Body Image Issues and Cognitive Dysfunction in Breast Cancer Survivors

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ABSTRACT

This study examined the relationship between body image issues and cognitive dysfunction in a sample of 35 female breast cancer survivors, aged 25 to 40 years. Body image was assessed using the Body Image Scale (BIS), and cognitive function was evaluated using the Montreal Cognitive Assessment (MoCA). Pearson product-moment correlation analysis revealed a statistically non-significant and weak negative association ($r = -0.14$, $p = .411$) between body image satisfaction and cognitive function. These results indicate that, within this sample, there was no statistically significant linear relationship between overall body image satisfaction and global cognitive function. Further research, employing larger and more heterogeneous samples and utilizing more specific assessment instruments, is warranted to enhance our understanding of the complex interplay between psychological and cognitive well-being in breast cancer survivors.

Keywords: Breast Cancer Survivors, Body Image Issues, Cognitive Dysfunction, Cancer-Related Cognitive Impairment (CRCI), Chemobrain, Quality of Life.

INTRODUCTION

"Breast cancer stands as the most frequently diagnosed malignancy among women and ranks as the second most prevalent cancer globally, surpassed only by skin cancer. Projections for India in 2022 estimated 216,108 new cases, constituting 28.2% of all female cancers within the nation (Sathishkumar et al., 2024). Advances in early detection methodologies and therapeutic interventions have significantly improved long-term survival rates for individuals diagnosed with this disease. Nevertheless, breast cancer survivors frequently encounter persistent physical, psychological, and cognitive sequelae that can compromise their overall quality of life, despite these advancements in medical care. Among these challenges, cognitive dysfunction, often termed cancer-related cognitive impairment (CRCI) or colloquially known as 'chemobrain,' represents a particularly concerning yet relatively understudied phenomenon in breast cancer survivors. This condition manifests as deficits

in executive functions, memory, attentional processes, and processing speed, potentially impacting daily activities, interpersonal relationships, and vocational engagement. Survivors experiencing CRCI may encounter difficulties in returning to employment, maintaining social connections, or participating in cognitively demanding tasks."

Body image concerns in breast cancer survivors frequently arise as a consequence of alterations in physical appearance resulting from surgical procedures, chemotherapy regimens, radiation therapy, and other treatment modalities. These changes—encompassing phenomena such as alopecia, cicatrization, mastectomy, and fluctuations in body weight—can precipitate negative self-perceptions, diminished self-esteem, and social withdrawal behaviors. Body image dissatisfaction has been empirically linked to elevated levels of psychological distress, including anxiety and depressive symptoms, and can significantly influence survivors' psychosocial adjustment in the post-treatment phase.

Concurrently, a substantial proportion of breast cancer survivors report experiencing cognitive dysfunction, characterized by impairments in memory, attention, processing speed, and executive functioning. These cognitive deficits can persist for months or even years following the completion of active treatment, thereby interfering with routine daily activities, occupational performance, and social interactions. While the precise biological mechanisms underlying cancer-related cognitive impairment remain to be fully elucidated, psychological factors such as heightened stress levels and mood disturbances are hypothesized to contribute to its manifestation.

Although body image concerns and cognitive dysfunction have been independently subjected to considerable scholarly investigation, there exists a relative paucity of research explicitly exploring the potential interrelationship between these two constructs within the context of breast cancer survivors. A comprehensive understanding of the association between body image issues and cognitive dysfunction is of critical importance, as both phenomena can independently contribute to a diminished quality of life and may interact synergistically to exacerbate psychological distress within this population.

The present investigation aims to examine the relationship between body image issues and cognitive dysfunction in breast cancer survivors. “A nuanced understanding of the correlation between body image issues and cognitive dysfunction in breast cancer survivors holds significant implications for several key reasons. Firstly, the identification of a relationship between these two factors can enable clinicians to proactively recognize patients who may be at heightened risk for experiencing compounded psychological and cognitive difficulties. For instance, survivors grappling with negative body image perceptions might also exhibit more pronounced cognitive complaints, or conversely,

suggesting a need for integrated assessment protocols and support systems. Secondly, empirical elucidation of this relationship can inform the development of targeted interventions that concurrently address both body image concerns and cognitive challenges, potentially leading to improvements in overall quality of life. Furthermore, recognizing the interplay between these variables may guide healthcare providers in the tailoring of survivors care plans that are sensitive to the complex and multifaceted nature of post-treatment adjustment, ultimately fostering more favorable long-term outcomes for individuals who have survived breast cancer."

“Cognitive dysfunction—frequently denoted as cancer-related cognitive impairment (CRCI)—is reported by a substantial proportion of breast cancer survivors, manifesting as measurable deficits in memory, attention, executive function, and cognitive processing speed (Vearncombe et al., 2009; Janelsins et al., 2017; Jansen et al., 2011). These cognitive impairments can persist considerably beyond the cessation of active treatment and may exert adverse effects on daily functioning, occupational engagement, and social interactions. Concurrently, body image dissatisfaction emerges as a prominent psychological concern, often stemming from both visible and non-visible physical alterations resulting from mastectomy procedures, chemotherapy-induced alopecia, fluctuations in body weight, and the presence of surgical scars (Manot & Halder, 2020; Turner et al., 2019). This dissatisfaction has been consistently associated with diminished self-esteem, elevated psychological distress, and a compromised quality of life. Moreover, existing literature underscores the influence of various psychosocial variables—such as fatigue, anxiety, and depression—on both cognitive and body image outcomes, suggesting a potential overlap in their underlying etiological pathways (Lange & Joly, 2017). Despite these parallel lines of inquiry, a limited body of research has specifically investigated whether and to what extent body image concerns may be associated with either subjective reports or objective measures of cognitive impairment in breast cancer survivors. Therefore, the present study is designed to rigorously examine the relationship between body image issues and cognitive dysfunction within this population, with the overarching objective of informing the development of more comprehensive and psychologically integrative models of survivorship care."

METHODOLOGY

AIM: To investigate the relationship between cognitive dysfunction and body image issues among breast cancer survivors.

RESEARCH OBJECTIVE: To examine the association between cognitive dysfunction and body image dissatisfaction in breast cancer survivors.

HYPOTHESIS: There will be a significant correlation between cognitive dysfunction and body image issues in breast cancer survivors.

SAMPLE

A sample of 35 female breast cancer survivors, ages 25 to 40, were included in the current study. Purposive sampling was used to find participants, specifically through online and offline support groups for breast cancer. No formal clinical settings, including hospitals, cancer units, or community healthcare facilities, were used for recruiting.

RESEARCH DESIGN

The study employed a cross-sectional correlational design to investigate the association between body image issues and cognitive function. Data on both variables were collected concurrently from the sample of breast cancer survivors, and the relationship was analyzed using correlational statistics. The cross-sectional nature indicates data collection at a single time point, while the correlational approach aimed to determine the degree to which the two variables were related.

INSTRUMENTS

- Body Image Scale (BIS)

  A self-report tool consisting of 10 items, the Body Image Scale (BIS) was created to evaluate body image issues in cancer patients. A 4-point Likert scale is used to rate each item, with 0 denoting "not at all" and 3 denoting "very lot." The items cover avoidance behaviors brought on by perceived physical changes, feelings of self-consciousness, dissatisfaction with appearance, and discomfort with physical contact.

  The scoring process is simple: replies to all ten items are added up to determine the final score. Greater body image disturbance and appearance-related distress are indicated by higher total scores, which range from 0 to 30. The BIS is designed to produce a single overall index of body image issues; it lacks sub-scales.

- Montreal Cognitive Assessment (MoCA)

  The Montreal Cognitive Assessment (MoCA) is a quick, standardised screening test

designed to identify moderate cognitive impairment (MCI) in a variety of clinical settings. The test has 30 points overall, and it usually takes 10 to 15 minutes to give. Trail-making, naming, digit span, word recall, abstraction, and orientation questions are just a few of the activities that make up the tasks, which offer a thorough picture of a person's cognitive profile.

A cumulative score of 30 is the highest possible. Scores below this cutoff point may indicate cognitive impairment, whereas scores of 26 or higher are regarded as normal. One point is added for those with 12 years of education or less to allow for educational diversity, guaranteeing a more equitable interpretation across a range of demographics.

ANALYTICAL APPROACH

The relationship between body image satisfaction, as indexed by the Body Image Scale (BIS), and global cognitive function, as assessed by the Montreal Cognitive Assessment (MoCA), was examined using the Pearson product-moment correlation coefficient. The statistical significance of the observed correlation was determined by a two-tailed probability value (p), with the threshold for significance set at an alpha level of 0.05 (α=0.05). Descriptive statistics, specifically means and standard deviations, were computed for both variables to characterize the study sample.

PROCEDURE

Data was collected via semi-structured interviews to provide a consistent yet flexible approach to exploring participants' experiences. Interviews were conducted either in person, within calm and private settings to ensure comfort and anonymity, or virtually via Google Meet, based on participant accessibility and convenience. Each interview lasted between 30 and 45 minutes. Prior to participation, all individuals received a comprehensive explanation of the study's aims and procedures and provided informed consent, with assurances of their right to withdraw without consequence. With participant permission, interviews were audio-recorded and transcribed verbatim for subsequent analysis. The interview protocol employed open-ended questions to examine two primary areas: perceived cognitive challenges following breast cancer, and body image concerns. A non-judgmental and empathetic interviewing technique was utilized to facilitate candid responses and minimize participant discomfort.

RESULT

Table No.1 Pearson Correlation Between Body Image Satisfaction and Cognitive Function (N = 35)

VARIABLE	N	M	SD	BIS	MOCA
BIS	35	17.65	9.61	—	—
MOCA	35	20.40	5.65	-0.14	—

Note. BIS = Body Image Scale; MOCA = Montreal Cognitive Assessment.
Correlation is not statistically significant, p = .411 (2-tailed).

The present analysis directly addresses the hypothesis positing a significant correlation between cognitive dysfunction and body image issues in a sample of 35 breast cancer survivors. Cognitive function was operationalised using the Montreal Cognitive Assessment (MOCA), a widely utilized screening instrument for mild cognitive impairment. Body image issues, in this context, were inversely represented by scores on the Body Image Scale (BIS), where higher scores indicate greater body image satisfaction, thus lower perceived body image issues. Pearson product-moment correlation analysis was employed to ascertain the linear association between these two continuous variables.

"The BIS and MOCA scores had a computed Pearson correlation coefficient (r) of -0.14". Within the study sample, this coefficient represents the direction and intensity of the linear relationship between the two assessed components. Higher body image satisfaction is linked to somewhat lower cognitive assessment scores, and vice versa, according to the negative sign, which indicates a small inverse tendency. On the other hand, the correlation's absolute magnitude (r = 0.14), which is usually suggestive of a very weak linear link, falls within this range. This number indicates a very little amount of linear covariation between body image satisfaction and cognitive function, in accordance with accepted standards for assessing correlation coefficients.

Furthermore, the statistical significance of this observed correlation was evaluated by examining the associated p-value, which was reported as p=.411 (two-tailed). The p-value represents the probability of obtaining a correlation coefficient as extreme as −0.14 (or more extreme) under the null hypothesis of no true linear relationship between body image satisfaction and cognitive function in the broader population from which this sample was drawn.

In the context of conventional alpha levels (α) used to determine statistical significance (typically set at 0.05 or 0.01), the obtained p-value of 0.411 substantially exceeds these thresholds (0.411>0.05 and 0.411>0.01). This outcome indicates that the observed weak negative correlation is not statistically significant. Consequently, we fail to reject the null hypothesis of no linear

relationship between body image satisfaction and cognitive function in this specific sample of breast cancer survivors. The observed association is likely attributable to random sampling variability and does not provide compelling evidence for a systematic linear relationship between these constructs in this population.

Based on the statistical analysis of the data presented in Table 1, the hypothesis asserting a significant correlation between cognitive dysfunction and body image issues in breast cancer survivors is not supported within this study sample. The Pearson correlation coefficient between Body Image Satisfaction (as an inverse indicator of body image issues) and cognitive function (as measured by the MOCA) demonstrates a very weak linear association that fails to reach statistical significance. Therefore, we cannot conclude, based on this data, that there is a reliable linear relationship between these two constructs in this group of breast cancer survivors.

It is important to acknowledge the limitations of this study, including the relatively small sample size (N = 35), which may have limited the statistical power to detect small to moderate correlations if they truly exist. Additionally, the use of a global cognitive screening tool and a single measure of body image satisfaction might not capture the full complexity of these constructs and their potential interrelationships. Future research employing larger, more diverse samples and more comprehensive assessment batteries may be warranted to further explore the nuanced relationships between specific aspects of cognitive function and various dimensions of body image in breast cancer survivors.

DISCUSSION

The present study aimed to investigate the relationship between body image issues and cognitive dysfunction in a sample of 35 female breast cancer survivors aged 25 to 40. Contrary to our initial hypothesis, the Pearson correlation analysis revealed a statistically non-significant and very weak negative correlation ($r = -0.14$, $p = .411$) between body image satisfaction (as inversely measured by the BIS) and overall cognitive function (as assessed by the MOCA). **This key result indicates that within this specific sample, no statistically reliable linear association was found between how satisfied survivors were with their body image and their performance on a general cognitive screening test.** Consequently, the hypothesis positing a significant correlation between these two variables was not supported by the data.

This null finding diverges from theoretical perspectives suggesting a potential interplay between psychological distress, such as that stemming from negative body image, and cognitive functioning (Lange & Joly, 2017). It was anticipated that greater body image dissatisfaction, often a consequence of the physical sequelae of breast cancer treatment might be associated with poorer cognitive performance, potentially through shared pathways involving stress, anxiety, and altered

neuroendocrine function. **However, the statistical outcome of this study did not demonstrate such a direct linear relationship within this particular group of survivors.**

Several factors may account for the observed lack of a statistically significant correlation. Firstly, the relatively small sample size (N = 35) inherently limits the statistical power of the analysis to detect small to moderate effect sizes. It is plausible that a larger study with a more diverse sample might reveal a subtle but meaningful relationship that was not discernible in the current investigation. Secondly, the use of the Montreal Cognitive Assessment (MoCA) as a global screening tool, while efficient for detecting mild cognitive impairment, may not have been sensitive enough to capture specific cognitive deficits that might be more closely linked to body image concerns. Future research could benefit from employing more targeted neuropsychological assessments that evaluate distinct cognitive domains, such as executive function, memory, and processing speed, in greater detail.

It is also important to consider the characteristics of the study sample. The participants were relatively young breast cancer survivors (age 25-40) recruited through support groups. This specific demographic might exhibit different patterns of cognitive and body image adjustment compared to older survivors or those recruited through clinical settings. Their potentially higher levels of social support and engagement with survivors communities could have influenced both their psychological well-being and cognitive reserve.

The findings of this study should be interpreted within the context of its limitations. The reliance on purposive sampling may limit the generalizability of the results to the broader population of breast cancer survivors. Additionally, the cross-sectional design precludes the establishment of any causal inferences between body image issues and cognitive function. Longitudinal studies are needed to explore the temporal dynamics of these constructs and to determine whether changes in one predict changes in the other over time.

This study contributes to the ongoing dialogue by highlighting that the relationship between these two critical aspects of survivors may be more complex or indirect than initially hypothesized, at least within this specific demographic and using the chosen assessment tools.

Further, future research should consider employing larger and more heterogeneous samples, utilising comprehensive neuropsychological batteries and multidimensional measures of body image, and adopting longitudinal designs. Qualitative investigations could also provide valuable insights into the lived experiences of survivors and the potential subjective links between their body image perceptions and cognitive challenges. Ultimately, a more nuanced understanding of these relationships is crucial for developing targeted and integrated interventions aimed at optimising the long-term quality of life for individuals navigating the complexities of survivors.

CONCLUSION

In conclusion, this study investigated the relationship between body image issues and cognitive dysfunction in a sample of 35 female breast cancer survivors. The statistical analysis did not yield a significant linear correlation between overall body image satisfaction and cognitive function as measured by the chosen instruments. While this finding does not support the initial hypothesis of a direct association within this specific cohort, it underscores the potential complexity of the interplay between psychological and cognitive well-being in survivors. The study's limitations, including the modest sample size and the use of broad assessment tools, warrant consideration when interpreting these results.

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