 controls. They found a significantly decreased pain intensity and anxiety in the intervention group in comparison with the control group.[4] A further study performed in 2004 by Hernandez-Reif et al randomly assigned 34 women to a massage therapy group and a control group. Twenty-seven of the 34 women had their blood drawn to assay immune measures as well. Their results demonstrated a reduction in anxiety, depressed mood, and anger in the short term, and a decline in depression and hostility in the long term. Blood analysis revealed increased urinary dopamine, serotonin values, NK cell number, and lymphocytes in the intervention group, highlighting the beneficial psychological and metabolic effects of massage therapy.[5] A study by Bilhult et al in 2007 studied the effect of massage therapy on 39 patients with breast cancer undergoing chemotherapy randomly assigned to the intervention and control group. They reported significantly reduced nausea in the intervention group compared with the control group.[6] In a pilot study by McVicar et al, 30 participants underwent either reflexology or no treatment (control), in a cross-over experimental design. They found that reflexology had a powerful anxiety-reducing effect.[7]

From this evidence, we started offering reflexology as a complementary therapy in our district general hospital since 2010. The service was funded by charitable funds and had good anecdotal outcomes. From 2010 to 2015, 311 patients attended the unit for reflexology, and 2015 saw a higher demand for the service, raising professional and stakeholder interest in the therapy (Figure 1).

Following from the qualitative evidence, it was felt that it would be beneficial to gather quantitative data on the patients' experience using an established and recognized evaluation tool to assess and understand the benefits of reflexology as a complementary therapy for our patients. Furthermore, a formal evaluation of the service would improve appropriate referral and use of resources and better demonstrate the value of the service to the patients. As such, a study was carried out to determine whether reflexology shows a significant improvement in concerns and well-being. At the same time, it was done to identify areas where the reflexology treatment would be useful.

Patients and Methods

Patients underwent 6 sessions of reflexology, each lasting 45 minutes. The patients were invited to relax on a reclining chair or treatment couch, or to put their feet up on a footstool. The feet

Figure 2 Distribution of Patients With Breast Cancer and Patients Without Breast Cancer Patients Participating in Study. Of the 57 Patients Who Completed the Questionnaire, 57.7% (30) Were Patients With Breast Cancer and 42.3% (22) Were Patients Without Breast cancer

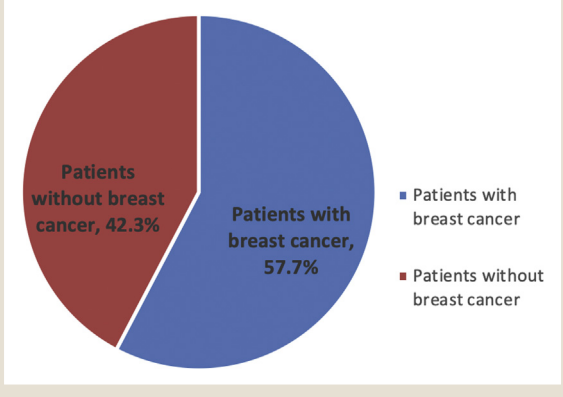


Figure 3 Categories of Concerns Raised by Patients Without Breast Cancer. Patients in the Non-breast Cancer Group Expressed Concerns that Could be Divided Into 2 Groups—Psychological and Emotional Concerns (19%) and Physical Concerns (81%)

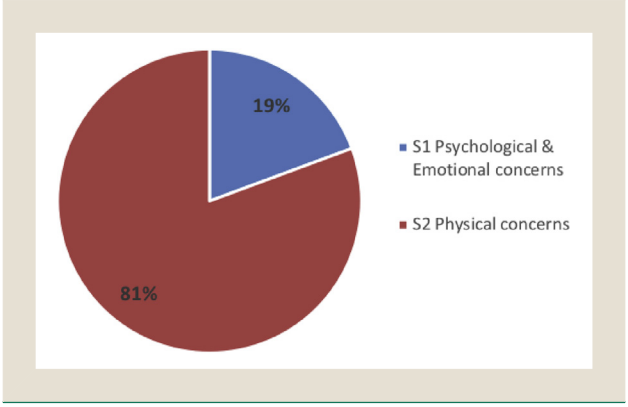
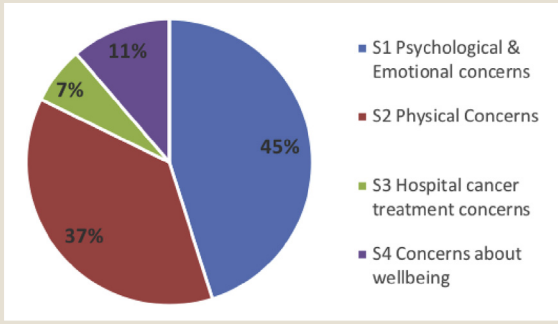


Figure 4 Categories of Concerns Raised by Patients With Breast Cancer. Patients in the Breast Cancer Group Expressed Concerns that Could be Divided Into 4 Groups—Psychological and Emotional Concerns (45%), Physical Concerns (37%), Hospital Cancer Treatment Concerns (7%), and Concerns About Well-being (11%)



were then cleansed at the start of the treatment, after which the reflexology zones on the feet were stimulated as per standard protocol by a single reflexologist.

The 'Measure Yourself Concerns and Wellbeing' (MYCaW) questionnaire was deemed to be the most suitable tool of evaluating the service. It is an established and valid tool (an adaptation of MYMOP—Measure Yourself Medical Outcome Profile) specifically used to evaluate complementary therapies in cancer care.[8,9] Following registration of the MYCaW evaluation, the questionnaire was given to patients attending between March 2015 and January 2016, and 57 questionnaires were completed for 52 patients, as 4 patients of the group completed 2 questionnaires each for different concerns raised. The concerns filled on the questionnaire were not shared with the reflexologist to prevent pretreatment bias; however, the reflexologist was free to provide a personalized service depending on the patient's verbal feedback during the treatment corresponding with routine practice. Referral forms to the reflexology service for each of these patients and referral pathways and reasons were reviewed and matched to patients' MYCaW evaluation forms.

MYCaW results were differentiated into groups of 'breast cancer' and 'non-breast cancer (NBC)', to gain clarity in the results and be able to distinguish how reflexology addresses the needs of each group and thereby improve reflexology referral pathways. The breast cancer group included patients who had previously been diagnosed with breast cancer at the time of their reflexology and who were undergoing or had completed standard cancer treatment as determined by the MDT. The NBC group consisted of patients referred from other pathways; these included breast pain, other cancers (ovarian and Hodgkin lymphoma), pneumonia, and anxiety (stress caused by partner's diagnosis). Of the 52 patients who completed their questionnaires, 30 (57.7%) were patients with breast cancer and 22 (42.3%) were in the NBC group (Figure 2). Data was also collated on the referral pathway for the reflexology service in order to investigate and inform this process.

The results were analyzed using Graphpad Prism version 7. Paired parametric *t* tests were used to compare preintervention and postintervention groups for MYCaW scores, well-being, and concerns raised by patients. One researcher further subdivided the patients into super categories as per MYCaW guidelines. Analysis was then done by a different researcher to assess which categories showed the most improvement.

Results

Referral Process

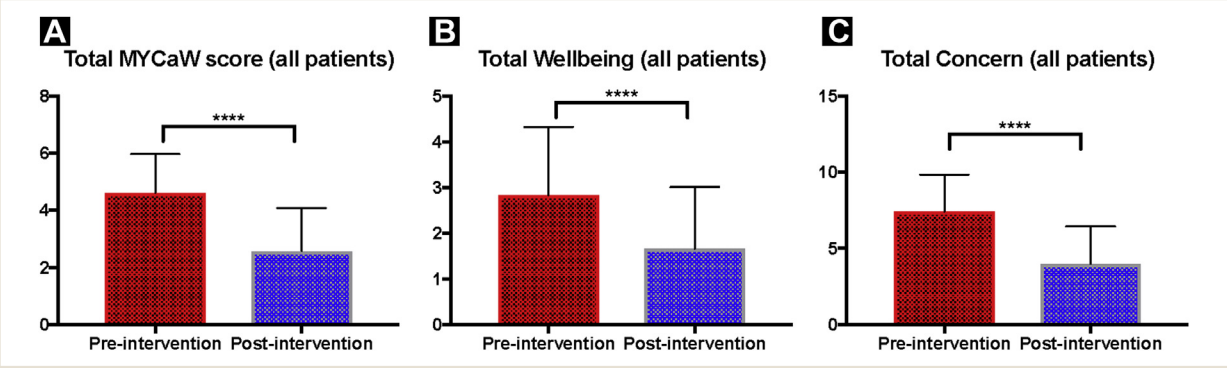
On reviewing the referral forms, it was found that patients were referred for reflexology largely by their breast care nurse or their consultant; more specifically, 39% were referred by their breast care nurse, 30% by their consultant clinician, 12% by the family history nurse, and 19% by an unknown referrer. Referral forms were analyzed with correlating MYCaW forms to determine if the reason for referral to the service by the referrer matched the patient's concern. It was found that of those referred, 32% were referred for a reason matching their concern at the outset of reflexology and 35% were not. The remaining 35% were unknown as it was not clearly indicated on the initial referral.

Concerns—Patient Rationale for Attending

On completing the MYCaW form, all patients had the opportunity to highlight 1 or 2 concerns for which they were seeking varying degrees of alleviation. Patients chose to provide 1 or 2 concerns independently (Figure 3). Overall, 93 concerns were reported by 52 patients; 62 concerns across the BC group (30 patients) and 31 from the NBC group (22 patients).

Using the MYCaW guidelines, patient-reported concerns were sorted into 5 super categories. These were: (1) psychological and emotional concerns; (2) physical concerns; (3) hospital cancer treatment concerns; (4) concerns about well-being; and (5) practical concerns. The NBC group concerns fell into 2 of the super category groups, psychological and emotional concerns and physical concerns, as shown in Figure 3. The breast cancer group concerns fell into 4 of the super category groups: psychological and emotional concerns, physical concerns, hospital cancer treatment concerns, and concerns about well-being, as shown in Figure 4.

Figure 5 Overall Change in MYCaW Score (A), Well-being (B), and Total Concerns (C) for Both Patients With and Without Breast Cancer (n = 52). There is a Significant Improvement of 42.4% in the MYCaW Score, 41.2% in Well-being and 44.2% in Total Concern (Lower Scores are Better). This is Statistically Significant When Performing Parametric Paired *t* tests Using Graphpad Prism Version 7 ($P < .0001$ for all Groups; **** in Graphs)



Abbreviation: MYCaW = Measure Yourself Concerns and Wellbeing.

Overall Combined Outcomes

Of the 52 patients who completed the MYCaW survey, 50 reported an improvement in their initial concerns (ie, 96% of the patients demonstrated via MYCaW that reflexology was of benefit to them). There was an overall improvement of 42.4% in the patients' MYCaW score before and after intervention, which was statistically significant ($P < .0001$). There was an overall improvement of 41.2% in patient well-being and 44.2% change in patient concerns ($P < .0001$ for both) (Figure 5).

Outcomes in Patients With Breast Cancer

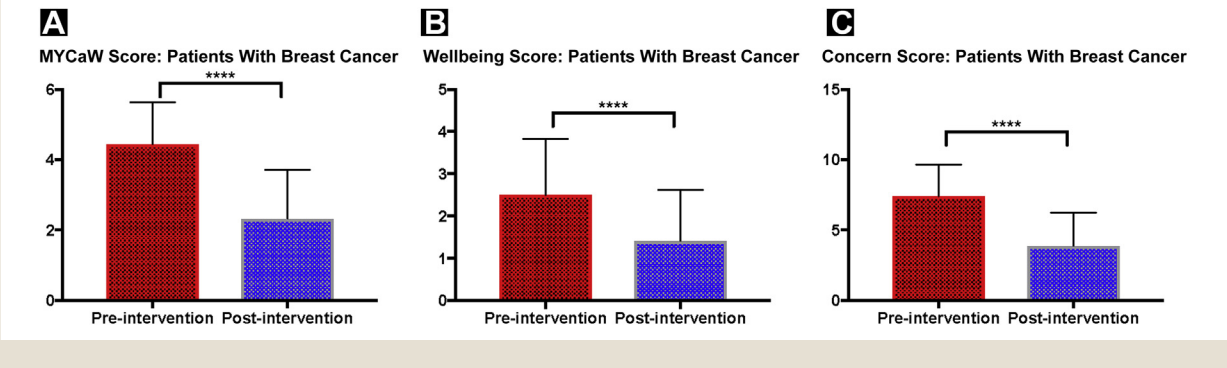
Concerns were graded by the individual at the beginning of the treatment and then regraded at the end of treatment. Within the breast cancer group, all patients reported an improvement in their MYCaW profile score. There was an improvement of 46.8% in the MYCaW score, a 43.4% change in well-being, and a 46.2% improvement in the initial concerns raised ($P < .0001$) (Figure 6).

The improvements were further broken down into the 4 super categories as discussed above. The patient grading was converted into a percentage change in order to compare outcomes for each super category: a 42.4% improvement was reported for psychological and emotional concerns and a 45.9% improvement in physical concerns. There was a further 41.2% improvement in concerns about hospital cancer treatment outcomes and a 35.7% improvement in concerns about well-being (Table 1).

Each super category was further broken down into the concerns that comprise each super category. For the breast cancer group, these included:

- S1e: Emotional problems
- S1g: Fear and anxiety

Figure 6 Change in MYCaW Score (A), Well-being (B), and Total Concerns (C) for Patients With Breast Cancer (n = 30). There is a Significant Improvement of 46.8% in the MYCaW Score, 43.4% in Well-being, and 46.2% in Total Concern (Lower Scores are Better). This is Statistically Significant When Performing Parametric Paired *t* tests Using Graphpad Prism Version 7 ($P < .0001$ for all Groups; **** in Graphs)



Abbreviation: MYCaW = Measure Yourself Concerns and Wellbeing.

Table 1 Percentage Improvement in Super Categories With Reflexology Intervention in Patients With Breast Cancer

MYCaW Super Category—BC Group	No. Concerns Raised in Super Category (n = 53)	Percentage Improvement, %
S1: Psychological and emotional concerns	21	42.4
S2: Physical concerns	20	45.9
S3: Hospital cancer treatment outcomes	5	41.2
S4: Concerns about well-being	7	35.7

Abbreviations: BC = breast cancer; MYCaW = Measure Yourself Concerns and Wellbeing.

- S2a: Hot flushes and sweats
- S2b: Fertility
- S2c: Pains/aches
- S2d: Physical problems not related to cancer
- S2e: Poor energy levels
- S2g: Concern of cancer spreading
- S2h: Weight change
- S3b: Side effects of chemotherapy
- S3c: Side effects of hormonal treatments
- S4d: Information and guidance on complementary therapies
- S4f: Relaxation

The greatest benefit was noted in the group reporting their main concern as poor energy levels, followed by those concerned with hot flushes and sweats. Conversely, reflexology did not appear to help weight change or physical problems not related to cancer for this patient group (Figure 7).

Outcomes: NBC Group

The same analysis was done for the NBC group (n = 22). Concerns were graded by the individual at the beginning of the treatment and then regraded at the end of treatment. Within the NBC group, 20 (90.1%) of 22 patients reported an improvement in their MYCaW profile score. There was an improvement of 40.0% in the MYCaW score, a 37.8% change in well-being, and a 41.4% improvement in the initial concerns raised ($P < .0001$ in the MYCaW score and the concern score; $P = .002$ in the well-being score) (Figure 8).

The same categorization was applied to the NBC group. Among these patients, the concerns reported fell into just 2 of the super categories, psychological and emotional concerns (S1) and physical concerns (S2). Within each of these categories, patients again reported a significant percentage of improvement in their symptoms from the beginning to the end of their reflexology course (Table 2).

Concerns for this group were also further categorized into subgroups as defined by MYCaW. These included:

- S1f: Family and relationships,
- S1g: Fear and anxiety
- S1j: Sleep problems
- S1k: Stress and tension
- S1m: The future
- S2d: Physical problems not related to cancer
- S2e: Poor energy levels

Overall, the greatest percentage improvement for the NBC group was seen in the concern category of sleep problems, followed by stress and tension and poor energy levels (Figure 9).

Figure 7 Subgroup Analysis of Each Concern Comprising Super Categories in Patients With Breast Cancer. Most Concerns Show Improvement Following Reflexology, With Large Improvements in Poor Energy Levels and Hot Flushes and Sweats. No Change Was Seen in Weight and Physical Problems Related to Cancer

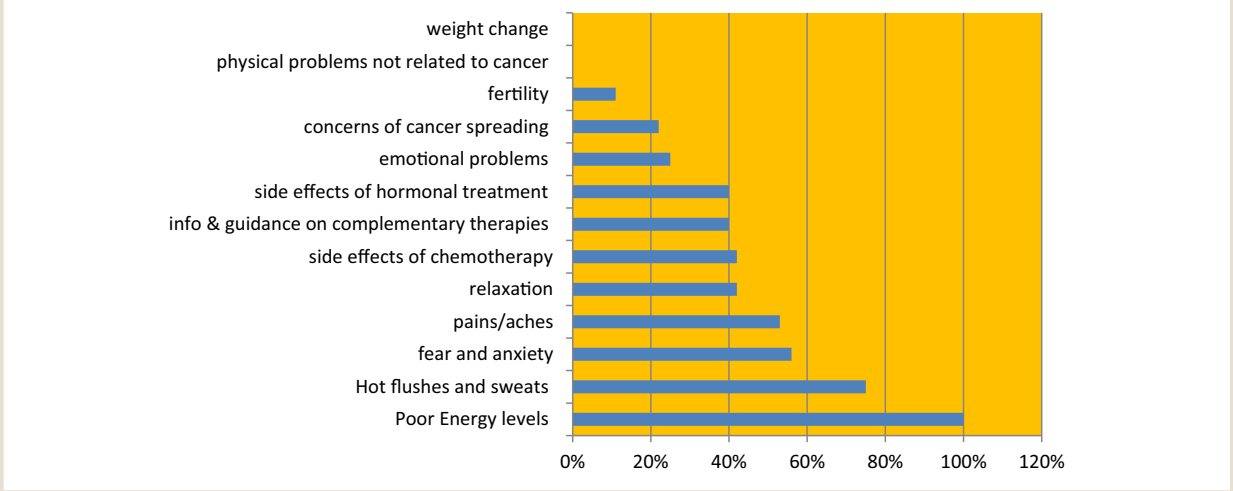
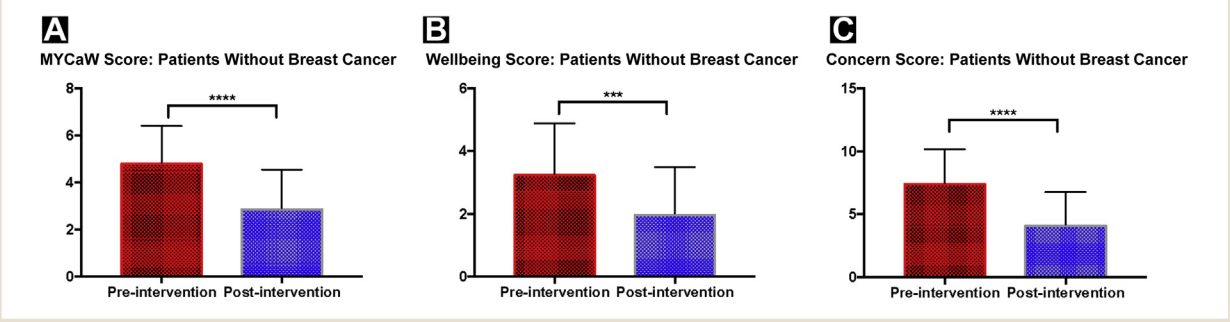


Figure 8 Change in MYCaW Score (A), Well-being (B), and Total Concerns (C) for Patients Without Breast Cancer (n = 22). There is a Significant Improvement of 40.0% in the MYCaW Score, 37.8% in Well-being, and 41.4% in Total Concern (Lower Scores are Better). This is Statistically Significant When Performing Parametric Paired *t* tests Using Graphpad Prism Version 7 ($P < .0001$ in MYCaW Score and Concern Score, Which is Depicted by **** in Graphs, and $P = .002$ in Well-being Score, Which is Depicted by *** in Graph)



Abbreviation: MYCaW = Measure Yourself Concerns and Wellbeing.

Discussion

On average, our results show statistically significant improvements in both groups: 42.4% in the MYCaW score, 41.2% in the well-being scores, and 44.2% in the concern scores highlighted by patients. Results for the breast cancer group seemed to be more substantial than for the NBC group (MYCaW score, 46.8% vs. 40.0%; Well-being, 43.4% vs. 37.8%; Concern, 46.2% vs. 41.4%, for the breast cancer and NBC groups, respectively); however, on comparative analysis between both groups, the improvement in MYCaW score, well-being, and concern was not significantly different between the breast cancer and NBC groups. Although it can be seen that the majority of patients found reflexology beneficial in some way, albeit via a small study, it is noted that those with poor energy levels, sleep problems, stress and tension, and hot flushes and sweats experienced the most improvement in their concerns.

Our findings are in line with Sharp et al who performed a randomized controlled trial of 183 women 6 weeks after breast surgery in 2010. They were randomized to 3 groups: Self-initiated support (SIS), SIS plus reflexology, or SIS plus scalp massage. Using the Functional Assessment of Cancer Therapy (FACT-B), Hospital Anxiety and Depression Scale (HADS), and the Mood Rating Scale (MRS), they found reflexology and massage to significantly relax patients compared with controls, with reflexology patients being more relaxed than patients being massaged in the longer run (24 weeks). Furthermore, reflexology was found to score higher on functional well-being than the control group.[10] The same group also looked at the alterations in Th1/Th2 balance in those 183 patients in a different paper to find a mechanistic link between reflexology and improved symptoms. The study showed significantly higher CD25(+) in the reflexology and scalp massage group compared with the SIS group. The T helper cells expressing IL4 decreased significantly in the massage group compared with the SIS group, which was accompanied by an increase in the percentage of CD8(+) T cytotoxic cells expressing IFNγ in the massage group, reflecting positive alternations in immunologic balance by either of the following forms of massage: reflexology or scalp massage.[11]

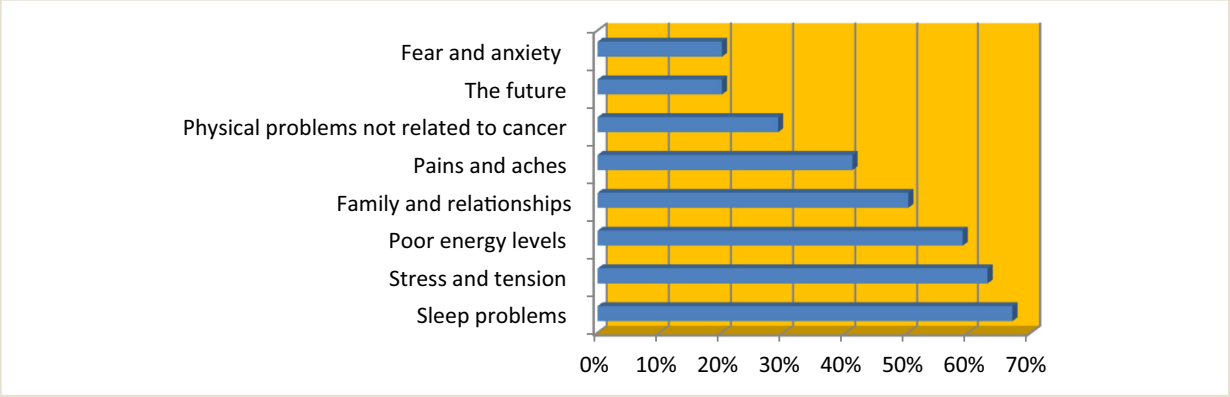
A systematic review was performed by Kim et al in 2010 and looked at the randomized clinical trial by Sharp et al and 3 non-randomized controlled clinical trials. They found that reflexology showed beneficial effects on nausea, vomiting, and pain; however, they felt that more studies were needed.[12] Following from this, a multicenter longitudinal randomized clinical trial was performed by Wyatt et al in 2012. They randomized 385 women to 3 groups: reflexology (n = 95), lay foot manipulation (n = 95), or conventional care (n = 96), and found significantly enhanced physical functioning in the reflexology group compared with the control group and significantly decreased dyspnea compared with the control and lay foot manipulation group. There were, however, no differences seen in breast cancer-specific health-related quality of life, depressive symptomatology, state anxiety, pain, and nausea.[13] More recently, a study from Tel Aviv looked at the effects of

Table 2 Percentage Improvement in Super Categories With Reflexology Intervention in Patients Without Breast Cancer

MYCaW Supercategory—NBC Group	No. Concerns Raised in Super Category (n = 34)	Percentage Improvement, %
S1: Psychological and emotional concerns	7	57.1
S2: Physical concerns	27	36.9

Abbreviations: MYCaW = Measure Yourself Concerns and Wellbeing; NBC = non-breast cancer group.

Figure 9 Subgroup Analysis of Each Concern Comprising Super-categories in Patients Without Breast Cancer. All Concerns Showed Improvement Following Reflexology, With Large Improvements in Sleep Problems, Stress and Tension, Poor Energy Levels, and Family and Relationships



reflexology on 58 patients. They observed lower levels of fatigue, maintenance of quality of life despite radiotherapy, improved sleep, and better pain scores in the intervention group compared with controls.[14] A study in the same year was performed in Turkey comparing 30 patients undergoing reflexology treatment during chemotherapy with 30 controls. They found that reflexology decreased the experience, development, and distress of nausea, vomiting, and retching as well as fatigue in the experimental group and recommended the use of reflexology for patients undergoing chemotherapy.[15] The same group also studied general health and functional status and found these to improve in patients receiving reflexology treatment compared with controls.[16]

Whereas reflexology has shown encouraging results, this remains operator-dependent (ie, the results may vary on the person who is doing it), and the role of the 'human factor' remains to be quantified. As such, Flynn et al attempted to standardize a robotic device to deliver the treatment to find whether there was a positive effect without a 'human factor.' The device was tested on 13 survivors of breast cancer, and significant improvements from pre- to post-device-delivered reflexology were seen in symptom severity among women on chemotherapy, indicating that the massage itself has an impact on patient symptoms.[17] At the same time, Wyatt et al recently looked at the effects of a home-based reflexology intervention delivered by a friend/family caregiver. They randomized 264 women to weekly reflexology sessions or attention controls, and caregivers were trained in 30-minute protocols. They used the MD Anderson Symptom Inventory, which evaluates severity of 13 symptoms (ie, pain, fatigue, nausea, disturbed sleep, distress, shortness of breath, difficulty remembering, decreased appetite, drowsiness, dry mouth, sadness, vomiting, and numbness/tingling) on a scale from 0 = not present to 10 = as bad as you can imagine, and the interference of these symptoms with daily life on a scale from 0 = does not interfere to 10 = completely interferes. They found significant reductions in symptom severity and interference in the reflexology treatment group compared with controls. They also noted improved quality of scales and perception of social support; however, both of these were nonsignificant.[18]

Despite of the encouraging results in the literature, further robust trials are needed to manifest reflexology as a treatment regimen in breast cancer recovery. Currently, it is still categorized as a complementary or alternative treatment, which poses funding challenges. Owing to our experience with reflexology, our center felt that all patients should be given the same opportunity for access to reflexology. However, recognizing that resources may not allow for this, our results may further aid in targeting those patients with concerns for which our study has found the most benefit. This further underlines the importance of the clarity of the referrals to reflexology. A clearly stated diagnosis and concern on the referral will not only guide the reflexology practitioner to provide treatment that is personalized and appropriate, but it will also allow the practitioner to track the progress and effectiveness of the treatment and determine whether the therapy has been useful. Results from our study and further such studies will allow the reflexology practitioner to determine which referral concerns may not benefit from reflexology and channel the funding more appropriately.

Clinical Practice Points

- Breast cancer treatment and recovery remain physically and psychologically challenging for patients. Treatments such as reflexology have been suggested to play in role in relieving patients of the physical and psychological stresses involved with breast cancer.
- Our study explores this in more detail using the validated MYCaW questionnaire. It provides a quantitative assessment of reflexology as a treatment and delineates in which subdomains these improvements are more pronounced.
- From our encouraging results in this study, we firmly believe that an emphasis on quality of life can help physical and psychological recovery in patients with breast cancer. Reflexology may be an avenue to achieve this aim, and we hope our findings can lead to further studies in this topic.

Acknowledgments

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Disclosure

The authors have stated that they have no conflicts of interest.

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