ORIGINAL PAPER

DEPRESSION, ANXIETY AND STRESS IN WOMEN WITH BREAST CANCER: EFFECT OF A 4-WEEK SELF MANAGEMENT INTERVENTION

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Abstract

Objective: **This study examined the relationship between depression, anxiety and stress before and after a patient self-management intervention in a cohort of women newly diagnosed with breast cancer.** ***Methods:*** **A clinical trial on women diagnosed with breast cancer was conducted at University Malaya Medical Centre. The experimental block underwent a 4-week self management program, followed by the control block who underwent usual care. Participants were assessed on their levels of depression, anxiety and stress at baseline (T1), at 4 weeks (T2) and at 8 weeks (T3) after the intervention. Analyses of variances on the repeated measures were conducted to examine the differences between the two groups.** ***Results:*** **There were significant differences in the change-scores between the experimental and control groups at post test and at follow up. Levels of depression, anxiety and stress generally decreased significantly in the experimental groups but either maintained or increase in the control group. Significantly lower stress was also found in women with higher level of self-reported physical activity than women with low physical activity.** ***Conclusion:*** **The depression, anxiety and stress level of women with breast cancer can be ameliorated with a 4 week self management intervention. Women with higher physical activity also show significantly lower stress. Intervention should consider factors that ameliorate distress level of women with breast cancer so that they can better go through adjuvant therapy.**

Keywords: **Depression, anxiety, stress, breast cancer, patient self-management, clinical trial**

Introduction

Breast cancer, among all cancers, is the leading cause of cancer mortality in women worldwide. Out of the 35 million people who died from chronic disease in 2005, half were under 70 years and half were women (1). Breast cancer is primarily a woman's disease, although among males there is a minimal risk of developing breast cancer as well, with a ratio of 1:100 as reported by the American Cancer Society (2). Earlier research have documented that up to 50% of women with breast cancer experience psychiatric morbidity (3), coupled with anxiety and depression commonly faced right from the moment they are diagnosed with breast cancer (4). Recently, emotional distress as a core indicator of a patient's wellbeing has been promoted as the sixth vital sign in cancer care (5).

Emotional distress varies in level of intensity, depending on severity of disease and phase of treatment (6). It has also been reported that the onset of reactive anxiety and depression also often coincides with the fatigue experienced with daily radiation treatments (7). Thus, management of emotion is crucial as one quarter to one third of women undergoing chemotherapy experienced distress (8, 9). Patient self management support (10, 11) has the potential for enabling women with breast cancer with the necessary knowledge and skills to manage the medical, emotional and role tasks of living with breast cancer. The intervention provided the knowledge and skills for women to self manage the medical, emotion and role tasks in a group of about 6-10 people. This paper presents the depression, anxiety and stress of women newly diagnosed with breast cancer who participated in a 4 week self management clinical controlled trial in University Malaya medical Centre.

Methods

Design & Subjects

A time series clinical trial (n=147) with an experimental block (n=69) followed by a control block (n=78), and involving women newly diagnosed with breast cancer (within one year) was conducted between December 2006 to February 2008 in University Malaya Medical Centre. The experimental block undertook the 4-week self management sessions which was led by health professionals and the aim was to enable women to self manage in partnership with health professionals. The control block consisted of women who underwent their usual-care group. Both groups filled up the repeated measures questionnaires at baseline, 4 weeks and at 8 weeks from baseline. The participants were selected based on the following eligibility criteria: I) more than 18 years of age, ii) confirmed by physician, a diagnosis of Stage 1-III (within one year since diagnosis), iii) completed surgery, may or may not be undergoing chemotherapy and/or radiotherapy, iv) may or may not be undergoing Tamoxifen (or other endocrine therapy), v) can read and understand English, and vi) give informed-consent. The exclusion criteria are I) marked cognitive impairment or learning disabilities (through observation/ interview) and ii) has other form of medical problem interfering with participation and attendance (from self report).

Tools

The Hospital Anxiety Depression scale (HADS) has been used for screening purposes, in diverse range of clinical groups, for both symptom severity and detecting anxiety disorders and depression (12). Specific to breast cancer, the use of HADs in women with breast cancer was questioned (13), and it was found inadequate in detecting depression (14, 15). Rodger and Martin (16) proposed that if HADs is used as a screening tool for anxiety and depression in breast cancer patients, it must be enhanced using a modified scoring method based on a tripartite model of psychological distress, but the efficacy of such scoring system is not only time consuming but has yet to be established. Thus the Depression, Anxiety and Stress (DASS) tool was selected for this study on women with breast cancer. DASS measure 3 distinct items - the depression, anxiety and stress. DASS-21 is a self report questionnaire (17) which allows simultaneous assessment of three emotional states - depression, anxiety (hyper arousal) and stress. A Likert-type scale is used to rate items according to symptoms experienced in the past week, ranging from 0 (not at all) to 3 (most of the time). The DASS tool has been established as having excellent psychometric properties (18).

Alpha value for the 7-item scales ranged from 0.73 (anxiety), 0.81 (depression) and 0.81 (stress) and has adequate convergent and discriminate validity (17, 18). It is a valid, reliable routine clinical outcome measure of these constructs in clinical and non-clinical groups (19, 20) and for inpatient setting (21). A Patient Information Questionnaire (PIQ) was also designed to collect data on the demographic and background of the participants.

Data analysis:

The data was entered into the SPSS (Version 16). All missing data from participants was imputed using the last observation carried forward method (for those missing at later time) and mean substitution for those with missing at earlier time. Participants on the experimental arm who attend at least three out of the four sessions were included, with missing data imputed and data accepted for analysis. Descriptive statistics and analysis of variance were conducted.

Results

Demographic data obtained from the PIQ were tabulated in Table 1 below. A total of 147 women participated in the study. The majority of the participants were Chinese (65%), with a mean age of 50 years (+ 9 SD) and within a range of 25-75 years. Most were married (76%), living with spouse and children (68%), had less than 2 children (42%), and had at least a secondary education (44%). Most had no extra role looking after aged parents (73%). Only about 6.8 percent were living alone, the rest were living with someone, indicating the traditional Asian trend of living within an extended family system is still highly prevalent, although the family today have fewer children. More than half the women had some form of insurance policy (53%) and had a household income of 1000-5000 ringgit per month (55%). The independent Chi-square tests ($p<0.05$) showed that the

demographic variables i.e. age range (p=0.02), ethnicity (p=0.04), insurance status (p= 0.005) and physical activity status (p=0.02), were significantly different at baseline between the experimental and control groups. These variables were entered into the model to be adjusted for and accounted for in the analyses.

Table 1 Demographic of participants.

Variables	**ALL n=147**		**Experiment n=69**		**Control n=78**		**Test p-value**
	n	%	n	%	n	%	X^2
Age Range							
20-49	72	49.0%	31	44.8 %	41	52.5 %	0.022*
50-79	75	51.1%	38	55.1 %	37	47.4 %	
Ethnicity							
Chinese	95	64.6 %	54	78.3 %	41	52.6 %	
Indian	21	14..3 %	7	10.1 %	14	17.9 %	0.040*
Malay(22) & Others(9)	31	21.1 %	8	11.6 %	13	29.5 %	
Marital Status							
Single	26	17.7 %	9	13 %	17	21.8 %	
Married	111	75.5 %	56	81.2 %	55	70.5 %	0.312
Widowed/Divorced	10	6.8 %	4	5.7 %	6	7.7 %	
Living Companion							
Alone	11	7.5 %	5	7.2 %	6	7.7%	
Spouse, kids & parent	108	73.5 %	51	73.9 %	57	73.1%	0.989
Parents & siblings	12	8.2 %	6	8.7 %	6	7.7 %	
Friends/Others	16	10.9 %	7	10.1 %	9	11.3 %	
Additional Roles							
Yes	40	27.2 %	16	23.2 %	24	30.8 %	0.303
No	107	72.8 %	53	76.8 %	54	69.2 %	
No of Children							
None	33	22.4 %	14	20.3 %	19	24.4 %	
<2 kids	62	42.2 %	30	43.5 %	32	41 %	0.840
> 3kids	52	35.4 %	25	36.2 %	27	34.6 %	
Education Level							
Nil -Primary	7	4.8 %	2	2.9 %	5	6.4 %	
Secondary	65	44.2 %	30	43.5 %	35	44.9 %	0.999
College	39	26.5 %	21	30.4 %	18	23.1 %	
University	36	24.5 %	16	23.2 %	20	25.6 %	
Insurance							
Yes	78	53.1 %	45	65.2 %	33	42.3 %	0 .005*
No	69	46.9 %	24	34.8 %	45	57.7 %	
Physical activity level							
Sedentary-low	92	62.6	30	43.5	62	79.5	0.02
Moderate -high	55	37.4	39	56.5	16	20.5	

Prior to the analysis the baseline differences between the two groups were assessed using t-test. There were no statistical significant differences in the mean scores of the two groups for stress (p=0.08), anxiety (p=0.299) and depression (p=0.44) suggesting that the two groups are from the same population. Thus any changes in the findings can be interpreted with confident as changes due likely to the intervention. Descriptive statistic (Table 2) shows that on the experimental group, a favourable decrease on all three scales ranging from -19.8 percent (stress) to 33.3 percent (depression) at T1 to T2 and a further decrease of 13.7 percent anxiety to 17.1 percent stress at T2 to T3. On the control group, all three scales had unfavourable increase with higher measures on depression, anxiety and stress with a percentage ranging from 8.9 percent to 14.9 percent on T1 to T2 period and 4.5 percent to 4.4 percent stress improves slightly with a decrease mean score of 2.5 percent for T2 to T3. Overall, the trend of change from baseline T1 to Post test T2 was favourable for experimental group, but unfavourable in control group.

Table 2: Descriptive (mean +SD) at repeated measures with percentages of change scores

DASS subscales		**Repeated measures**						**Change Score (T2-T1)**		% change scores (at T2)	**Change Score (T3-T1)**		% change scores (at T3)
		Baseline (T1)		Post-test (T2)		Follow Up (T3)							
		Mean	SD	Mean	SD	Mean	SD	Mean	SD		Mean	SD	
Stress	**exp**	**12.67**	**8.22**	**9.86**	**7.21**	**8.29**	**6.98**	**-2.81**	**6.9**	**-22.2***	**-4.38**	**8.15**	**-34.6***
	ctrl	10.31	8.05	11.92	9.82	11.33	9.89	1.62	6.60	15.7	1.02	8.27	9.9
Anxiety	**exp**	**9.13**	**7.57**	**7.16**	**6.45**	**6.64**	**6.90**	**-1.97**	**5.37**	**-21.6***	**-2.49**	**5.46**	**-27.3***
	ctrl	7.92	6.47	9.05	7.95	8.97	7.84	1.13	5.45	14.3	1.05	5.75	13.3
Depression	**exp**	**9.28**	**8.7**	**6.09**	**6.59**	**5.54**	**6.33**	**-3.19**	**7.21**	**-34.4***	**-3.74**	**7.04**	**-40.3***
	ctrl	8.21	8.04	9.26	9.53	9.41	9.92	1.05	6.46	18.3	1.21	8.16	14.7

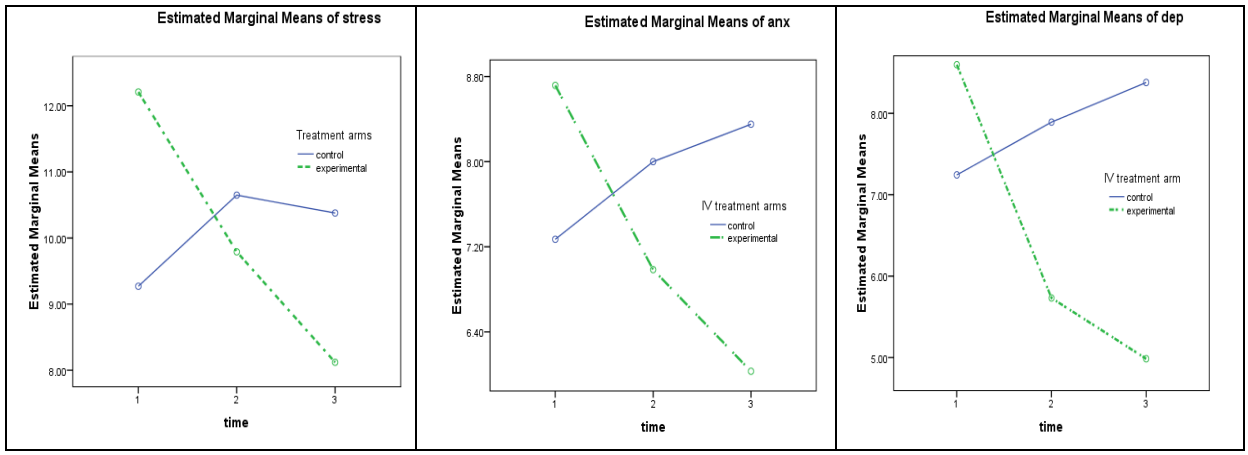
Exp= experimental arm [n=69], ctrl=control arm [n=77] DASS =Depression, anxiety, stress scale
Significant at p<0.05

Changes over time between the two groups for depression, anxiety and stress

Using the change scores (T2-T1), analysis of variances shows significant differences between groups for stress [F(1,140) =13.68, p<0.0001)], anxiety [F(1,140) = 8.44, p<0.004)] and depression [F(1,140) =11.57, p<0.0001)]. Figure 1 showed the changes over time in the experimental and control groups. Between the experimental and control group, there were no significant differences in the age group, marital status and ethnic groups. The women's self reported level of physical activity were categorised into 4 levels (sedentary =no exercises, low =1-2 hours per week, moderate =2-5 hours per week and high=more than 5 hours per week). Significant differences between groups were

found between the low (sedentary to light physical activity) and high (moderate to active) group for stress (p=0.031) but not for depression and anxiety. The women who exercise showed lower stress compared to those who do not exercise (p<0.05). The within subject repeated measure (experimental group, n=69) showed that the changes were statistically significant (p<0.001) for all three variables on.

Figure 1 Line graph of repeated measure between experimental and control arms



Anx=Anxiety, dep= depression
T1 = Time 1 (baseline), T2= posttest at 4 weeks, T3 = Posttest at 8 weeks

Discussion

At baseline the levels of depression, anxiety and stress of women with breast cancer who were allocated to a 4 weeks self management program were comparable to the control group. The pattern of progression appears significantly favourable over the repeated measures for experimental but unfavourable for the control arm. In the control arm, the increased distress (depression, anxiety and stress) was noted with time. The 4-week self management intervention, developed from insights derived from four focus groups (22) provided the knowledge and skills for women to self manage the required tasks. Thus, although there were extra demands for them to attend the sessions, the women reported feeling supported by the health team and, the unavailability of information (22) which was a barrier to self management as well as a stressor was mediated by the group sessions, and the support from their peers' (buddies) and from the health team. This perhaps leads to the favourable outcomes in the experimental group.

The depression profile of the control block continued to have a sharper rise even at the third repeated measure. One study has shown that in a large cohort of breast cancer patients (n=2943), the post-hoc multivariate analysis revealed that chemotherapy (HR: 1.2; 95% CI: 1.0 – 1.5), and hormonal receptor positive status (HR: 1.2; 95% CI: 1.0 – 1.5) were significantly and independently associated with an increased risk for developing depression (23). Another significant finding was that women who reported higher physical activity level showed significant difference in terms of stress, whereby they had significantly (p<0.05) lower stress. This could be explained by the slightly greater number of women who reported lower physical activity

level (at baseline) in the control group. However, one limitation of the study was it utilised self report measures and the sample size was not large enough. Thus, a larger study is needed to confirm the beneficial role of physical activity in buffering stress during treatment. These findings suggest that women with breast cancer needs support in managing the multiple tasks even after the breast surgery, as chemotherapy and radiation can be equally distressing and it alters participation in life because of its duration of treatment.

Conclusion

Women with breast cancer who went through a 4-week patient self management led by health professionals showed significant reduction in distress (depression, anxiety and stress) over time. In contrast, women who were in the usual care group showed unfavourable increased in distress over time. Having a higher physical activity level is also significantly associated to a lowered stress, and as such exercise as a lifestyle strategy should be counselled to women newly diagnosed with breast cancer. Having a diagnosis of breast cancer is distressing to most women but women who were offered the self management support as they go through the multiple appointments for treatment, showed reduced psychological distress. Rehabilitation of women with breast cancer needs to be emphasised as increasingly more women are living with this condition.

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