Use of reflexology foot massage to reduce anxiety in hospitalized cancer patients in chemotherapy treatment: methodology and outcomes

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QUATTRIN R., ZANINI A., BUCHINI S., TURELLO D., ANNUNZIATA M. A., VIDOTTI C., COLOMBATTI A. & BRUSAFERRO S. (2006) *Journal of Nursing Management* 14, 96–105

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Aim To examine the effectiveness of reflexology foot massage in hospitalized cancer patients undergoing second or third chemotherapy cycles.

Background Since the late-1970s, studies have been conducted to assess the efficacy of behavioural and relaxation approaches in controlling nausea/vomiting, anxiety and other side-effects associated with chemotherapy.

Methods The study consisted of 30 patients being admitted to the oncology unit at a Scientific Research Hospital in Italy. Only 15 of the 30 participants received therapeutic massage. The subjects' self-reports of anxiety (measured by the Spielberger State-Trait Anxiety Inventory) were recorded before, after and 24 hours after the intervention.

Results There was an average decrease of 7.9 points on the state-anxiety scale in the treatment group and of 0.8 points in the control group ($P < 0.0001$).

Conclusions Reflexology foot massage can be considered a support treatment used in combination with traditional medical treatments and executed by an expert, qualified person to help cancer patients receiving chemotherapy feel better and also cope better with their disease.

Keywords: cancer, relaxation measures, therapeutic massage

Accepted for publication: 20 January 2005

Introduction

The quality of life of a patient with cancer is an important consideration. Besides prolonging the patient's life, medicine has to take care of its quality as well. This is a particularly important issue in oncology where, in addition to problems caused by cancer as a disease, there is a treatment-related toxicity, which causes distress to the patient. New antiblastic drugs are more effective than in the past, but they are also responsible for several side-effects that cause suffering, non-acceptance of treatment and overall worsening of the patient's quality of life. Quality of life is a multidimensional concept and involves physical,

psychological, emotive and social dimensions. Different aspects form part of the patient's quality of life such as being free of pain and of the symptoms caused by cancer and chemotherapy treatments, as well as the opportunity to communicate one's own anxiety and the possibility to live with dignity.

Many patients with cancer often try alternative therapies. However, they often make these choices based on limited information on the efficacy of the therapies (Montbriand 1995, Stephenson *et al.* 2000). Therapeutic massage is one of the alternative therapies that modifies myofascial and muscle tension pain and possibly other forms of cancer pain by reducing muscle tension and spasm. These effects also relax the patient, reduce anxiety and lessen the pain (Ferrel-Torry & Glick 1993).

Background

Anxiety is the reaction to the threat of a serious disease or to a possible physical injury. Fear and unpleasant emotional reactions occur with the prospect of suffering an attack to one's own personal integrity, even more if the subject feels the potential injury is imminent, destructive and excessive with respect to the capacities to fight it effectively and adequately (Bressi *et al.* 2002).

Psychopathological disorders are very frequent in cancer patients. Many times the tendency to consider the psychological suffering as 'understandable and normal under the circumstances' can cause an underestimation of the symptoms and the patient does not undergo treatment for them. Anxiety disorders are a class of disorders frequently present in oncology. In this sector anxiety can represent one of the symptoms or actually the principal symptom of a series of disorders that have different clinical, prognostic and therapeutic indications. About 15–40% of oncology patients suffer from psychological disorders related to anxiety and depression during chemotherapy (Morasso 2002).

Cancer and its treatment provoke a series of changes in the emotional sphere of the patient that include anxiety, senses of guilt, solitude, ruin, depression or underevaluation. They often represent reactive symptoms that do not form a normal psychiatric disorder (Silberfarb *et al.* 1980, Derogatis *et al.* 1983). The undesirable effects of chemotherapy and the idea of the many sessions the patient has to undergo, increase the anxiety that is already present and related to cancer. They cause sleep disorders with consequent alteration of sleep–waking rate, fatigue, moments of depression, rage and fits (Dipartimento Oncologico di Ravenna – Azienda USL di Ravenna 1998).

Massage has been used as a treatment for a variety of illnesses for over 3000 years. However, theoretical and empirical support in utilizing massage as a nursing intervention to modify anxiety, which frequently accompanies pain, is limited (Ferrel-Torry & Glick 1993). Since the late-1970s, studies have been conducted to investigate the efficacy of behavioural and relaxation approaches in controlling nausea/vomiting, anxiety and other side-effects associated with chemotherapy (Cotanch 1983, Cotanch & Strom 1987, Lerman *et al.* 1990, Arakawa 1995). Many authors point out the role that anxiety plays in the incidence of pretherapy or post-therapy nausea and vomiting. So, in the research for a more effective management of this, psychological factors such as anxiety must be considered (Rhodes *et al.* 1986, Carey & Burish 1987, Pervan 1990, Gilber 1991). More recent studies suggest that relaxation, induced in various ways, influences the experience of pain and there is emerging evidence that relaxation may also be effective for the management of nausea (Ferrel-Torry & Glick 1993, Corner *et al.* 1995, Davies & Riches 1995, Ross *et al.* 2002). Arakawa (1997) has found that as a result of relaxation, during a 25-minute taped instructional relaxation therapy session, patients reported a decrease in the intensity of nausea and vomiting symptoms after chemotherapy.

A concept in examining the effects of massage on cancer pain is the relaxation response described by Benson *et al.* (1974). The associated relationship between pain (and anxiety) states and autonomic arousal disorder are well known. Benson *et al.* (1974) have documented a decrease in sympathetic nervous system activity in relaxed states and have suggested that decreasing muscle tension is one way to induce relaxation (Ferrel-Torry & Glick 1993).

The purposes of this exploratory study are to verify whether a reflexology foot massage, provided by a student nurse, decreases anxiety in hospitalized cancer patients who undergo chemotherapy treatment and to suggest a methodology for other studies.

Methods

Design

The study was an experimental, pretest, post-test, comparative group design assigned to groups in accordance with the following criteria.

- First week: new admissions to the hospital (patients who comply with study selection criteria) identified as control subjects.

- Second week: new admissions to the hospital (patients who comply with study selection criteria) identified as experimental subjects.
- If an experimental or control patient was lost, another patient was chosen.

The assignment method was chosen because the hospital stay was 4 days and the same patient was hospitalized for the chemotherapy treatment every 2 months. Therefore, the experimental and controls subjects never met each other. The experimental subjects received therapeutic massage whereas the control patients did not.

Subject participation was voluntary, with informed consent procedures specifying provisions for confidentiality, anonymity, and the right to withdraw from the study.

Statistical analysis was conducted by means of the chi-square test, the *t*-test for average comparison, Mann–Whitney test and Wilcoxon signed ranks tests. A *P*-value of <0.05 result was accepted as being statistically significant.

Sample

A sample of 30 patients (15 experimental and 15 control) was selected from 241 admissions of two oncological units of an Italian Research Scientific Hospital over a period of 22 days (November–December 2003).

The selection included subjects of over 18 years of age, either male or female, of Italian nationality, and hospitalized for at least 2 days, oriented to time and place. The selection criteria included patients as follows: literate in Italian, willing to participate, consented to the study, diagnosed with cancer not in progression since 2002, scheduled for the first, second or third chemotherapy cycles, not subject to radiation treatment, informed of the diagnosis of cancer and the requirement for chemotherapy, not practising relaxation habitually, not in a similar study, or previous pilot study related to this research.

Exclusion criteria were based on the relevant reflexology literature (Marquardt 1993, Griffiths 2002) that outlines suitability for reflexology treatment. Moreover, consideration was given to excluding conditions where the effects of massage might be blurred by the condition itself, e.g. with psychiatric diseases.

Patients were excluded if they suffered from the following conditions: haemorrhage, epilepsy, paraplegia, thrombosis, bile or kidney stones, foot diseases, psychiatric diseases, had a pace-maker in situ, were

Table 1

Distribution of exclusion reasons* in the population of patient admissions in 22 days (*n* = 211)

Reason	Number of subjects excluded[†]
Admission for administration of interleukin, chemotherapy and other agents, chemotherapy and radiation treatment, radiation treatment, possibly chemotherapy	94
Not scheduled for the first or the second part of the second or third chemotherapy cycle	88
Nationality different from Italian	6
Recruited in pilot study or in the current one	19
Diagnosed with cancer before 2002	14
Age below 18	13

*The other exclusion reason reported in the text were not found among the surveyed population.
[†]Excluded subjects could have one or more reasons of exclusion.

menstruating, febrile, had open foot wounds or foot fractures. The reasons for exclusion of 211 patients are shown in Table 1.

Thus, the sample consisted of 30 subjects, 11 men (36.7%) and 19 women (63.3%), ranging in age from 18 to 71 years with an average age of 54.2 (SD = 13.1). Twenty-three, the majority of subjects (76.7%) were married, four (13.3%) were single, one (3.3%) was separated, two (6.7%) were widowed and 73.3% (22) of the patients lived near the hospital. All subjects were Catholic. About 43.3% (13) of the subjects attended the intermediate school, 43.3% (13) secondary school, 10% (three) primary school. Only one person did not have any qualifications, but was able to read and write. The types of cancer included gastrointestinal (12, 40%), genitourinary (7, 23.3%), breast (5, 16.7%), lymphatic (4, 13.3%), head/neck (1, 3.3%) and orthopaedic (1, 3.3%). Metastasis was not present in 76.7% (23) patients. All the subjects had family/social support. Seven chemotherapeutic agents were administered to subjects including alkylators (16, 23.5%), antimetabolites (25, 36.8%), alkaloids (6, 8.8%), cytotoxic antibiotics (6, 8.8%), cisplatin (10, 14.7%), rituximab (3, 4.4%), others (aredia or irinotecan; 2, 2.9%). Twenty-five (83.3%) of the 30 patients did not take tranquillizers, while five (16.7%) took them as usual. Only two patients had not undergone invasive treatments.

Comparison of selected demographic and clinical variables (Table 2) between experimental and control subjects did not reveal any significant statistical differences.

Table 2

Comparison of demographic and clinic information of the experimental and control groups

Variables	Experimental (n = 15)	Control (n = 15)
Sex		
Male	5	6
Female	10	9
Age, mean (SD)	54.9 (10.7)	53.5 (15.5)
Marital status		
Not married	2	2
Married	12	11
Separated	1	0
Widowed	0	2
Home residence		
Near the hospital	11	11
Distant from the hospital	4	4
Catholic religion	15	15
Qualification		
Primary school	1	2
Intermediate school	9	4
Secondary school	5	8
Any, but able to read and write	0	1
Cancer type		
Genitourinary	3	4
Gastrointestinal	8	4
Breast	2	3
Head/neck	0	1
Lymphatic	1	3
Orthopaedic	1	0
Metastases		
Present	12	11
Not present	3	4
Familiar/social support		
Present	15	15
Chemotherapeutic agents		
Alkylators	10	6
Antimetabolites	10	15
Alkaloids	3	3
Cytotoxic antibiotics	1	5
Cisplatin	5	5
Rituximab	1	2
Others (aredia or irinotecan)	1	1
Tranquillizer use		
Yes	3	2
No	12	13
Invasive treatments		
Practised	13	15
Not practised	2	0

Measures

Self-report of anxiety was assessed using the Spielberger State-Trait Anxiety Inventory (STAI). The STAI consists of two subscales: state anxiety and trait anxiety. The state-anxiety scale measures how subjects feel at a particular moment in time; the trait anxiety scale measures what people normally feel. Each subscale consists of 20-items on a 4-point Likert-type scale (not at all, somewhat, moderately so, very much so). Scores range from 20 to 80, with lower scores indicating less anxiety and higher scores indicating greater amounts of anxiety. Reliability and validity of the scales have been demonstrated in many different populations including medical and surgical patients with test–retest and α-reliability coefficients ranging from 0.83 to 0.92 (Spielberger *et al.* 1983, Spielberger & Sarason 1986, Ferrel-Torry & Glick 1993).

In the present study, the experimental patients filled in the STAI-Trait and the STAI-State before the massage treatment and the STAI-State $\frac{1}{2}$ and 24 hours after the massage. The control patients filled in the STAI-Trait and the STAI-State and after an hour they compiled the STAI-State. We did not continue measuring the anxiety level in the control group on the second day because a further assessment of anxiety on the second day identified increased levels of anxiety in the control group not subjected to massage. The results of the STAI-State in this situation could be misleading in that the initial test itself might have lead to increased anxiety observed on further testing. It seemed unethical to continue measuring rising anxiety, without offering treatment.

Massage intervention

A nursing student provided a reflexology foot massage following training that included three steps:

- participation in a theoretical and practical course;
- practise on some patients during nursing apprenticeship and
- audit of the method standardization.

The reflexology foot massage was provided on the basis of a predefined procedure according to Fitzgerald's methodology (Fitzgerald & Bowers 2003) and principles (Marquardt 1993, Griffiths 2002). The student training began in September 2003. Reflexology foot massage allows more relaxation and beneficial effects than hand massage, resulting from the patient's position. It takes 30 minutes and is carried out on both feet so as to not create imbalances. It consists of a foot massage with hands, in particular with the thumbs, following a sequence (standardized methodology). Both for the person giving the massage and the person receiving it, the treatment must be administered at least one hour after eating.

The massage starts from the left foot. The nurse has to respect the sequences, and, during the treatment, must take note of the various expressions on the patient's face. The subject is asked to refrain from speaking during the massage unless it is absolutely necessary, and is invited to feel the sensations of his/her body, and use only verbal communication which

expresses feelings/information and are useful for the treatment. The massage session lasts 30 minutes (15 minutes per foot).

In preparation for, and during, the massage procedure, particular attention was paid to the following: the room condition, nurse preparation and patient preparation.

Room conditions

The door has to be closed (if possible) and the lights dimmed in order to provide privacy and avoid possible distractions.

Nurse training

Nurses must wear a clean uniform and must have eaten at least an hour before treatment. They must also remove rings, watches, and jewellery and wash their hands. When the nurse is giving the massage, her hands have to be warm and she must assume a natural and comfortable position at the end of the bed in front of the patient's feet.

Patient training

The patient must be informed and has to give consent. Ensure there is foot hygiene and do not let the patient use cream lotion. Ask the patient to remove all jewellery and assume a supine position by removing the foot of the bed. Put a small pillow or a soft roll under the knees of the patient to facilitate relaxation of the inferior limbs.

Treatment time

At least an hour after meals.

Pilot study

In the first 3 weeks of November 2003 we conducted a pilot study to aid us in defining our methodology for the main study. The results of the first pilot study are outlined as follows (Table 3): comparison of demographic and clinic information of the experimental and control groups (pilot study; Table 4), comparison of variables between experimental and control groups in the first day (pilot study; Table 5) and comparison of variables between experimental and control groups in the second day (pilot study).

The timing of data collection were as follows:

- For vital parameters: before, immediately after and $\frac{1}{2}$ hour after the massage in the experimental group and before and after an hour in the control group.
- For STAI-State and VAS: before and $\frac{1}{2}$ hour after the massage in the experimental group and before and after an hour in the control group.

Table 3

Comparison of demographic and clinic information of the experimental and control groups (pilot study)

Variables	Experimental (n = 15)	Control (n = 15)
Sex		
Male	5	9
Female	10	6
Age, mean (SD)	50.7 (13.8)	48.1 (14.9)
Marital state		
Not married	3	5
Married	12	9
Separated	0	1
Widowed	0	0
Catholic religion	15	15
Qualification		
Primary school	2	4
Intermediate school	5	4
Secondary school	7	6
Degree	1	1
Any, but able to read and to write	0	0
Cancer type		
Genitourinary	1	2
Gastrointestinal	7	7
Breast	4	0
Head/neck	2	2
Lymphatic	1	1
Orthopaedic	0	1
Skin	0	2
Metastases		
Present	9	9
Not present	6	6
Chemotherapeutic agents		
Alkylators	5	5
Antimetabolites	11	10
Alkaloids	5	4
Cytotoxic antibiotics	1	1
Cisplatin	3	3
Rituximab	1	0
Others (aredia or irinotecan)	4	1
Tranquillizer use		
Yes	1	0
No	14	15
Invasive treatments		
Practised	15	15
Not practised	0	0
Relaxation experiences in the past*		
Yes	3	/
No	12	/

*Only in the experimental group.

Self-reports of pain in the pilot study were measured using a 100 mm visual analogue scale (VAS) with verbal anchors at either end (0 mm = 'no pain'; 100 mm = 'as bad as can possibly be'). The VAS is considered a sensitive subjective measure of pain intensity and is accurate in assessing changes in pain perception (Lee & Kieckhefer 1989, Ministero della Salute 2002).

In addition, the physiological measures of heart rate, respiratory rate, systolic pressure and diastolic pressure

Table 4
Comparison of variables between experimental and control groups in the first day (pilot study)

Variables	Experimental (n = 15)		Control (n = 15)		Experimental vs. control (P-value)
	Mean (SD)	*P-value*	*Mean (SD)*	*P-value*	
Systolic pressure					
Before	127.0 (22.2)	B *vs.* I (<0.001)	116.7 (15)	B *vs.* A (<0.05)	n.s.
Immediately after	114.0 (19.3)	I *vs.* A (n.s.)	/	/	/
After	114.3 (18.7)	B *vs.* A (<0.001)	122.0 (12.1)	/	n.s.
Diastolic pressure					
Before	82.7 (13.9)	B *vs.* I (<0.05)	78.7 (11.9)	B *vs.* A (n.s.)	n.s.
Immediately after	77.0 (11.9)	I *vs.* A (n.s.)	/	/	/
After	77.0 (10.7)	B *vs.* A ($t = 2.3$, <0.05)	78.3 (8.4)	/	n.s.
Pulse					
Before	76.1 (12.8)	B *vs.* I (<0.001)	79.9 (14.1)	B *vs.* A (n.s.)	n.s.
Immediately after	66.9 (11.2)	I *vs.* A (<0.001)	/	/	/
After	66.1 (11.6)	B *vs.* A (<0.01)	78.5 (14.2)	/	<0.01
Respiratory frequency					
Before	17.3 (4.4)	B *vs.* I (<0.01)	17.0 (2.9)	B *vs.* A (n.s.)	n.s.
Immediately after	15.4 (3.6)	I *vs.* A (<0.05)	/	/	/
After	14.5 (3.1)	B *vs.* A (<0.01)	17.5 (3.2)	/	<0.05
STAI-State					
Before	51.7 (10.8)	B *vs.* A (<0.01)	51.1 (11.7)	B *vs.* A (n.s.)	n.s.
After	43.3 (8.0)	/	51.2 (11.7)	/	<0.05
VAS					
Before	4.8 (1.7)	B *vs.* A (<0.01)	5.6 (2.5)	B *vs.* A (<0.05)	n.s.
After	3.6 (1.6)	/	6.2 (2.2)	/	<0.01

Variables	n		n		
	R	*AR*	*R*	*AR*	
Type of pulse					
Before	14	1	14	1	
Immediately after	15	0	/	/	
After	15	0	14	1	
Type of breath					
Before	3	12	3	12	
Immediately after	14	1	/	/	
After	15	0	3	12	

I, immediately after; R, rhythmic; P, significant level; A, after; AR, arrhythmic; B, before; n.s., not significant; STAI, State-Trait Anxiety Inventory.

were used to provide an objective measure of relaxation in the pilot study. Table 3 shows the demographic and clinical information of both the experimental and control groups of the pilot study. Comparisons of selected demographic and clinical variables between experimental and control subjects did not reveal any significant statistical differences. After we introduced the pilot study results, the final study showed further demographic information that could have had an influence on the patient's anxiety such as the place of residency (because the further the patient lived, the more anxious the patient was leaving the family alone). Another factor was the family/ social support (because if there is support from the family/society, the patient is less anxious). In the final study we excluded the subjects that had practised relaxation in their daily lives. The pilot study data are shown in Table 4 for the first day and in Table 5 for the second day.

On the basis of data collection and the analysis of significance we decided to eliminate the collecting of all vital parameters and the administration of the VAS. In fact, on the basis of the literature (Ferrel-Torry & Glick 1993), the vital parameters did not appear to be a reliable indication of anxiety because they were subjected to continuous variations on the basis of the patient's physical, clinical and emotional conditions. The VAS also seemed a too subjective instrument of anxiety. We preferred to introduce the STAI-Trait rather than STAI-State to point out the anxiety associated with chemotherapy. Finally, as there were no differences between the data of the first day and the second day, we decided to reduce the two massage sittings to only one session. Regarding the data collecting timing, we eliminated the 'immediately after' in the experimental group because the answers disturbed patients and also because the data were the same as the

Table 5
Comparison of variables between experimental and control groups in the second day (pilot study)

Variables	Experimental (n = 15)		Control (n = 15)		Experimental vs. control (P-value)
	Mean (SD)	P-value	Mean (SD)	P-value	
Systolic pressure					
Before	122.0 (19.7)	B *vs.* I (<0.01)	122.0 (19.3)	B *vs.* A (<0.01)	n.s.
Immediately after	112.3 (20.6)	I *vs.* A (n.s.)	/	/	/
After	111.3 (18.8)	B *vs.* A (<0.01)	128.7 (19.3)	/	<0.05
Diastolic pressure					
Before	79.7 (12.6)	B *vs.* I (<0.01)	75.3 (11.9)	B *vs.* A (n.s.)	n.s.
Immediately after	72.0 (12.6)	I *vs.* A (n.s.)	/	/	/
After	70.7 (10.3)	B *vs.* A (<0.01)	79.0 (9.3)	/	<0.05
Pulse					
Before	79.1 (15.8)	B *vs.* I (<0.01)	80.3 (11.9)	B *vs.* A (n.s.)	n.s.
Immediately after	72.9 (12.7)	I *vs.* A (n.s.)	/	/	/
After	71.9 (11.1)	B *vs.* A (<0.01)	78.2 (12.6)	/	n.s.
Respiratory frequency					
Before	17.9 (3.7)	B *vs.* I (<0.01)	18.1 (3.4)	B *vs.* A (n.s.)	n.s.
Immediately after	16.4 (3.1)	I *vs.* D (<0.05)	/	/	/
After	15.3 (3.1)	B *vs.* A (<0.01)	18.1 (3.3)	/	<0.05
STAI-State					
Before	53.7 (6.4)	B *vs.* A (<0.01)	53.6 (13.8)	B *vs.* A (n.s.)	n.s.
After	45.1 (6.0)	/	53.6 (13.8)	/	n.s.
VAS					
Before	5.9 (1.2)	B *vs.* A (<0.01)	6.7 (2.2)	B *vs.* A (n.s.)	n.s.
After	4.5 (1.1)	/	6.7 (2.4)	/	<0.01

Variables	n		n	
	R	AR	R	AR
Type of pulse				
Before	15	0	14	1
Immediately after	15	0	/	/
After	15	0	14	1
Type of breath				
Before	3	12	6	9
Immediately after	14	1	/	/
After	15	0	5	10

I, immediately after; R, rhythmic; *P*, significant level; A, after; AR, arrhythmic; B, before; n.s., not significant; STAI, State-Trait Anxiety Inventory.

'after' ones and we added the STAI-Trait in the second day after 24 hours from the massage.

Results

The average scores of pretest trait anxiety (STAI-Trait) in the experimental and control group are 32.4 (SD = 10.1) and 28.2 (SD = 11.5), respectively. Their comparison does not reveal any significant statistical differences.

The average scores of pretest state anxiety (STAI-State) in the experimental and control group are 55.7 (SD = 7.3) and 57.1 (SD = 11.9), respectively. Their comparison does not reveal any significant statistical differences.

In the experimental group the average reading of the difference between STAI-State and STAI-Trait is 23.3 (SD = 13.0), while in the control group is 28.9

(SD = 12.8) the comparison between the two averages does not reveal any statistical differences.

The average scores of post-test STAI-State in the experimental and control group are 47.7 (SD = 4.4) and 56.3 (SD = 12.0) respectively. Between these values there are significant statistical differences (P < 0.05).

Pretest state-anxiety scores in both groups decrease at post-test and the scores for the experimental group decrease by 8 and those for the control group decrease by 0.8. The average of the differences between post-test STAI-State and pretest STAI-State in experimental and control group are 7.9 (SD = 7.2) and 0.8 (SD = 3.3), respectively, between them significant statistical differences were observed (P < 0.0001). Figure 1 shows pretest and post-test average scores of the anxiety state (STAI-State) in experimental and control groups.
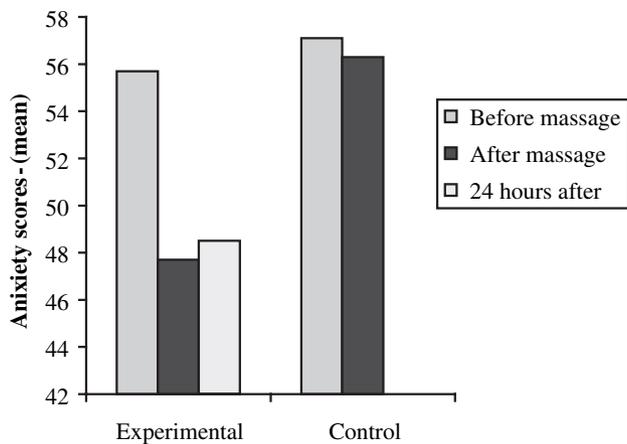
Figure 1
Mean scores pretest and post-test of the anxiety state [State-Trait Anxiety Inventory (STAI)-State] in experimental and control groups.

To understand whether the massage produces significant decreases also the following day, we considered the STAI-State the day after the treatment only in the experimental group. Average scores for second day post-test STAI-State was 48.5 (SD = 2.8). Between this value and the average of the first day pretest STAI-State there were significant statistical differences ($t = -3.919$, $P < 0.01$); while there was no significant statistical differences between the average scores for second day post-test STAI-State and the average of the first day post-test STAI-State.

Discussion

The study provides some new elements with respect to the literature on this topic. In particular, it considers the patient during the second or third cycle of chemotherapy. This choice was made because in the first cycle the patient would have too much anxiety in the first approach to the treatment. In the other cycles the patient would be more accustomed to the therapy. The second element is the desire to reduce the anxiety due to chemotherapy and not to the 'cancer' disease. Furthermore, the exclusion criteria selected a homogeneous group among experimental and control subjects who had had cancer in progression since 2002. But the originality of the study lies in the fact that it is an initial attempt at examining the effectiveness of reflexology massage for the reduction of anxiety related to chemotherapy.

Anxiety caused by chemotherapy could influence the quality of cancer patient's life. This study has demonstrated that anxiety in cancer patients, subjected to the first or the second part of the second or third cycle of chemotherapy, decreased with reflexology foot massage and was unchanged the day after the massage. The

massage had some effect in decreasing state-anxiety scores, i.e. state-anxiety levels in the experimental group were significantly decreased at the post-test. Likewise, state anxiety in the control group also slightly decreased at the post-test, but not significantly. This result was consistent with the findings of other previous studies that verified the efficacy of relaxation measures to reduce anxiety levels related to chemotherapy. Relaxation techniques are thought to reduce people's anxiety and physiological arousal directly and enhance a patient's sense of well-being and of control (Arakawa 1995).

The importance of decreasing anxiety in cancer patients is related to the fact that most commonly identified pain, such as spasm and tension, in these patients is muscular in nature (Ferrel-Torry & Glick 1993). Dorrepaal *et al.* (1989) found that 83% of the cancer patients they studied said that tension and nervousness increased the pain they were experiencing. Anxiety and depression have also been shown to exacerbate cancer pain (Welch-McCaffrey 1985). Based on the assumption that there is a close relationship between pain and anxiety (French 1989), it would follow that modification of one modality through the administration of massage would also modify the other modality, and that alleviating pain and anxiety enhances relaxation.

The results of this study encourage the use of reflexology foot massage in nursing practise to help cancer patients. However, the nurse providing the massage must be qualified, trained and expert as well as motivated. Reflexology foot massage can be performed anywhere, requires no special equipment, is non-invasive and does not interfere with patients' privacy. Therefore, interested family members should be encouraged to perform reflexology foot massage on their loved ones and nurses can help families by teaching them this simple skill.

The difficulty with introducing support therapies such as massage into nursing practise is that there was little empirical evidence to support their use (Eisenberg *et al.* 1993, Yates *et al.* 1993, Montbriand 1995, Stevenson 1996). Consistent difficulties exist with many of the studies that have been published in this area. They were based on a small sample only (Grealish *et al.* 2000, Smith *et al.* 2002).

The second purpose of this study was to find a valid methodology to verify the role of massage in decreasing anxiety. The pilot study was very important to define the instruments and variables required.

The pilot study showed there was no homogeneity between statistically significant differences of all vital parameter values in the experimental and control groups

on both days. Therefore, we assumed that vital parameters did not appear to be reliable indicators of anxiety. Another important step was the introduction of the STAI-Trait to point out the anxiety associated with chemotherapy.

A major limitation in the study was the small sample, (Arakawa 1995). This data must be read looking at the selection criteria. The medical consultation before the treatment is very important, in order to discover whether patients manifest any possible symptoms such as deep vein thrombosis or any other contraindications. Other limitations to the study include the facts that the patients were not categorized by diagnosis and metastasis extensions and that the study examined the immediate and day after effects of massage only. There is a need to further investigate the intermediate and long-term effects of massage.

The study suggests some recommendations regarding the methodology, it is preferable to use two different nurses: one for collecting data and the other for giving the massage.

- It would be interesting to teach relatives how to conduct the massage procedure. Then, using a similar methodology, one could research the subjects to see if the effects in this study could be verified.
- It would be useful to verify the effects of massage on patients subjected to chemotherapy cycles different to the current study ones.
- Nevertheless, the results of the study appear promising, and additional research is recommended to further the appropriate use of massage in the nursing practise.

Conclusions

Reflexology foot massage can be considered as a support treatment used in combination with traditional medical treatments and carried out by an expert, qualified person to help cancer patients receiving chemotherapy feel better and cope better with their disease.

Acknowledgement

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