

THERAPEUTIC OUTCOMES OF COGNITIVE BEHAVIORAL THERAPY-1 FOR INSOMNIA AMONG WOMEN WITH BREAST CANCER: AN INTERVENTIONAL STUDY IN PUNJAB, PAKISTAN

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ABSTRACT

Background: Cancer patients experience insomnia as a widespread issue that negatively impacts their quality of life. Both disease-related factors and treatment-related factors serve as triggers for insomnia symptoms. Research shows that cancer patients who experience persistent sleep disturbances develop worse health-related quality of life through negative impacts on their physical and psychological health. **Objective:** The research aims to assess insomnia severity among breast cancer patients while evaluating Cognitive Behavioral Therapy-I (CBT-I) as an insomnia treatment approach for this specific group.

Methodology: The research took place at the Oncology Department of Mayo Hospital in Lahore through a quasi-experimental study design. The research included breast cancer patients who were selected through purposive sampling to participate as $n = 52$ participants. The validated 7-item questionnaire was used to collect data from participants individually during their time in the oncology department between January 2025 and July 2025. The researchers used SPSS version 26 to analyze data that they entered into the system.

Results: The research data showed that most participants fell within the 41–50 years age range (51.9%) and were female (98.1%) and married (92.3%). The study showed that 34.6% of participants had primary education and 38.5% had completed matriculation. The intervention led to a significant reduction in mean rank insomnia scores from 87.12 before treatment to 33.88 after treatment. The post-intervention insomnia scores showed a statistically significant difference from the pre-intervention scores ($p < 0.05$), indicating that CBT-I was effective.

Conclusion: The research demonstrates that Cognitive Behavioral Therapy-I (CBT-I) proves effective in treating insomnia among breast cancer patients.

Keywords: Cognitive Behavioral Therapy-I, Insomnia, Breast Cancer.

INTRODUCTION

Breast cancer patients experience insomnia at rates much higher than those found in the general population. According to Aricò et al. (2016) and Peoples et al. (2017), the combination of sleep disturbances with

psychological distress and reduced quality of life affects breast cancer patients. CBT-I stands as the primary non-pharmacological treatment for chronic insomnia because it targets the

behavioral and cognitive factors that maintain poor sleep patterns (Nissen et al., 2024).

The growing body of research about breast cancer survivors demonstrates that CBT-I effectively treats insomnia while delivering positive effects on total health outcomes. Research studies indicate CBT-I leads to better sleep efficiency and shorter sleep onset latency and reduced wake time after sleep onset for this population (Ma, 2020). The research shows that CBT-I produces long-lasting benefits which extend to 12 months following treatment in terms of sleep quality and mood and fatigue and quality of life aspects (Squires, 2022). The results of randomized trials indicate CBT-I has positive effects on immunological functions by boosting interferon- γ secretion and improving lymphocyte profiles, which suggests its potential to provide systemic advantages above sleep improvement (Aricò et al., 2016).

The direct insomnia treatment provided by CBT-I creates beneficial effects on multiple symptoms that frequently affect breast cancer patients. The implementation of CBT-I has proven effective in reducing cancer-related fatigue (CRF) and anxiety and depression and perceived cognitive impairment through its treatment of common physiological and behavioral pathways (Greeley et al., 2025; NeurologyLive, 2025). Research shows that internet-based and eHealth versions of CBT-I work effectively to enhance sleep quality for breast cancer survivors while maintaining high levels of acceptance (Oswald et al., 2022; Clara et al., 2025). The intervention of CBT-I functions as a strong insomnia treatment while building complete recovery and resilience in breast cancer patients who face psychosocial challenges.

1. Research Methodology

2.1 Study Design

The quasi-experimental one-group pretest-posttest design served to study the impact of Cognitive Behavioral Therapy-I (CBT-I) on insomnia in women with breast cancer.

2.2 Study Variables

- The treatment group received Cognitive Behavioral Therapy-I (CBT-I) as an independent variable to combat insomnia.
- The Insomnia Severity Index (ISI) measured the insomnia severity of breast cancer patients at both pre-intervention and post-intervention stages.

2.3 Operational Definition

The study defines insomnia as the repeated difficulty in starting sleep, staying asleep and waking up too early that occurs at least three times a week for a period of three months. The Insomnia Severity Index (ISI) evaluated insomnia severity by assessing seven items. The following cut-off scores were applied:

0 to 7: No clinically significant insomnia

8 to 14: Subthreshold insomnia

15 to 21: The moderate severity of clinical insomnia

22–28: Clinical insomnia (severe)

2.4 Study Setting

The research was conducted at Mayo Hospital, Lahore in the Oncology Department which operates as a tertiary care facility. The oncology unit at Mayo Hospital provides specialized cancer care to patients including those with breast cancer.

2.4 Study Population

The research subjects were diagnosed breast cancer patients undergoing treatment at the Oncology Department at Mayo Hospital in Lahore.

2.5 Sample Size

The researcher selected 52 participants after conducting an assessment of inclusion and exclusion criteria. The researchers used purposive sampling to determine the sample size because it provided both operational feasibility and statistical reliability.

Inclusion Criteria

- The study included women with breast cancer who received their diagnosis at Mayo Hospital in Lahore
- Stage I and II breast cancer
- The study participants were women who were 18 years or older.
- Breast cancer patients who experienced insomnia because of their cancer condition
- The participants were willing to join the research after signing an informed consent form.

Exclusion Criteria

- Serious or critical condition patients
- Patients with psychiatric comorbidities
- The participants were patients who had already received insomnia management sessions.
- Participants scoring ≤ 7 on ISI at baseline
- The subjects who did not provide consent for the study
- Patients with Stage III breast cancer

2.6 Data Collection Tool

Two instruments were used:

Tool I: The socio-demographic profile sheet obtained background information from participants (age, marital status, education, etc.).

Tool II: The Insomnia Severity Index (ISI) with 7 items was translated into Urdu for better understanding of participants to assess insomnia severity both pre- and post-intervention.

2.7 Data Collection Procedure

The research team conducted participant selection through purposive sampling after participants provided written informed consent. The research followed all confidentiality standards throughout the entire study period. The ISI questionnaire was given to participants as a self-report instrument before the intervention (pre-test) and after the completion of CBT-I sessions (post-test) to assess the effect of the intervention.

2.8 Data Analysis

The data entry and analysis used SPSS version 26. The analysis used descriptive statistics to show socio-demographic and baseline characteristics through frequencies and percentages as well as tables and graphs. The analysis of pre- and post-intervention insomnia severity scores utilized the Mann-Whitney U test. The statistical analysis set the significance level at $p\text{-value} \leq 0.005$.

2. Results

Table 1: Demographic Characteristics of the Participants (n = 52)

Demographic Characteristics	Frequency	Percentage
Age of Participants		
41–50 years	27	51.9%
51–60 years	24	46.1%
61–70 years	1	2.0%
Marital Status		
Unmarried	3	5.8%
Married	49	94.2%
Mother's Education Level		
Illiterate	9	17.3%
Primary	19	36.5%
Matric	20	38.5%
Intermediate	5	7.7%

The survey revealed that 51.9% of participants belonged to the 41–50 years age group followed by 46.1% in the 51–60 years age group while 2.0% were in the 61–70 years age group. The majority of the respondents were married (94.2%), while a

small proportion was unmarried (5.8%). The educational level of mothers was as follows: 38.5% had matric education, 36.5% had primary education, 17.3% were illiterate, and 7.7% had intermediate education.

Table 2: Insomnia Severity Index Levels Pre- and Post-Intervention (n = 52)

Insomnia Severity Index Level	Pre n (%)	Post n (%)
No clinically significant insomnia	0 (0%)	15 (28.8%)
Subthreshold insomnia	3 (5.8%)	28 (53.8%)
Clinical insomnia (moderate)	36 (69.2%)	9 (17.4%)
Clinical insomnia (severe)	13 (25.0%)	0 (0%)

The results show a marked improvement in insomnia severity after CBT-I. Before the intervention, most participants had moderate insomnia (69.2%) or severe insomnia (25.0%), with very few reporting subthreshold insomnia (5.8%) and none in the no-insomnia category. After the intervention, a majority shifted to

subthreshold insomnia (53.8%) and no clinically significant insomnia (28.8%), while only 17.4% remained in the moderate category and none in the severe category. This indicates a substantial reduction in insomnia severity following CBT-I.

Table 3: Tests of Normality

Variable	Kolmogorov–Smirnov			Shapiro–Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-intervention insomnia	0.176	52	0.001	0.892	52	0.001
Post-intervention insomnia	0.264	52	0.000	0.781	52	0.000

The Kolmogorov–Smirnov and Shapiro–Wilk tests produced $p < 0.05$ results for both pre- and post-intervention insomnia scores which indicated that the data failed to meet normal distribution requirements. The non-parametric Wilcoxon

Signed Rank Test became the appropriate statistical method for further analysis because the data failed to meet normal distribution requirements.

Table 4. Comparison of Pre- and Post-Intervention Insomnia Scores (Wilcoxon Signed Rank Test)

Variable	Mean Ranks (Pre)	Mean Ranks (Post)	Z-value	p-value
Insomnia	35.80	17.20	-6.42	0.000

The Wilcoxon Signed Rank Test evaluated insomnia scores before and after the intervention.

- The mean rank of insomnia severity scores was 35.80 before intervention, indicating higher levels of insomnia symptoms among participants at baseline.
- The intervention (CBT-I) resulted in a significant reduction of insomnia severity as the mean rank decreased to 17.20. The majority of participants experienced better sleep initiation and maintenance and enhanced overall sleep quality.
- The test statistic generated a Z-value of -6.42 which exceeded the critical value

range to confirm the significant difference between pre- and post-scores.

- The p-value (0.000) demonstrates a highly significant effect ($p < 0.001$), strongly supporting the conclusion that the intervention was effective in reducing insomnia severity.

The results indicate that Cognitive Behavioral Therapy for Insomnia (CBT-I) had a substantial impact. Most participants had moderate or severe insomnia before the intervention but moved to subthreshold or no clinically significant insomnia after receiving the therapy.

The intervention proved effective in reducing insomnia symptoms among study participants because all statistical tests showed consistent results including mean rank changes and a significant Z-value and an extremely low p-value.

3. Discussion

The study results showed that CBT-I effectively reduced moderate and severe insomnia symptoms because participants decreased from 94.2% to 17.4% after the intervention while the mean rank scores demonstrated significant changes ($Z = -6.42$, $p < .001$). The controlled trial by Edinger et al. (2001) demonstrated that CBT-I produced superior results than placebo when treating chronic primary insomnia patients through multiple sleep outcome assessments.

The meta-analysis conducted by Van der Zweerde et al. (2019) demonstrated that CBT-I produced meaningful clinical results which persisted for at least one year following treatment. The smartphone-based Chinese adaptation of CBT-I led to significant ISI score reductions according to Zhang et al. (2023) when compared to sleep education.

The large-scale RCT conducted by Veda et al. (2020) demonstrated that digital CBT-I produced better results than control conditions by showing significant improvements in ISI scores. The research evidence supports CBT-I effectiveness regardless of delivery method because this study demonstrated both significant mean rank reductions and categorical changes.

4. Conclusion

The research showed that CBT-I produced outstanding results by reducing insomnia severity which led most participants to move from moderate and severe insomnia to subthreshold or no clinically significant insomnia. The adoption of CBT-I as a first-line non-pharmacological insomnia treatment should become standard practice in clinical settings to enhance patients' long-term sleep health.

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