

Perceived Attentional Function and Related Factors in Women Following Breast Cancer Surgery

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Abstract

Background: This study examined perceived cognitive function in patients with breast cancer and determined the main predictors of changes in cognitive function following treatment.

Methods: The analytical cross-sectional study was performed in this study. 96 women receiving adjuvant treatment after surgery and who had already received adjuvant treatment were included in the study. The convenience sample was selected from the list of patients in Cancer Registry Center, private clinics and the Oncology Ward of Imam Khomeini Hospital in Ardabil, Iran. We used the Attentional Function Index to measure perceived cognitive function. SPSS version 16.0 was used to analyze the data. We used the t-test and analysis of variance to compare the differences in the Attentional Function Index scores to demographic and medical characteristics.

Results: The mean Attentional Function Index score was 59.53 ± 1.69 . There was a statistically significant difference between the scores in terms of current non-surgical treatment ($P < 0.000$). Regarding the time elapsed after disease diagnosis, the difference between the Attentional Function Index scores was statistically significant ($P < 0.00$).

Conclusion: Chemotherapy and hormone therapy can act as risk factors for cognitive impairment in patients with breast cancer.

Keywords: Breast cancer, Attentional Function Index, Cognitive impairment, Perceived cognitive function

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Introduction

Cancer, as the third cause of mortality after cardio-vascular diseases and accidents, is widespread among Iranian women.^{1,2} Breast cancer as a social problem is

increasing in all countries. After lung cancer, it is the most common cause of cancer-related deaths. The prevalence rate of breast cancer in global studies has been reported to be 12.5%. This statistical data suggests

that one out of 8 women is at risk of having breast cancer in her lifetime.³ Of all cancers related to women in Iran, 25% are breast cancer cases, with women affected one decade earlier than other women worldwide.⁴ Breast cancer can be a fatal disease that affects patients mentally and psychologically. Therefore, breast cancer and its treatment considerably affect patients' mental and social health, as well as quality of life.⁵

Cognitive impairment occurs in 16%-75% of cancer cases, affecting attention, concentration, and memory.^{6,7} The changes in cognitive function also impact quality of life in patients.^{8,9} Although the cause of cognitive impairment in patients with cancer is unclear, it seems that the use of anticancer and neurodegenerative drugs cause varying degrees of cognitive impairment.¹⁰ In addition, anti-estrogen therapies that use tamoxifen trigger changes in cognitive function.¹¹ Therefore, treatment of this disease affects the cognitive ability of patients.^{12,13}

Among the components of cognitive function, attention is an essential factor for the efficiency of cognitive function. Therefore, understanding the problems related to attention is an important step in treating patients with cancer.¹⁴

This study examined perceived cognitive function in patients with breast cancer and determined the main predictors of changes in cognitive function following treatment. The study findings might be employed to design intervention programs to prevent or minimize these disorders.

Materials and Methods

This analytical cross-sectional study was performed on 96 women receiving adjuvant treatment after surgery and who had already received adjuvant treatment. Each patient had a pathologically confirmed diagnosis of cancer.

The statistical population comprised patients with breast cancer. Exclusion criteria were metastatic disease or relapse, approved prior neurological or psychological disorders, the use of drugs that affect cognitive function, and addiction to drugs or alcohol. We selected the study patients from the Cancer Registry in Ardabil,

Iran, private clinics and the Oncology Ward of Imam Khomeini Hospital in Ardabil.

In this study, the Attentional Function Index (AFI) was used to measure perceived cognitive function.^{15,16} The AFI consists of 16, 100 mm visual analogue scales (VASs) that range from 0 (not at all) to 100 (extremely well). Individuals self-rate how well they are able to perform cognitive activities such as planning daily activities, getting started on tasks, keeping a train of thought, remembering to do important things, and attention to details. Participants were asked to place a mark through the horizontal line at whatever point best described how well they were functioning at that time.

The validity and reliability of the technique have been established in healthy and unhealthy populations.^{15,16} Cronbach's alpha for the questionnaire was estimated at 74% in this study.

We used the following formula to calculate sample size for this study:

$$n = (Z_{1-\sigma/2})^2 (\sigma)^2 / d^2$$

Previous literature used to estimate variance, which was 5 for the calculated sample size in this study. A maximum error of 1 was accepted in this study with a probability of 95%. We chose α value of 5% (0.05). Due to the lack of detailed data recording on patients with breast cancer and the obstacles to patient access, we performed non-random sampling.

Initially, we extracted information related to patients that included personal information and addresses. Next, we met with the patients and discussed the study objectives, method, and questionnaire. Patients signed a consent form to participate. SPSS version 16.0 was used to analyze the data. Descriptive statistics were used to describe demographic and clinical characteristics of the sample. We used the t-test and one way analysis of variance (ANOVA) to compare the differences in AFI scores to demographic and medical characteristics.

Results

Patients had a mean age of 44.7±1 years with an age range of 20-66 years. There were 51

Table 1. Comparison of perceived cognitive function according to demographic and medical characteristics.

	Number (%)	Mean score for cognitive function	P-value
Age group (years)			
<50	79(82.3)	61.32±14.1	0.02
≥50	17(17.7)	51.22±24.9	
Education			
Primary and lower	68(70.8)	54.15±15.1	<0.001
High school and university	28(29.2)	72.6±13.3	
Marital status			
Married	85(88.5)	62.4±15.1	<0.001
Single	7(7.3)	44.2±11.02	
Widow	4(4.2)	25.3±3.05	
Employment status			
Employed	8(8.3)	71.7±19.8	0.03
Housewife	88(91.7)	58.4±16	
Type of surgery			
Breastconservation	29(30.2)	62.25±14.9	0.3
Mastectomy	67(69.8)	58.35±17.5	
Current treatment			
Chemotherapy	70(72.8)	56.3±15	<0.001
Hormone therapy	18(18.8)	43.9±20.7	
Radiotherapy	4(4.2)	65.6±11	
Combined	4(4.2)	65.38±14.8	
Elapsed time after diagnosis			
<6 months	14(14.6)	65.3±13.2	<0.001
6-12 months	45(46.9)	60.4±16.1	
1-3 years	16(16.7)	54.8±16.5	
3-5 years	11(11.5)	43.3±14.5	
>5 years	10(10.4)	72.6±12.9	

(53.1%) who were in the age group of 41-50 years, which represented the majority of patients. A total of 28(29.2%), had high school diplomas and college/university degrees. There were 85 (88.5%) married patients and 8 (8.3%) were employed. The number of patients who had mastectomies was 67 (69.8%). According to the type of nonsurgical treatment received at the time of the study, 72.8% of patients had undergone chemotherapy, 18.3% had hormone therapy, 4.2% received radiotherapy, and 4.2% underwent combined treatment.

The time lapse after diagnosis was 6-12 months in 46.9% of patients (Table 1).

Patients' mean AFI score was 59.53±1.69. We compared mean scores for cognitive function in terms of demographic variables and disease characteristics.

Patients' mean AFI score was 61.32±14.1 for those under 50 years of age and 51.22±24.9 for

patients age 50 and older. There was a statistically significant difference between AFI scores at the age of 50 years and above ($P=0.02$).

The comparison of mean scores revealed that AFI scores were higher in patients with high school diplomas or college/university degrees compared to those with lower levels of education ($P<0.001$). There was no significant difference between AFI scores with respect to the type of surgery ($P=0.3$).

There was a statistically significant difference between AFI scores in terms of current nonsurgical treatment ($P<0.001$). People who underwent radiotherapy had higher scores compared to those who received hormone therapy or chemotherapy.

Regarding the time lapse after disease diagnosis, we observed a statistically significant difference between AFI scores ($P<0.001$).

Discussion

The present study intended to determine perceived cognitive function with regard to attention in patients with breast cancer and identify the factors that predict its change. In this study, the mean AFI score was 61.32 for patients under 50 years of age and 51.22 for those 50 and older.

The results of the present study agreed with findings by Seongmi et al., however they contradict those reported by Chen et al.^{13,17}

The results of this study were similar to a study conducted by Cimprich et al., where the current identified age was a predictor of cognitive impairment in patients with breast cancer. Patients who were older suffered from more severe cognitive disorder.¹⁸

In the present study, patients who had higher educational degrees obtained better scores. These results supported those of Seongmi et al. and Cimprich et al., which suggested that level of education could predict cognitive impairment in patients with breast cancer. Patients with lower levels of education had more serious cognitive disorders.^{17,18}

Previous studies reported significant differences between the scores of patients who had breast conserving surgery and those who underwent radical mastectomy.¹⁷ This finding contrasted the results of the current study, which showed no statistically significant difference between AFI scores in terms of the type of surgery. However, the scores of patients who underwent breast conserving surgery were higher than those who underwent mastectomy.

In terms of the type of treatment following surgery, the results demonstrated that patients who received chemotherapy and hormone therapy had lower AFI scores compared to other patients.

Chemotherapy-related cognitive impairment was the most widely reported source of cognitive deficit in cancer patients, particularly in breast cancer. Recently, physiological evidence showed that chemotherapy seemed to affect cerebral white matter integrity which might reflect mild cognitive impairment.^{17,19}

Paganini et al. found that anti-estrogen drugs

such as tamoxifen could cause cognitive dysfunction.¹¹ Likewise, Phillips et al. showed that tamoxifen use could lead to cognitive impairment in patients.¹⁹

In the current study, AFI scores varied among patients regarding the amount of time elapsed after the cancer diagnosis. In the patients where five years or more had passed after diagnosis, the AFI scores demonstrated a dramatic increase.

Biglia et al. reported a significant decrease in patients' attentional function after 6 months of chemotherapy treatment.²⁰

Considering the decreased attention during the first years following treatment, therapeutic interventions can be an appropriate action to be taken for patients during this period.

Conclusion

The results of the present study indicated that chemotherapy and hormone therapy, increased age, low education level, and short time after diagnosis could affect cognitive function in patients with breast cancer. However, AFI is a self-report tool where it is likely that real problems experienced by patients in their daily lives are not reflected. Hence, it is recommended to conduct additional studies that employ objective tools in the future.

Conflict of Interest

No conflict of interest is declared.

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