



# Impact of Neoadjuvant Chemotherapy on the Post Mastectomy Quality of Life in Bangladeshi Breast Cancer Patients

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## Abstract

**Background:** Mastectomy affects the Quality of Life (QOL) in their life time for various reasons. This Study aimed to evaluate the short term impact of mastectomy on QOL along with some other oncological factors in breast cancer patients and made a comparison between administrations of neoadjuvant chemotherapy with no chemotherapy.

**Methods:** Among the 250 patients six weeks after mastectomy, QOL was measured using the QOL Questionnaire (EORTC QLQ-C30) and QLQ-BR-23 as outpatient basis. For estimation of the oncological factors-age, economic status (monthly income), educational status, occupation and tumour status were taken. Two groups were made one with no neoadjuvant chemotherapy and another with chemotherapy to make a comparison. In the post chemotherapy category, a sub grouping was done in the pre mastectomy and post mastectomy patients to see their status in the oncological subgroup. Scoring done by supplied EORTC authority which was analyzed and statistically tested by student t test to see the performance among different subgroup of patients.

**Results:** Average functional scale score showed patient receiving neoadjuvant chemotherapy have lower scores in fields like Physical Functioning (PF2), Role Functioning (RF2), Emotional Functioning (EF), Cognitive Functioning (CF) and Social Functioning (SF). Among them, only physical functioning showed significant deterioration ( $p < 0.05$ ) in post chemotherapy group. Others didn't have much impact. On the other hand, breast symptoms (BRBS, BRAS and BRBI) showed positive impact on the quality of life  $p < 0.05$  even in post chemotherapy group. There is also deterioration of the score of the quality of life in post chemotherapy group after mastectomy but doesn't have significant impact on all domains.

**Conclusion:** Neoadjuvant chemotherapy does not affect much the QOL during the phases of treatment. Younger and educated people need special attention to complete the treatment and to pass a healthy life in the society.

**Keywords:** Breast cancer; Neoadjuvant Chemotherapy; Quality of life; Mastectomy

## Introduction

Breast cancer is the most common cause of cancer-related deaths among women worldwide as well as in Bangladesh. It accounts for 31% of cancers among women, and 19% of deaths among women [1]. Patients with cancer are exposed to different types of stress and anxiety. The length of survival depends on disease free interval, changes related to the size of tumor and its metastasis, and toxicity of treatment. In addition, the value of cancer treatment is assessed not only on survival but on quality of that survival. The quality of life analysis evaluates the result of treatment from different points of view. This evaluation consists of social, physical, functional and psychological status of health judged by the patient [2].

Neoadjuvant chemotherapy is now a day's well established protocol for the treatment of locally advanced breast cancer. Preoperative therapy allows breast-conserving surgery in many patients and provides prognostic information that could guide the choice of treatments to maximize the

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degree of response [3].

Neoadjuvant therapy implies the initiation of systemic therapy before definitive local-regional management. It is also referred to as primary systemic therapy or preoperative chemotherapy. Although historically reserved for patients with inoperable disease, contemporary management of breast cancer involves a neoadjuvant approach for patients with inflammatory breast cancer, locally advanced cancer and in selected patients with early-stage, operable breast cancer [4].

Primary breast cancer treatments are complex including surgery, chemotherapy, hormone therapy, radiation therapy, and reconstructive surgery, often extending more than a year after diagnosis. Research on treatment effects on Quality of Life (QOL) has focused on the time primarily describing the immediate impact of surgery [5] and chemotherapy on women's lives. Other studies have examined the effects of various treatments on breast cancer survivors many years after diagnosis and initial treatment. Cross-sectional studies of long-term breast cancer survivors have suggested that adjuvant chemotherapy is associated with poorer physical functioning and overall QOL. On the basis of cross-sectional data from breast cancer survivors several years beyond this time period, it was hypothesized that patients with exposure to chemotherapy would experience worse physical functioning with slower recovery than women without chemotherapy and would have more severe symptoms [6].

Several studies have documented the significant disruptions in the patient's Quality of Life (QOL) during the initial phases of the breast cancer diagnosis and its subsequent treatment. Patients undergoing a mastectomy have been observed to experience significant QOL changes at various levels: physical, functional, emotional domains of QOL and well-being. Studies have also identified the relationship between mastectomy and poor sexual adjustment and body image [7]. Strong evidence shows that HRQOL changes occur mainly during the first year following breast cancer surgery or chemotherapy [8].

### Factors affecting QOL

The objective quality of life measures are built on the basis of hard variables, i.e., the data from the municipal or governmental institutions, the population physical, psychic, and moral health, educational level and proficiency. The material welfare is determined by the standards of living, income differentiation, housing, telecommunication, trade, education, culture, health system, mass media capacities.

Research in the past decade mainly focused on possible demographic and clinical factors affecting QOL in breast cancer patients. Investigation of QOL in oncological subgroups is important for drawing conclusions about operation or therapy modalities. Most studies investigated single parameters, such as primary surgical treatment and modality or age [9], whereas other factors, such as tumour stage and other sociodemographic factors were often neglected. There is a lack of studies investigating the impact of several oncological factors on long term QOL within the same clinical trial [10]. Also, the impact of these factors on QOL is controversial. Again a study on the effect of neoadjuvant chemotherapy is also very limited in the world literature.

This study will cover influence of neoadjuvant chemotherapy and make a comparison with non chemotherapy group as well as effects of other oncological subgroups like age, income, education, occupation

and tumour profile on the QOL after mastectomy.

The aim of the present study was to evaluate QOL parameters in post mastectomy patients suffering from breast cancer and to assess the potential differences between patients receiving chemotherapy with no chemotherapy as neoadjuvant protocol. We also tried to find the comparison of the QOL status of the post neoadjuvant therapy patients before and after mastectomy. Influences by some other oncological factors on the QOL were also evaluated.

### Patient and Methods

This cross sectional study enrolled patients fulfilling the eligibility criteria was carried out between January 2012 to March 2013 in National Institute of Cancer Research and Hospital, Dhaka, Bangladesh. Regarding the eligibility criteria; patients with histologically proven as duct cell carcinoma breast and history of mastectomy. They were divided into two groups. One group with no chemotherapy (A) is within Stage I and Stage II disease, another group (B) receiving neoadjuvant chemotherapy (Stage III and IV) were included. Generally patients after completion of third cycle of chemotherapy-were admitted for mastectomy, at least 20 days after completion of treatment and operated within fifth to sixth week. Drugs chosen for chemotherapy were uniform like FAC-5- Fluorouracil, Adriamycin and Cyclophosphamide for all patients in this study group. After 3<sup>rd</sup> to 4<sup>th</sup> week of the 3<sup>rd</sup> cycle patients were assessed in the outpatient department and advised for admission for surgery. Patient receiving radiotherapy and recurrent breast cancer cases were excluded from this series. The study was approved by the institutional review board and ethics committee, and complied with the Helsinki Declaration. Informed verbal and written consent was obtained from all patients willing to participate in this study. Women were excluded if they met any of the following exclusion criteria: presence of brain or other central nervous system metastases, or expected survival of less than 3 months; active psychosis, untreated major depression, or severe personality disorder; inability to speak and current participation in any supportive-expressive group therapy. Supportive care was considered the administration of analgesics and/or opioids, palliative radiotherapy in painful bone metastasis and relief from other distressing symptoms (e.g. dyspnea, fatigue, and constipation). None of the patients in the chemotherapy arm has received such care at the time the questionnaires were complete.

Interview was taken as outpatient basis after 6 weeks of mastectomy when they came for post operative follow up after cessation of the seroma discharge, removal of the drain and satisfactory wound healing. Interview was taken by research assistants who were female medical graduates, having knowledge about breast cancer, research methodology, and previous experience of data collection. To address both the general and specific objectives the research done by a well designed close type structured questionnaire made by European Organization for Research and Treatment of Cancer (EORTC). It was EORTC Q30 and BR23. We were already registered and approved to use Bangla (local language) Questionnaire supplied by EORTC authority. The interview of the study participants was taken by giving them adequate time and privacy in a separate room. A day long workshop and pre testing on questionnaire was arranged for the local research assistants for better understanding prior to starting the project. The scoring formula supplied by EORTC was used for both the questionnaires compiled an analyzed with SPSS -19 programme.

### EORTC questionnaire

The EORTC QLQ-C30 is a Health Related Quality of Questionnaire

**Table 1:** Shows patient characters (n=250).

Patient Factors	Frequency	Percentage
Age in years < 45 >45	98	39.2
	152	60.8
Menopausal status Premenopausal Postmenopausal	104	41.6
	146	58.4
Literacy Literate Illiterate	122	48.8
	128	51.2
Occupation Housewife Service holder	230	92
	20	08
Income <120\$/month >120 \$/ month	180	72
	70	28
BMI <18.5 >18.5	52	20.8
	198	79.2
Tumor profile T1+T2 T3+T4	117	46.8
	133	53.2
Axillary metastasis Metastasis No Metastasis	230	81.6
	20	18.4
Neoadjuvant administered Applied Not applied	138	55.2
	122	44.8

(HRQOL), developed by the European Organization on Research and Treatment of Cancer (EORTC) Study Group on QOL. The EORTC QLQ-C30 is a well-known instrument for measuring quality of life in cancer patients and contains 30 items that measures global quality of life and five functional scales, and several cancer related symptoms. The core questionnaire is intended to measure general aspects of HRQOL specific to cancer patients. EORTC QLQ-C30, Version 3, incorporates five functional scales on Physical Functioning (PF), Role Functioning (RF), Cognitive Functioning (CF), Emotional Functioning (EF) and Social Functioning (SF), three symptom scales on Fatigue (FA), Pain (PA) and Nausea and Vomiting (NV), single items assessing Dyspnea (DY), Insomnia (SL), loss of Appetite (AP), Constipation (CO) and Diarrhea (DI), one item assessing perceived Financial Impact (FI) and a global health status: QOL scale (Global QoL). Each item is scored in one of four categories 1) 'Not at all', 2) 'A little', 3) 'Quite a bit' 4) 'Very much', with the exception of 'Global QoL', which ranges from 1) 'Very poor' to 7) 'Excellent'. Scoring of the items in the PF scale in the latest revision of EORTC QLQ-C30, Version 3 is extended to the four-point scale instead of the previous 'Yes: No' dichotomy [11,12].

Its supplementary breast cancer questionnaire is QLQ-BR23 is a specific questionnaire containing 23 items measuring functioning and symptoms related to breast Cancer. The assessment is comprised of five domains body image (BRBI), sexuality (BRSEF), arm symptoms (BRAS), breast symptoms (BRBS), and systemic therapy side effects (BRST) [12].

### Data analysis

Each EORTC QLQ-C30 single-item and multi-item subscale was scored and linearly transformed to range from 0 to 100, with a higher score indicating higher level of functioning and higher QOL. The scoring approach for the QLQ-BR23 module is similar in principle

to that for the function and symptom scales/single items of the QLQ-C30. For calculation of the score, score sheet and formula were supplied by the EORTC authority.

### Statistical method

Statistical analysis was carried out using SPSS version 19 (statistical package for social sciences V19, SPSS Inc, Chicago IL USA), categorical variables were expressed in frequency and percentage and Chi-square test was used to determine the association among categorical variables. Pearson Correlation coefficient was used to measure the strength of relationship between different subscales of Quality of Life (QOL); *t* test was used to determine the difference between any two variables or factors. A  $p \leq 0.05$  was taken as significant statistical value.

### Results

Two hundred and fifty (250) women with breast cancer were included in the study. Mastectomy was done for all patients. There was no operative mortality. For estimation of some oncological factors like demography and social status, following variables were taken into consideration like age, economic status (monthly income of the family), educational status, occupation and tumour status.

### Patients' characters

The mean age of the 250 participating patients was 44.7 years, Standard Deviation (SD) was 9.82 (range: 21-67), 58.4% postmenopausal, 92% housewives, 128 (51.2%) illiterate, 72% of the patients' family monthly income were less than 10,000 taka (120\$) Table-1, over 20% have BMI<18.5, 58.4% were post menopausal, tumour profile shows over 53% patients were in the group of advanced breast cancer (T3 and T4) in 81.6% cases there was axillary lymph node metastasis. Neoadjuvant chemotherapy offered to 138 (55.2%) patients.

### Quality of life assessment in oncological subgroups

Health related quality of life was measured categorizing the patients into two groups along with breast related problems as no chemotherapy-group A and with neoadjuvant chemotherapy-group B.

In comparison of pre mastectomy with post mastectomy patients in the post neoadjuvant chemotherapy patients observation was described below.

### Comparison of younger vs. older patients

Older patients (>40 years) scored better in all parameters of QOL than younger ( $\leq 40$  years) women shortly after surgery. Parameters like Physical Functioning (PF2), role functioning ( $p < 0.05$ ), emotional functioning, cognitive functioning and social functioning ( $p < 0.05$ ), older women performed better. Breast image (BRB1), Breast symptoms (BRBS) and Arm Symptom (BRAS) category shows also higher score in older patients ( $p > 0.05$ ) Table 2. Changes were similar in both groups of premastectomy and post mastectomy group.

### Comparison of illiterate with literate patients

In this series, illiterate patients (51.2%) had a better score in all parameters examined of the QOL.

In the parameter of PF2, RF2, EF, CF and SF as well as BRB1, BRBS and BRAS illiterate group performed better in both groups of A and B. Among them illiterate people scored better ( $< 0.05$ ).

**Table 2:** Comparison scores of quality of life of patients receiving neoadjuvant chemotherapy before and after mastectomy (n=138).

Oncological variables		Age in yrs			Educational status			Occupation			Income			Tumour		
QOL Parameters		<40	>40	p value	A	B	P value	C	D	P value	E	F	P value	G	H	P value
PF2	Pre	62.7	71.1	.163	70.9	69.7	.05	91.3	49.3	.005	81.3	59.3	.05	54.4	88.5	.444
	Post	48.1	56.5		56.3	55.1		76.7	34.7		60.7	44.7		33.8	73.9	
RF2	Pre	56.4	64.8	.233	64.6	63.4	.01	85	43	.05	75	53	.01	45.8	82.2	.435
	Post	41.9	50.3		50.1	48.9		70.5	28.5		60.5	38.5		31.3	67.7	
EF	Pre	57.5	65.9	.04	65.7	64.5	.04	86.1	44.1	.04	76.1	54.1	.03	48.9	83.3	.437
	Post	46.8	55.2		55.0	53.8		75.4	33.4		65.4	43.4		36.2	72.6	
CF	Pre	60.4	68.8	.04	68.6	67.4	.05	89	47.1	.02	79	57	.05	49.8	86.2	.441
	Post	52.3	60.7		60.5	59.3		80.9	38.9		70	48.9		41.7	78.1	
SF	Pre	36.9	44.7	.04	44.5	43.3	.04	64.9	22.9	.25	54.9	32.9	.191	25.7	62.1	.368
	Post	39.4	47.8		47.6	46.4		68	26		58	36		28.8	65.2	
BRB1	Pre	57.6	66.0	.05	65.8	57.3	.05	86.2	44.2	.002	76.2	54.2	.02	47	83.4	.437
	Post	50.3	58.7		58.5	64.6		78.9	36.9		68.9	46.9		39.7	76.1	
BRBS	Pre	66.2	74.6	.282	74.4	68.9	.191	94.8	52.8	.02	84.8	62.8	.05	55.6	92	.448
	Post	61.9	70.3		70.1	71.3		90.5	48.5		80.5	58.5		51.3	87.7	
BRAS	Pre	62.7	71.7	.267	70.9	69.7	.171	91.3	49.3	.04	81.3	59.3	.03	52.1	88.5	.444
	Post	57.3	65.7		65.5	64.3		85.9	43.9		75.9	53.9		46.7	83.1	

Pre-Premastectomy, post- Postmastectomy, A-Illiterate, B- Literate, C-Housewife, D-Service holder  
 E- Income <120 \$/month, F- >Income >120\$ month, G-Tumor T1+T2, H>T3

**Comparison of different economic group of people**

Financially weaker group of people (72%) expressed better performance in all sectors of the QOL including Breast related profiles. Among them PF2, CF, SF and BRB1 and BRAS has significant changes (<0.05) which are seen in both groups of A and B.

**Patterns of QOL in different professionals**

We categorized the professionals into housewives and service holders. Though housewives (92%) scored better in all categories of QOL, changes were not significant in majority of the parameters, only BRBS (Breast symptoms) has significant superiority among housewives over service holders in group A and B and Arm symptoms (BRAS) in group B (<0.05).

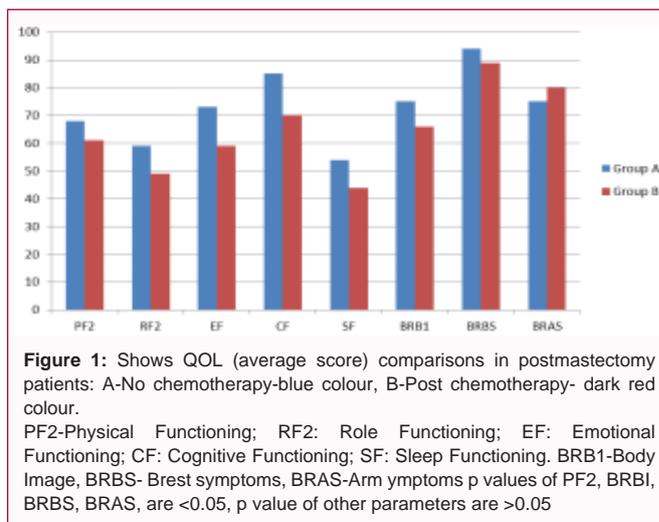
**Comparison of patients in different TNM Stages**

We focused on tumour size. Accordingly two groups were made like T1+T2 (47%) and T3+T4 (53%). In the first group tumors with less than 5 cm in size and no skin or pectoral fixation were taken, other group included who had tumour size over 5 cm or with skin or pectoral fixation (T3+T4). The advanced tumour group scored better but not significantly (>0.05) in all global health parameters and also in breast related parameters like BRBS, BRAS and BRB1.

So in all parameters the post mastectomy group performed worse in scoring their general and breast related symptoms (Table 2).

**Comparison of patients with or without neoadjuvant chemotherapy**

A comparison of patients between who did not receive chemotherapy (Group A) with who received chemotherapy (Group-B) was made. Functional scale score showed on average patient receiving neoadjuvant chemotherapy have lower scores in respects like physical functioning (PF2)-68/61, role functioning (RF2)-59/49, emotional functioning (EF)-73/58, Cognitive Functioning (CF)-85/70 and Social Functioning (SF)-54/44. Among them, only physical functioning



scored significantly. On the other hand, breast symptoms showed much positive impact on the quality of life in respect with breast symptoms, arm symptoms and body image. Body image (BRB1), arm symptoms (BRAS) and breast symptoms (BRBS) -scores were 75/68, 75/80 and 94/91 (p<0.05) respectively shown in Figure 1.

**Discussion**

Because long-term survival is common among women with early and locally advanced breast cancer, quality-of-life issues become vitally important. QOL refers to “global well-being, including physical, emotional, mental, social, and behavioral components. Other dimensions have also been identified and include health and functioning, socioeconomic [13], functional ability, family well-being, emotional well-being, treatment satisfaction [14]. Certainly there are many women who choose to undergo mastectomy and facilities also dictate for this procedure also as in the underdeveloped

countries. For most women, however, loss of a breast is an emotionally disturbing and difficult circumstance. In addition uses of anti cancer drugs create an extra burden over the patients. For persons surviving cancer, the period after treatment can be a complex time in which survivors experience physical and psychosocial effects, which in turn, may affect QOL [15].

Various factors such as mutilation of the body after surgery, problems due to systemic therapies, worries and anxiety about the disease, and fear of death interferes with Quality of life in patients with breast cancer. Overall, subjects showed significant improvement on most QOL dimensions during the first 6 months after surgery; however, they did suffer deterioration on both indicators of social functioning (social/family well-being and social support) and reported a reduction in satisfaction with their sex lives [16,17].

Using the EORTC tool, Ali Dehkordi et al. [18] assessed the QOL in cancer patients getting anticancer therapy having a wide range of experiences [17]. Unfortunately, not many data concerning quality-of-life issues in relation to preoperative chemotherapy are available in the literature. Considering the fact that preoperative as well as postoperative chemotherapy seems to yield similar results in terms of prognosis, this might be a conclusive factor on the decision of which chemotherapeutic strategy should be chosen [18].

In another post surgical study, it was shown that the post-operative period is generally associated with increased amount of physical discomfort and pain. This, therefore, reflects on the functional aspects, like the inability to work, troubles meeting the needs of the family. This is also seen in the results of the present study where the functional well-being of women showed significant deterioration after surgery. On the other hand, not much effect was observed on social, functional and emotional well-being in contrast to earlier results [19].

In this work, we focused on comparisons among health-related QOL outcomes after mastectomy with or without neoadjuvant chemotherapy. In addition, we used the test to implement analysis of covariance models controlling for sociodemographic clinical variables i.e., age, educational level, occupation, family income status and tumour profile of the patients. Linear transformation was used in this study to standardize the raw scores of the QoL parameters so that all scores ranged from 0 to 100. In accordance with the scoring manual, the questionnaire items of the QLQ-C30 and the QLQ-BR23 were grouped into scales in the categories like different Functional Scales and breast symptoms. We investigated the following oncological factors: tumor size according the TNM stage at the time of primary diagnosis checking their records and present papers typed as T1+T2 and T3+T4 groups, categorized them as with or without neoadjuvant chemotherapy. The demographic factor was the patient's age at time of primary diagnosis. Patients' age was median-dichotomized into two categories:  $\leq 40$  years and  $>40$  years. Educational status was categorized as illiterate and literate- who can read and write Bangla (native language) to graduation level. Income group into those family earns less than 10,000 taka (120\$) per month belongs to the poorer section of the society and who earns more per month belongs to the better group.

### Oncological subgroups

**Age:** A group of women in the current study were receiving chemotherapy for advanced-stage breast cancer, posing a serious threat to their biologic processes. The symptom component is defined

as the patient's perception of abnormal physical or emotional states. Functioning is defined as the ability to perform in multiple domains (i.e., role, physical, and social) (Wilson & Cleary, 1995). These findings support the need for interventions to prevent and reverse functional decline among elderly long-term cancer survivors [20].

The ability of elderly individuals to perform activities such as her own housework, walking up and down stairs, or preparing meals is an important measure of the effects of health on function and the ability to live progression to disability and possibly for earlier mortality [21]. There is a possibility that elderly women are more oriented with social and physical and emotional crisis.

Studies have documented that cancer patients report deficits in physical function within 1 or 2 years after treatment. Several studies were based on single cross-sectional surveys [22], with no information on health before cancer diagnosis. The effects of cancer and its treatment on functional limitations may be of particular concern for the elderly because other age-related conditions, such as diabetes or high blood pressure, make them susceptible to a decline in physical function [23].

In this series of a short term follow up, it has been observed that elderly women scored better than their younger counterparts in all domains of the functional scales and breast subscales even emotionally they are significantly stable in the post chemotherapy groups which are contradictory to other studies.

### Tumour

It is usually assumed that the number and severity of symptoms caused by the tumour burden will be decreased by chemotherapy, and that there is a direct relationship between the tumour load and its symptomatic effect on the patient. A few studies have shown that objective responses to chemotherapy are associated with improvement of various parameters of QOL of these patients, while its possible prognostic value is intensely studied [24].

Again in this study, patients with locally advanced tumors performed better in all functional scales significantly in the domain of cognitive function and also the post neoadjuvant group in the domain of breast and arm symptoms they were better than no chemotherapy group. It is a possibility that tumour with advanced stage, people were more adjusted psychologically as they were living with more time with the tumour.

### Socioeconomic factors (family income and educational status and occupation)

This study was carried out in a public hospital where the underprivileged group of people from the society takes their services. Considering their family income, educational status and occupation a big group belongs to this section of the society. They were subdivided into two groups- one is weaker and other relatively better in the context of their monthly income. Weaker sections of people have better score in all the subscales. There was significant change in the physical functioning, cognitive functioning and breast image and arms symptom category particularly in the post chemotherapy group. Similarly illiterate women also expressed better than relatively literate people. This is not the true picture of the country as well. It also does not match with developed world or other rich country. People have to bear their own expenses, in this part of the world. On the contrary, in the underdeveloped world patient sometimes are not aware of the disease and its consequences. It was observed in a study done in US that higher education, never married status, and receipt of chemotherapy

were associated with lower perceived QOL. Conversely, age older than 66 and higher family income (i.e., higher than \$50,000) were associated with higher perceived QOL. Chemotherapy treatment is a predictor of greater financial problems after treatment has ended [25,26]. In our post chemotherapy group they also performed badly but not significantly except few items. House wives were shown better than working women in this study.

### Neoadjuvant chemotherapy

In this study average scores between neoadjuvant chemotherapy and no chemotherapy group analysis shows that though all parameters of the functional scales in post chemotherapy group has reduced score but only physical functioning has significant changes, on the other hand breast symptoms scale has positive impact on the post chemotherapy group. After analysis of the oncological subgroups it is seen that all subscales were deteriorated in the post chemotherapy group. Emotional upset was not very visible except in case of literate people. A positive impact was expressed during the measurement of breast cancer modules especially in alleviation of arm symptoms.

Functional subscale analysis in our study revealed significant positive results in terms of chemotherapy use. Our findings seem to contradict previous investigations, which have shown a consistent adverse impact of systemic chemotherapy on the cognitive function of patients, while there are also reports of cognitive function of patients undergoing only supportive therapy with inconsistent results.

There is considerable evidence suggesting that cancer patients suffer from substantial and long-term psychological distress associated with different forms of cancers and its medical treatment. These psychological problems can, in fact, be more challenging to some cancer patients than the physical aspects of the disease, and contribute significantly to the overall suffering of the patients [27].

So, our findings suggest that chemotherapy in the phases of treatment is the more rational therapeutic approach in terms of QoL improvement. However, these results cannot be generalized, and as people from different cross section to be recruited and longer study to be carried out.

In other studies observations are to delineate prospectively the rates and clinical course of emotional distress, cognitive impairment, and QOL in a sample of chemotherapy-naive patients with cancer. Although no significant changes emerged with regard to the rates of anxiety or depression over time, nearly one-third of their patients nevertheless experienced severe emotional distress at the initiation of treatment. In another study acute decline in cognitive function during and/or shortly after chemotherapy occurred in 65% of patients [28]. The most common domains affected included learning and memory, executive function, and processing speed. The incidence and pattern of acute decline was consistent with their previous longitudinal trial, there are also evidences of chemotherapy associated profound fatigue and substantial cognitive dysfunction [29].

In our study cognitive function deteriorated in all oncological subgroups especially in post chemotherapy group, remarkable changes found in the poorer section of the community.

However, the cross-sectional nature of the study itself, as well as the fact that the data came from a single institution, were limitations of this study. In addition, our study was limited by the fact that our patient population was derived from patients who were referred to a tertiary cancer center, which may have affected the demographics and

treatment patterns noted in the study.

Studies have documented that cancer patients report deficits in physical function within 1 or 2 years after treatment. Some reports suggest that physical function of cancer survivors returns to normal over time [30], but existing studies considering function in long-term survivors have limitations. Several studies were based on single cross-sectional surveys, with no information on health before cancer diagnosis. The effects of cancer and its treatment on functional limitations may be of particular concern for the elderly because other age-related conditions, such as diabetes or high blood pressure, make them susceptible to a decline in physical function [30].

Our study reveals a contrast result, the elderly, underprivileged group of people performed physically well even after mastectomy and getting chemotherapy.

The known physical and psychosocial distress associated with chemotherapy may undermine a patient's sense of control over medical circumstances, leaving that patient are more vulnerable to additional distress. An essential issue yet to be empirically addressed is the relative contribution of patient factors (e.g. age, education, social support), contextual factors (knowledge of, and confidence in the healthcare system, the nature and strength of the patient-physician relationship), and disease and treatment factors (e.g. disease stage, prognosis, symptom profile, treatment side effects) to the patient's decisional role response [31].

Additional research is needed to shed light on how distress is developed and maintained in patients undergoing chemotherapy, and the role that treatment side effects play in exacerbating cognitive, behavioral and emotional indicators of maladjustment. Studies have documented that cancer patients report deficits in physical function within 1 or 2 years after treatment. Some reports suggest that physical function of cancer survivors returns to normal over time, but existing studies considering function in long-term survivors have limitations. Several studies were based on single cross-sectional surveys [32], with no information on health before cancer diagnosis. During the active phase of treatment physical functioning has an enormous impact on QOL. Concerning demographic factors (age, education, and marital status) the subgroups did not differ much from one another. Some research, but not all, indicates that younger women may suffer poorer QOL following a breast cancer diagnosis. Unfortunately, age definitions vary across studies. This association wasn't seen in our study. In line with other findings, in the present study, employment status was significantly associated with QOL [33,34]. Weaker section of the community responded well as because many people still don't have the idea about cancer and its fate which is opposite with other studies [35,36].

### Conclusion

In conclusion, this study demonstrates the relationship between clinical, sociodemographical factors and neoadjuvant chemotherapy with the quality of life in post mastectomy state in breast cancer patients. On average, cognitive impairments, mental depression and physical disabilities after chemotherapy appear to be slight. Current data suggest that social dysfunction during treatment are pronounced. The goal of this study was to focus on the post neoadjuvant chemotherapy period in the phases of treatment especially after mastectomy. Patient taking preoperative chemotherapy have lower score but affected not much even in the process of treatment and after surgery. The population was limited to patients with breast cancer among the

underprivileged section of the society. Younger people suffered more in all domains of the quality of life. Special attentions in the social and family life, extra care and psychological support to the younger patients are needed. Affluent group of people who have potentials to understand cancer and its consequences after a moral support and giving more time to them could improve their short term quality of life which will encourage them to take up the total treatment. We suggest that there is a need of studies with longer follow up and more details data on demographic and socio-economic characteristics and effect of neoadjuvant chemotherapy as the country is moving towards affluence and educated people can express about their well being and want better QOL.

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## References

- Jemal A, Siegel R, Ward E, Murray T, Xu J, Smigal C, et al. Cancer statistics, 2006. *CA Cancer J Clin*. 2006;56(2):106-30.
- Jaber AF. Quality of Life Assessment for Patients with Breast Cancer Receiving Adjuvant Therapy. *J Cancer Sci Therapy*. 2002;4:51-5.
- Colleoni M, Goldhirsch A. Neoadjuvant chemotherapy for breast cancer: any progress? *Lancet Oncology*. 2014;15:131-2.
- Teshome M, Hunt KK. Neoadjuvant Therapy in the Treatment of Breast Cancer. *Surg Clin N Am*. 2014;23:505-23.
- Shimozuma K, Ganz PA, Petersen L, Hirji K. Quality of life in the first year after breast cancer surgery: rehabilitation needs and patterns of recovery. *Breast Cancer Res Treat*. 1999;56(1):45-57.
- Ganz PA, Kwan L, Stanton AL, Bower JE, Belin TR. Physical and Psychosocial Recovery in the Year After Primary Treatment of Breast Cancer. *J Clin Oncol*. 2011;29:1101-9.
- Pandey M, Thomas BC, Ramdas K, Ratheesan K. Early Effect of Surgery on Quality of Life in Women with Operable Breast Cancer. *Jpn J Clin Oncol*. 2006;36:468-72.
- Bottomley A, Therasse P, Piccart M, Efficace F, Coens C, Gotay C, et al. Health-related quality of life in survivors of locally advanced breast cancer: an international randomised controlled phase III trial. *Lancet Oncol*. 2005;6:287-94.
- Measures, Methods, and Applications. Cambridge, United Kingdom, Cambridge University Press. 2005;93-125.
- Montazeri A. Health-related quality of life in breast cancer patients: A bibliographic review of the literature from 1974 to 2007. *J Exp Clin Cancer Res*. 2008;27:7-32.
- National Center for Health Statistics CDCP. US Mortality Public Use Data Tapes. 2006:1969-2003.
- Michelson H, Bolund C, Nilsson B, Brandberg Y. Health-related Quality of Life Measured by the EORTC QLQ-C30. *Acta Oncologica*. 2000;39:477-84.
- Montazeri A, Vahdaninia M, Harirchi I, Ebrahimi M, Khaleghi F, Jarvandi S. Quality of life in patients with breast cancer before and after diagnosis: an eighteen months follow-up study. *BMC Cancer*. 2008;8:330-6.
- Ferrans CE. Development of a quality of life index for patients with cancer. *Oncol Nurs Forum*. 1990;17(3 Suppl):15-9.
- McMasters KM, Hunt KK. Neoadjuvant Chemotherapy, Locally Advanced Breast Cancer, and Quality of Life. *J Clin Oncol*. 1999;17:441-4.
- Alzabaidey FJ. Quality of Life Assessment for Patients with Breast Cancer Receiving Adjuvant Therapy. *J Cancer Sci Therapy*. 2012;4:51-5.
- Arora NK, Gustafson DH, Hawkins RP, McTavish F, Cella DF, Pingree S, et al. Impact of surgery and chemotherapy on the quality of life of younger women with breast carcinoma: a prospective study. *Cancer*. 2001;92(5):1288-98.
- Dehkordi A, Heydarnejad MS, Fatehi D. Quality of Life in Cancer Patients undergoing Chemotherapy. *Oman Med J*. 2009;24(3):204-7.
- van der Hage JA, van de Velde CJ, Julien JP, Tubiana-Hulin M, Vandervelden C, Duchateau L. Preoperative Chemotherapy in Primary Operable Breast Cancer: Results From the European Organization for Research and Treatment of Cancer Trial 10902. *J Clin Oncol*. 2001;19:4224-37.
- Wronska I. The quality of women's life after mastectomy in Poland. *Health Care Women Int*. 2003;24(10):900-9.
- Sweeney C, Schmitz KH, Lazovich D, Virnig BA, Wallace RB, Folsom AR. Functional Limitations in Elderly Female Cancer Survivors. *J Natl Cancer Inst*. 2006;98:521-9.
- Onder G, Penninx BW, Ferrucci L, Fried LP, Guralnik JM, Pahor M. Measures of physical performance and risk for progressive and catastrophic disability: results from the Women's Health and Aging Study. *J Gerontol A Biol Sci Med Sci*. 2005;60:74-9.
- Guralnik JM, LaCroix AZ, Abbott RD, Berkman LF, Satterfield S, Evans DA, et al. Maintaining mobility in late life. I. Demographic characteristics and chronic conditions. *Am J Epidemiol*. 1993;137(8):845-57.
- Karamouzis MV, Ioannidis G, Rigatos G. Quality of life in metastatic breast cancer patients under chemotherapy or supportive care: a single-institution comparative study. *Eur J Cancer Care* 2007;16:433-8.
- Carver CS, Smith RG, Petronis VM, Antoni MH. Quality of life among long-term survivors of breast cancer: different types of antecedents predict different classes of outcomes. *Psycho-oncology*. 2006;15:749-58.
- Meneses K, Azuero A, Hassey L, McNeen P, Pisu M. Does economic burden influence quality of life in breast cancer survivors? *Gynecol Oncol*. 2012;124:437-43.
- Jansen CE, Miaskowski C, Dodd M, Dowling G. Chemotherapy-induced cognitive impairment in women with breast cancer: a critique of the literature. *Oncol Nurs Forum*. 2005;32:329-42.
- Fawzy FI, Fawzy NW, Arndt LA, Pasnau RO. Critical review of psychosocial interventions in cancer care. *Arch Gen Psychiatry*. 1995;52(2):100-13.
- Wefel JS, Saleeba AK, Buzdar AU, Meyers CA. Acute and late onset cognitive dysfunction associated with chemotherapy in women with breast cancer. *Cancer*. 2010;116(14):3348-56.
- Tchen N, Juffs HG, Downie FP, Yi QL, Hu H, Chemerynsky I, et al. Cognitive Function, Fatigue, and Menopausal Symptoms in Women Receiving Adjuvant Chemotherapy for Breast Cancer. *J Clin Oncol*. 2003;21:4175-83.
- Watters JM, Yau JC, O'Rourke K, Tomiak E, Gertler SZ. Functional status is well maintained in older women during adjuvant chemotherapy for breast cancer. *Ann Oncol*. 2003;14:1744-50.
- Baker F, Haffer SC, Denniston M. Health-related quality of life of cancer and non-cancer patients in Medicare managed care. *Cancer*. 2003;97(3):674-81.
- Hack TF, Pickles T, Ruether JD, Weir L, Bultz BD, Mackey J, et al. Predictors of distress and quality of life in patients undergoing cancer therapy: impact of treatment type and decisional role. *Psycho-Oncology*. 2010;19:606-16.

34. Safae A, Moghimi-Dehkordi B, Zeighami B, Tabatabaee H, Pourhoseingholi M. Predictors of quality of life in breast cancer patients under chemotherapy. *Indian J Cancer*. 2008;45(3):107-11.
35. Üstündag S, Zencirci AD. Factors affecting the quality of life of cancer patients undergoing chemotherapy: A questionnaire study. *J Oncol Nurs*. 2015;2:17-25.
36. Ho PJ, Gernaat SAM, Hartman M. Health related quality of life in Asian patients with breast cancer: a systematic review. *BMJ Open*. 2018;8:e020512.