RESEARCH ARTICLE

**Editorial Process:** Submission:06/18/2024 Acceptance:06/02/2025

# Evaluating Group CBT for Depression in Newly Diagnosed Breast Cancer Patients in a Malaysian Public Hospital

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## Abstract

**Introduction:** Breast cancer stays as one of the most prevalent cancers worldwide, and the increasing number of cases alerts the urgent need for comprehensive support for affected patients. Breast cancer surgery, such as mastectomy, often induces significant psychological distress, including depression, that is particularly pronounced in newly diagnosed patients. The study aims to evaluate the presence of depressive symptoms in newly diagnosed breast cancer patients undergoing mastectomy and assess the effectiveness of group cognitive behaviour therapy (G-CBT) in reducing depression. **Methods:** An experimental study was conducted at a large tertiary public hospital in Kuala Lumpur. Seventy (70) newly diagnosed breast cancer patients were recruited and randomly allocated to an intervention (G-CBT) or control group. The PHQ-9 questionnaire was used to assess the level of depressive symptoms at baseline, immediate post-operation, and post operation in the first and third-month follow-up. A mixed design ANOVA analysis was used to determine the effect of G-CBT on depressive symptoms with partial eta squared as a measure of the intervention effect size. **Results:** The study found that both groups showed significant depressive symptoms above the threshold for clinical attention prior to mastectomy. The evaluation of the effect of G-CBT across time points revealed a general reduction in depressive symptoms for both groups. However, subjects in the G-CBT intervention group showed a significantly greater reduction in depressive symptoms compared to the control group. The effect of G-CBT on depressive symptom scores sustained until the third month after mastectomy and proved that the psychological intervention is effective in alleviating psychological distress. **Conclusion:** G-CBT significantly reduced depressive symptoms in newly diagnosed breast cancer patients and the effect of intervention sustains until third month follow-up. These findings emphasize the value of incorporating G-CBT into standard care practices to provide targeted psychological support and improve mental health outcomes in this vulnerable population.

**Keywords:** Group cognitive behaviour therapy (G-CBT), depressive symptoms- breast cancer - mastectomy

*Asian Pac J Cancer Prev,* **26 (6)**, 1971-1976

## Introduction

The increasing number of cancer cases highlights it as a global concern. Based on recent published data from the World Health Organization (WHO), the burden of disease has risen with more than 10 million deaths due to cancer worldwide [1]. It is also reported that breast cancer has surpassed lung cancer as the world's leading diagnosed case [2]. Huang et al. 2022 [3] revealed that incidence among Asians was responsible for 169.1 for every 100,000, where breast cancer ranked as the second most common cause of cancer death among Asian women. With the increasing rate of new number cancer cases in Malaysia over the past five years, one in eight women may develop breast cancer before the age of 70 [4]. Given the high number of cases for breast cancer, it justifies the need to provide optimal support to newly diagnosed patients to reduce the burden of cancer.

Based on the Malaysian Clinical Practice Guideline (CPG) for Breast Cancer Management [5], surgery is one of the main lined-up treatments for operable breast cancer. The main breast cancer surgery for optimal recovery is mastectomy. Mastectomy, whether involving partial or total removal of breast tissue, is an invasive procedure. The psychological burden of breast cancer surgery urgently needs to be addressed, as they encompass emotional, cognitive and social challenges during an entire process before, during and after the surgery. A recent meta-analysis by Fortin et al 2024 [6] reported that up to 34% of patients experienced significant anxiety after receiving diagnosis

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and prior to surgery. There was still an ongoing fear of recurrence post-surgery and 20- 50 % breast cancer survivors experienced long-term anxiety symptoms, and they are more prevalent than depression [7, 8].

Depressive symptoms are presented as one of the common psychosocial complaints among cancer patients. Kyranou et al., 2014 [9, 10] reported that preoperative depression and anxiety among patients with breast cancer were 37% and 70% respectively. Incidence of depression in breast cancer patients was high in the early stages after surgery. It was found that 30% of breast cancer patients suffer from significant depressive symptoms throughout the course of the illness [11].

In a local study of 205 patients, the finding reports that the prevalence of depression is 20 % among patients receiving breast cancer treatment [12]. Linden et al. 2012 [13] reported higher rates of depression were among women aged 50 and below for any cancer diagnosis and occurred during disclosure of diagnosis. While the earliest onset of depressive symptoms prominently occurred at the time of the first tumor assessment. Curtis et. al 2014 [14] revealed that patients are at challenging to combat psychological symptoms as they await the histopathological examination (HPE) report to confirm the status of tumor. Past studies found that there was range of emotions experienced by women with breast cancer manifesting as anxiety, sadness, anger, guilt and fear which reflects a grief reaction over the loss of breast or their identity. This in turn will affect their overall quality of life, recovery and cancer outcomes significantly [15].

The complex nature of psychological burden experienced by patients undergoing breast cancer surgery has highlighted the need to integrate psychological interventions alongside physical treatment. Interventions such as cognitive-behavioural therapy (CBT) and other forms of mindfulness-based therapy have been shown to reduce anxiety prior to surgery. CBT helped patients in altering maladaptive or distorted thought patterns reframing their negative thoughts and minimize catastrophic thinking which contributed to the anticipation of surgery and reduce depression through addressing the patterns of negative cognition the patients experience [16]. Getu and Chen 2020 [17] reported that CBT significantly reduces depressive symptoms and enhances emotional well-being among breast cancer patients. Given the crucial time points in cancer trajectories, the study aims to investigate the depressive symptoms seen among newly diagnosed breast cancer patients undergoing mastectomy and to examine the effectiveness of Group Cognitive Behavior therapy (G-CBT) in reducing the level of depressive symptoms at post-surgical mastectomy.

## Materials and Methods

*Study setting*

The study was conducted at Breast and Endocrine (B&E) outpatient clinic of one of the largest hospitals in Klang Valley, Malaysia which serves approximately 800 new breast cancer patients every year. The G-CBT intervention was carried out at one of the health education seminar rooms at the surgical ward in the main building of the hospital.

*Study design*

This was an experimental study designed to compare the effectiveness of G-CBT against a wait-list control group in reducing the level of depressive symptoms in newly diagnosed breast cancer patients who underwent surgical mastectomy. The subjects were randomly allocated into G-CBT and wait-list control groups respectively using simple randomization techniques.

*Target population*

The study population was all newly diagnosed breast cancer patients who were registered at the B&E clinic in the hospital.

*Inclusion and exclusion criteria*

The inclusion criteria were subjects aged between 18 and 65 years old, who were literate and diagnosed with Stage I to III breast cancer and without detectable metastatic disease using mammogram or biopsy results as confirmed by the attending physician. Subjects were planned to undergo mastectomy. Subjects who scored four or more on Distress Thermometer scale and all emotional domains of the scale were also included in the study.

The exclusion criteria were subjects who were pregnant, has a history of earlier breast or axillary surgeries, axillary hematoma, poorly controlled diabetes mellitus and subjects who have history of neurological disorders or being treated for psychiatric illnesses.

*Sample size estimation*

The sample size was estimated using G* Power version 3.1.9.7 and a sample size of 83 was required to detect an effect size of at least 0.5, with 80% power, two-sided p- value of less than 0.05 and 15% attrition rate.

*Development and implementation of intervention*

The G-CBT was developed through a series of reviews by a group of expert panels which included the senior consultant breast surgeon, a psychiatrist, a clinical psychologist, and a public health physician who worked at a cancer unit under the ministry. The underlying theories supporting the intervention were the Gate-control theory [18], model of stress and coping [19] and cognitive behavioural model [20]. The G-CBT has 4 sessions which focus on brief introduction of CBT and its underlying theory, cognitive restructuring, reflective session, and psychoeducation. The duration of each session was 90 minutes, and it was conducted on a weekly basis. The assessment on the outcomes was done at baseline (prior to intervention), immediate post operation (Day 1 -3), 1 month and 3 months' post operation.

*Data collection*

There were 205 subjects screened for study eligibility and only 70 met the inclusion and exclusion criteria and consented for the study. The subjects were randomly allocated into intervention group (n=37) and a wait-list control group (n=33). The subjects were assessed for their depressive symptoms at baseline prior to intervention

using a set of pre-tested and validated questionnaires.

The intervention was implemented prior to surgery. Once the G-CBT was completed, the same outcome measure was evaluated immediately (Day 1-3), 1 month and 3 months' post-surgery. The wait-list group received the usual treatment care as per standard in the hospital. The subjects in the wait-list group were also assessed for the same outcome measure at a similar timeline with the subjects in the intervention group.

*Outcome measures*

The outcome measure was assessed using the 9-item Patient Health Questionnaire (PHQ-9) which identified the presence of depressive symptoms. This questionnaire has been validated in Malay language by Sherina, Arroll and Goodyer-Smith 2012 [21], and has an acceptable internal reliability (Cronbach's alpha =0.70) among women in primary care clinics. Its score ranges from 0 to 27, and cut-off score of nine (9) reflects depression and requires clinical attention.

The questionnaire used in the present study was validated on a sample of breast cancer patients who matched the study selection criteria, and they were recruited from a non-governmental organization in the hospital's breast cancer survivors' group. The internal consistency of the questionnaire was examined and the Cronbach's alpha value for the scale was 0.814. which was considered reliable for the study.

*Ethical consideration*

The study was approved by the Ethics Committee of Universiti Putra Malaysia and the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia. The subjects consented for the study and subjects in the wait-list group were offered intervention after the study completed.

*Data Analysis*

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22. Parametric tests such as Independent t-test, mixed design ANOVA and nonparametric tests (Chi-square) were used to analyze data. The level of significance was set as p value less than 0.05. Multivariate analysis of variance mixed between-within as analytic method was used to determine the effectiveness of the intervention. The effect size or partial eta squared based on Cohen's d guideline informs the magnitude of difference is small (0-0.2), medium (0.5) or large (0.8), which altogether explains the meaningful impact for the effects observed (Pallant, 2016).

## Results

Seventy subjects were recruited in the present study with all subjects in the intervention group completed the intervention (n=37) and all subjects (n=70) completed the PHQ-9 questionnaire at baseline, immediate (Day 1-3), 1 month and 3 months post surgery.

Table 1 shows the distribution of age, ethnicity, cancer stage and scores of depressive symptoms between subjects in the G-CBT and control groups. There was no significant difference between the two groups in their age, ethnicity, stage of cancer and depressive symptoms scores at baseline of the study. Although there was no significant difference in scores of depressive symptoms in both groups, the scores showed their mean was higher than the cut off scores (above 9) which warranting clinical attention prior to surgery.

Table 2 shows the distribution of scores of depressive symptoms between G-CBT and control groups across the four time points. There is significant reduction of scores within the G-CBT groups from baseline to 3 months' post operation and there is also reduction of depressive symptoms scores between G-CBT and control groups at immediate, 1 month and 3 months' post operation.

*Evaluation on the effectiveness of G-CBT on Depressive symptoms*

Table 3 shows the main effect of intervention between and within groups and interaction between time and group of the study. A two-way ANOVA was performed to analyse the effect of time and G-CBT on depressive symptoms. The effect of G-CBT within the group has shown a significant change in scores of depressive symptoms from baseline to immediate, 1 month and 3 months' post intervention for time ($F(2.53, 172) = 199.02$, $p= 0.0001$, partial eta squared = 0.75) with medium effect size. There was notable change in depressive symptoms mean scores across baseline, immediate post-operation on the third day, and post-operation in the first and third-month follow-up

Table 1. Age, Ethnicity and Cancer Stage of Subjects between G-CBT Intervention and Control Groups at Baseline

| Variables | | n (%) or mean (SD) | | |
|---|---|---|---|---|
| | | G-CBT n = 37 | Control n = 33 | p-value |
| Age in years | | 51 (8.0) | 52 (8.8) | 0.402[b] |
| Ethnicity | Malay | 25 (67.6) | 20 (60.6) | 0.672[a] |
| | Chinese | 4 (10.8) | 6 (18.2) | |
| | Indian | 8 (21.6) | 7 (21.2) | |
| Cancer Stage | I | 7 (18.9) | 4 (12.1) | 0.526[a] |
| | II | 21 (56.8) | 23 (69.7) | |
| | III | 9 (24.3) | 6 (18.2) | |
| Scores of depressive symptoms | | 15.73 (2.33) | 16 (3.77) | 0.716[b] |

aChi Square test ($\chi 2$), bIndependent t-test (t), Frequency (n), Standard Deviation (SD)

Table 2. Estimated Marginal Means between Intervention and Control Groups

| Scores of depressive symptoms | mean, SE (95% CI) | |
|---|---|---|
| | G-CBT (n=37) | Control (n=33) |
| Baseline | 15.73 ± 0.51 (14.72-16.74) | 16.00 ± 0.54 (14.93-17.07) |
| Immediate post operation | 4.00 ± 0.50 (2.99 – 5.00) | 13.42 ± 0.53 (12.36 – 14.49) |
| 1-month post operation | 2.84 ± 0.49 (1.86 – 3.81) | 12.06 ± 0.52 (11.03 – 13.09) |
| 3-month post operation | 1.43 ± (0.29 – 2.57) | 10.21 ± 0.60 (9.01 – 11.42) |

between G-CBT and control groups. Also, there was a significant interaction effect between group and time with small effect size (F (2.53, 172) = 50.09, p= 0.0001, partial eta squared= 0.42).

Figure 1 shows the variation in depressive symptoms scores for the three time points from baseline in G-CBT and wait-list groups. There is a sharp decline of depressive symptoms scores in the G-CBT group from baseline to immediate post surgery and the trend reduced steadily following that. It was also shown that the reduction of the mean scores between both groups maintains until the third-month of follow-up.

## Discussion

The present study reported that the presence of depressive symptoms among the newly diagnosed breast cancer patients was found prior to the surgical treatment phase when the scores of depressive symptoms were significantly high at baseline of the study. This occurred during the disclosure of the cancer diagnosis, and they were informed about the investigation report such as the histopathology report (HPE) which confirmed the diagnosis and outlined the recommended treatment plan. The finding concurred with the results of earlier studies which reported elevated levels of depressive symptoms during this critical time [21, 22].

Burgess et al. 2005 [22] found that approximately 50% of newly diagnosed breast cancer patients experiencing clinically significant distress and depressive symptoms peak shortly after diagnosis. The diagnostic phase was reported to be a high-risk period for the onset of depressive symptoms which were driven by heightened emotional vulnerability as patients process the shock of receiving the diagnosis and confront uncertainties about their illness prognosis and treatment outcomes [23]. These findings emphasize the importance of early psychological evaluation and intervention to support the

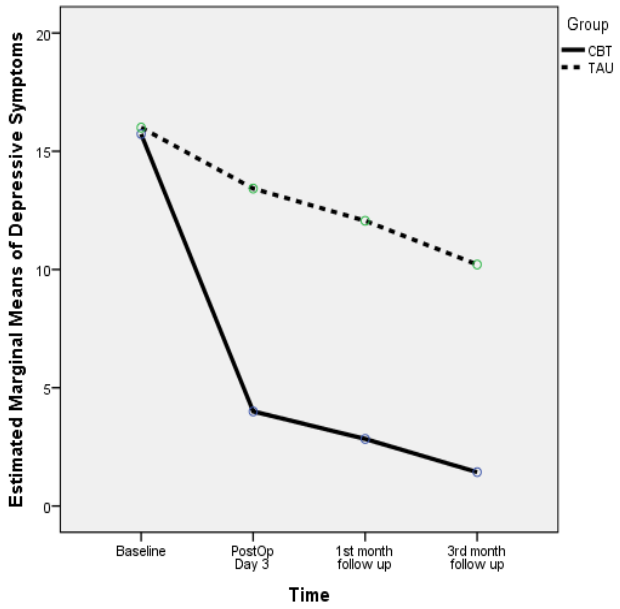


Figure 1. Line-Plot of Estimated Marginal Means on Level of Depressive Symptoms

Table 3. Effect of G-CBT between Intervention and Control Groups

| | Sum of squares | df | Mean square | F | p-value | Partial η2 |
|---|---|---|---|---|---|---|
| Time | 4106.6 | 2.53 | 1623.49 | 199.02 | 0.0001* | 0.75 |
| Group | 3345.2 | 1 | 3345.2 | 174.21 | 0.0001* | 0.72 |
| Group*Time | 1033.51 | 2.53 | 408.59 | 50.09 | 0.0001* | 0.42 |
| Within | 1403.12 | 172 | 8.16 | | | |

emotional well-being of the patients and subsequently help in improving their overall adjustment.

Results from the multivariate analysis reported that there were comparable scores for depressive symptoms between the G-CBT and control groups before the implementation of the G-CBT. This observation is critical as it shows a consistent starting point for evaluating changes in depressive symptoms following the intervention. The findings revealed that the depressive symptoms changed significantly over time after the implementation of G-CBT with a medium effect size. The mean depressive scores for the G-CBT group decreased by 74% compared to a modest 16% reduction in the control group. This substantial improvement underscores the favorable impact of G-CBT in alleviating depressive symptoms among breast cancer patients.

These findings align with results from meta-analysis by Xiao et al. [24] which proved that psychological interventions help patients share their thoughts and emotions leading to reduced psychological distress. However, the past study used individual-based therapy sessions which differ from the group-based approach, specifically in its format. Similarly, Antoni et al. [25] found that group-based CBT showed reductions in psychological distress and physiological markers of stress namely cortisol levels among breast cancer patients. This provides robust evidence on benefits of G-CBT for psychological and physiological components in breast cancer patients and highlights the relationship between immunological health and psychological well-being.

The present study also saw the sustained effects of G-CBT on depressive symptoms through a significant interaction effect of group and time albeit a small effect size. This finding suggests that time plays a role in shaping the overall outcomes of the intervention. Montgomery et al. 2010 [26] similarly reported that higher levels of psychological distress are almost inevitable before surgery, as patients confront the uncertainty and anxiety associated with the procedure and its outcomes. Despite the first distress seen, this study revealed that the decline in mean depressive symptom scores persisted until the third month post-mastectomy. This sustained improvement shows that the G-CBT intervention may have adequately addressed patients' psychological needs by helping them redirect negative emotions toward more constructive and engaging activities. The enduring effects at follow-up highlight the potential for G-CBT to provide long-term psychological benefits.

To date, no comparable local studies specifically examining depressive symptoms in breast cancer patients have been found. However, a related local study by Cardosa et al. [27] evaluated a customized CBT intervention incorporating pain management for non-cancer chronic pain patients. This study showed significant improvements in both pain and depressive symptoms. These results support the idea that tailored CBT interventions targeting specific patient needs whether psychological distress or physical pain can yield positive outcomes. The findings from the present study, combined with evidence from related research, underscore the potential of CBT interventions to help breast cancer patients. By addressing both emotional and behavioral dimensions, such interventions can enhance patients' coping mechanisms during a highly stressful phase of their treatment journey.

*Conclusion and Future Directions*

The persistence effect of G-CBT until the third-month follow-up reflects its effectiveness in managing depressive symptoms in newly diagnosed breast cancer patients. Future research may explore long-term sustainability of these benefits beyond three months and integrate culturally adapted CBT programs in local contexts. Comparative studies of group-based and individual CBT approaches in managing both cancer-related and non-cancer psychological distress can also be examined.

In conclusion, the study findings highlight the necessity of incorporating structured psychological interventions like G-CBT into standard care for breast cancer patients to ensure comprehensive treatment and support.

## Author Contribution Statement

Conceptualization: Nur Haidzat Abd Wahid, Zubaidah Jamil Osman, Normala Ibrahim, David J. de L. Horne, Siti Irma Fadhilah, Nor Aina Emran. Data Collection: Nur Haidzat Abd Wahid. Methodology: Nur Haidzat Abd Wahid, Zubaidah Jamil Osman, Normala Ibrahim, David J. de L. Horne, Nor Aina Emran. Administrative Tasks on Hospital: Nur Haidzat Abd Wahid, Nor Aina Emran. Supervision: Normala Ibrahim, Zubaidah Jamil Osman, David J. de L. Horne.

## Acknowledgements

*General*

The authors would like to acknowledge the contributions of surgeons, matrons, nurses, administrative staff of HKL staff including enumerators, as well as all willing patients and family members for their time, cooperation and support throughout the study.

*Funding Statement*

This research is funded by the Postgraduate Grant Initiative from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

*Ethical Declaration*

The ethics approval for this study was obtained from Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia.

*Conflict of Interest*

The author(s) declare that they have no conflict of interest.

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