# Effect of different modalities of treatment on the quality of life of breast cancer patients in Egypt

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## تأثير أساليب العلاج المختلفة في نوعية معيشة مرضى سرطان الثدي في مصر

فاطمة مختار الشرقاوي ومحمود فتحي صقر وهدى يوسف عطا وحافظ محمد غانم

خلاصة : تمت دراسة تأثير معالجة سرطان الثدي في نوعية حياة النساء المصريات . فقسّمت المريضات إلى أربع مجموعات عولجت كما يلي : 1 ـ استئصال الثدي فقط ، 2 ـ الجراحة مع المعالجة بالأشعة ، 3 ـ الجراحة مع المعالجة الكيميائية ، 4 ـ المعالجة الثلاثية . وأظهرت النتائج أن المجالات الأربعة لنوعية حياة المريضات اللاتي تلقين علاجات مساعدة ( المجموعات 2، 3 ، 4 ) تغيرت كثيرا بالمقارنة مع اللواتي أجري لهن استئصال الثدي فقط . وكان لأسلوب المعالجة الثلاثية تأثير ضائر في نوعية الحياة برمّتها مقارنةً بالمعالجة بالأشعة أو بالمعالجة الكيميائية . أما المعالجة بالأشعة فكان تأثيرها على نوعية الحياة أقل كثيرا من تأثير المعالجة الكيميائية . ولقد تبين بالتحليل التحوّفي أن أسلوب المعالجة الثلاثية ينبيء بأسوإ نوعيات الحياة . وبناء عليه ينبغي إدماج مقاييس نوعية الحياة مع النقاط النهائية التقليدية المستخدمة لتقييم المعالجة كما ينبغي تزويد المرضى بالتثقيف الصحي حول الآثار الضائرة المحتملة لكل معالجة .

ABSTRACT The impact of breast cancer therapy on the quality of life (QL) of Egyptian women was studied. Patients were divided into four groups: 1: mastectomy alone; 2: surgery plus radiotherapy; 3: surgery plus chemotherapy; and 4: triple modality. The results revealed that all the four domains of QL of women having adjuvant therapy (groups 2, 3, or 4) were significantly altered compared to those who underwent mastectomy alone. Triple modality adversely affected global QL the most compared to radiotherapy or chemotherapy; radiotherapy had significantly less effect on QL compared to chemotherapy. Triple modality predicted the worst QL. QL measures should be incorporated with the traditional end points for evaluation of treatment and patients given health education on the effects of each therapy.

### Effets des différentes thérapeutiques sur la qualité de vie des patientes ayant un cancer du sein en Egypte

RESUME L'impact de la thérapie du cancer du sein sur la qualité de vie des femmes égyptiennes a été étudié. Les patientes ont été réparties en quatre groupes: 1: mastectomie seule; 2: chirurgie plus radiothérapie; 3: chirurgie plus chimiothérapie; 4: chirurgie plus radiothérapie et chimiothérapie associées (traitement combiné). Les résultats ont indiqué que les quatre domaines relatifs à la qualité de vie des femmes sous traitement adjuvant (groupes 2, 3 et 4) étaient tous considérablement altérés par comparaison avec celles qui ont subi une mastectomie uniquement. Le traitement combiné affecte globalement la qualité de la vie le plus défavorablement par comparaison avec la radiothérapie ou la chimiothérapie; la radiothérapie a un impact bien moins important sur la qualité de la vie que la chimiothérapie. La prédiction de la moins bonne qualité de vie concernait le traitement combiné. Des mesures concernant la qualité de vie devaient être incluses avec les paramètres traditionnels pour l'évaluation du traitement et une éducation sanitaire devait être dispensée aux patientes sur les effets de chaque thérapeutique.

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## Introduction

Quality of life (QL) is subjective in nature; each individual has a slightly different view of what is important to his or her QL. There is wide agreement that health-related QL should be conceptualized as a complex and multidimensional construct [*1*,*2*]. Physical functioning, social interactions, psychoemotional well-being and disease- or treatment-related symptoms are critical domains that are included in most efforts to measure overall QL [*3*,*4*].

Surgery, radiation therapy, chemotherapy and hormonal therapy make up the standard armamentarium of breast cancer therapy either alone or in combination. Treatment-related adverse effects or toxicities vary depending on the specific modalities that are used [*5*]. Determination of the QL of breast cancer patients under different therapeutic modalities provides a comprehensive description of their potential side-effects from the patient's perspective. Indeed, this can help health care providers in weighing the associated risks and benefits particularly when the differences in survival between the options are small or even nonexistent [*6*]. Moreover, it may be of importance in affecting treatment outcomes and may prove to be of prognostic importance in the setting of clinical trials [*5*]. Finally, QL data can assist in planning an effective educational intervention.

Hence, the present study was undertaken to determine the effects of the different modalities of treatment on the QL of Egyptian women with early breast cancer.

## Patients and methods

The study was conducted at the Surgery and Clinical and Nuclear Medicine Departments at Alexandria Main University Hospital, Alexandria, Egypt.

### Study population

Women with early breast cancer were the target population of this study. A total of 272 patients were selected from those attending the hospital for outpatient or inpatient care. Patients who received postoperative endocrinal therapy (tamoxifen) were excluded because of their small number (4 patients only). To be considered eligible for the study women were required to:

- have a definite diagnosis of early breast cancer: stage I (T1N0) or II (T1N1, T2N0/N1, M0) [*7*].
- have a known current status of treatment;
- be aware of the diagnosis;
- be fully oriented about the purpose of the study and agree to participate.

Patients were divided into four groups according to the adopted therapeutic modality used: surgery (mastectomy) alone (group 1, $n = 56$), surgery and radiotherapy (group 2, $n = 76$), surgery and chemotherapy (group 3, $n = 100$) and triple modality i.e. surgery coupled with radiotherapy and chemotherapy (group 4, $n = 40$).

### Data collection

Data were collected over a 15-month period using a standardized pretested interview questionnaire which had been translated into Arabic and modified to suit Egyptian patients. It was specifically designed to reveal sociodemographic characteristics (age, marital status, menopausal condition and working status) and to measure the four domains of QL namely: physical functioning (three parameters), social interaction (three parameters), psychoemotional well-being (six parameters) and disease- or treatment-related symptoms (10 parameters). The linear analogue self-assessment (LASA) scale [*8*] with scores ranging from 1 to 10 was used to measure these parameters. Accordingly, a score of 1 indicates normality or absence of symptoms, while higher scores reflect mild (2,3,4), moderate (5,6,7) or severe (8,9,10) impairment.

Patients were interviewed and asked to score how each aspect of their QL had been affected by their disease or treatment modality in a week. The interview was conducted on a single occasion for each patient. Patients in group 1, attending the outpatient clinic for regular follow-up, were interviewed 2–3 months after mastectomy, a time usually coinciding with complete wound healing. Patients receiving adjuvant therapy (groups 2, 3 and 4) were interviewed during the course of active treatment.

### Therapeutic modality

- Mastectomy (M): either radical mastectomy (RM) or modified radical mastectomy (MRM) was performed.
- Radiotherapy: radiotherapy was applied to the chest wall and nodal areas, 2–3 weeks after mastectomy, in the form of 4500 cGy given 5 days per week for a total period of 4.5 weeks.
- Chemotherapy : six cycles of CMF (cyclophosphamide, methotrexate and fluorouracil [5-FU]) were administered on the first and eighth day, then every 21 days. Patients treated with the triple modality received their chemotherapy 2 weeks after completion of radiotherapy.

### Statistical analysis

Data were analysed using a microcomputer and statistical software (*Stata* version 3.1). The arithmetic mean, 95% confidence interval of mean and the Pearson product correlation were computed. The chi-square test ($\chi^2$), the Student *t*-test and ANOVA followed by Scheffe post comparison were used. In addition, stepwise multiple regression analysis was performed. The 5% level was chosen to test the significance of the results obtained.

## Results

### Sample description (Table 1)

Women assigned the different therapeutic modalities were of comparable age. Their ages ranged from 25 to 70 years with a mean of 44.42 ± 9.75 years. The majority of the women were married (90.8%) while a few were divorced (4.4%), widowed (3.3%) or single (1.5%). Only the latter were employed outside the home. The four groups were significantly different regarding marital status ($P < 0.001$).

Breast carcinoma stage I was encountered in 52 patients (19.12%) and they received surgical treatment only. The remaining 220 patients (80.88%) had stage II tumours and all received postoperative adjuvant therapy with the exception of four patients who underwent radical mastectomy and refused any further treatment. As regards the type of mastectomy performed, all patients who received adjuvant therapy were treated first with modified radical mastectomy, while patients in groups 1 were treated with radical mastectomy (40 patients) or modified radical mastectomy (16 patients). None of the patients surveyed was considering future breast reconstruction at the time of the interview.

### Physical functioning QL domain (Table 2)

The majority of women who received a combination of radiotherapy and chemotherapy in conjunction with mastectomy reported severe impairment in their daily activities (80.0%), housework (80.0%), as well as their activities around the home (90.0%). Such degrees of impairment were reported by fewer women in the three other groups, being the least in those who underwent mastectomy alone. Indeed, the overall score of these women in this domain indicated that their physical functioning was significantly least impaired (5.35 ± 2.04). In contrast, those who received the triple modality were significantly the most impaired (8.36 ± 1.06). The scores of those who received radiotherapy or chemotherapy were comparable.

## Social interaction QL domain (Table 3)

Personal relationships, whether family (marital) relations, social life outside the family or recreations, were moderately affected in nearly half of the patients who underwent mastectomy (group 1). A greater proportion of women who received adjuvant therapy reported that their social interaction had been severely affected by the treatment modality, particularly those who received the triple modality of treatment (group 4) where over 90% of women reported that their social relationships both within and outside the family were severely impaired.

Table 1 **Patient characteristics in the four groups**

| **Characteristic** | **Group 1 (M) *n* = 56** | | **Group 2 (M+RT) *n* = 76** | | **Group 3 (M+C) *n* = 100** | | **Group 4 (M+RT+C) *n* = 40** | | **Total *n* = 272** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| *Occupation* | | | | | | | | | | |
| Housewife | 56 | 100.0 | 76 | 100.0 | 96 | 96.0 | 40 | 100.0 | 268 | 98.51 |
| Working | 0 | 0.0 | 0 | 0.0 | 4 | 4.0 | 0 | 0.0 | 4 | 1.5 |
| *Marital status* | | | | | | | | | | |
| Married | 52 | 92.9 | 60 | 78.9 | 100 | 100.0 | 35 | 87.5 | 247 | 90.8 |
| Divorced | 4 | 7.1 | 4 | 5.3 | 0 | 0.0 | 4 | 10.0 | 12 | 4.4 |
| Widowed | 0 | 0.0 | 8 | 10.5 | 0 | 0.0 | 1 | 2.5 | 9 | 3.3 |
| Single | 0 | 0.0 | 4 | 5.3 | 0 | 0.0 | 0 | 0.0 | 4 | 1.5 |
| *Menopausal status* | | | | | | | | | | |
| Premenopausal | 24 | 42.9 | 36 | 47.4 | 56 | 56.0 | 10 | 25.0 | 126 | 46.3 |
| Postmenopausal | 32 | 57.1 | 40 | 52.6 | 44 | 44.0 | 30 | 75.0 | 146 | 53 |
| *Stage of disease* | | | | | | | | | | |
| Stage I (T1N0M0) | 52 | 92.9 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 52 | 19.1 |
| Stage II (T1N1, T2N0/N1, M0) | 4 | 7.1 | 76 | 100.0 | 100 | 100.0 | 40 | 100.0 | 220 | 80.9 |
| *Mastectomy type* | | | | | | | | | | |
| Radical (RM) | 40 | 71.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 40 | 14.7 |
| Modified radical (MRM) | 16 | 28.6 | 76 | 100.0 | 100 | 100.0 | 40 | 100.0 | 232 | 85.3 |
| *Age (years)* | | | | | | | | | | |
| Range | 29–65 | | 25–70 | | 28–60 | | 33–52 | | 5–70 | |
| Mean ± *s* | 46.91 ± 10.18 | | 44.94 ± 13.11 | | 42.96 ± 7.10 | | 43.60 ± 6.30 | | 44.42 ± 9.75 | |

*M = mastectomy, RT = radiotherapy, C = chemotherapy*
*s = standard deviation*

Comparison of the social interaction scores showed that the scores of patients who underwent mastectomy alone (4.21 ± 1.96) were significantly lower than those of patients receiving adjuvant therapy. Social interactions in patients having the triple modality were significantly the most impaired (8.63 ± 0.64). On the other hand, no difference was found between patients in groups 2 and 3.

### Psychoemotional well-being QL domain (Table 4)

Patients reacted to their current status of disease and treatment with excessive depression and/or anxiety. Some 60% to 90% of patients who received adjuvant therapy reported their depression as being severe compared to 21.4% of those who underwent mastectomy alone. Severe anxiety was a common problem among all groups, being lowest in those having mastectomy alone (57.1%) and highest in those receiving adjuvant chemotherapy (96.0%). Following mastectomy, a substantial proportion (74%–90%) of patients who received adjuvant therapy experienced severe body image disturbance compared to only 21% of those who underwent mastectomy alone. In relation to sexual interest, almost

Table 2 **Impairment of physical functioning in the four groups**

| **Physical functioning impairment** | **Group 1 (M) *n* = 56** | | **Group 2 (M+RT) *n* = 76** | | **Group 3 (M+C) *n* = 100** | | **Group 4 (M+RT+C) *n* = 40** | | **Total *n* = 272** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| *Daily activities* | | | | | | | | | | |
| None | 8 | 14.3 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 16 | 5.9 |
| Mild | 8 | 14.3 | 8 | 10.5 | 12 | 12.0 | 4 | 10.0 | 32 | 11.8 |
| Moderate | 32 | 57.1 | 32 | 42.1 | 24 | 24.0 | 4 | 10.0 | 92 | 33.8 |
| Severe | 8 | 14.3 | 32 | 42.1 | 60 | 60.0 | 32 | 80.0 | 132 | 48.5 |
| *Housework* | | | | | | | | | | |
| None | 4 | 7.1 | 0 | 0.0 | 4 | 4.0 | 0 | 0.0 | 8 | 2.9 |
| Mild | 12 | 21.4 | 0 | 0.0 | 8 | 8.0 | 0 | 0.0 | 20 | 7.4 |
| Moderate | 28 | 50.0 | 52 | 68.4 | 36 | 36.0 | 8 | 20.0 | 124 | 45.6 |
| Severe | 12 | 21.4 | 24 | 31.6 | 52 | 52.0 | 32 | 80.0 | 120 | 44.1 |
| *Activities around the home* | | | | | | | | | | |
| None | 4 | 7.1 | 4 | 5.3 | 0 | 0.0 | 0 | 0.0 | 8 | 2.9 |
| Mild | 8 | 14.3 | 4 | 5.3 | 0 | 0.0 | 0 | 0.0 | 12 | 4.4 |
| Moderate | 40 | 71.4 | 36 | 47.4 | 64 | 64.0 | 4 | 10.0 | 144 | 52.9 |
| Severe | 4 | 7.1 | 32 | 42.1 | 36 | 36.0 | 36 | 90.0 | 108 | 39.7 |
| *Physical function score* | | | | | | | | | | |
| Range | 1.6–8.3 | | 2.6–9.0 | | 2.6–9.0 | | 6.3–9.6 | | *F* = 30.928[a] | |
| Mean ± *s* | 5.35 ± 2.04 | | 6.40 ± 1.39 | | 6.88 ± 1.48 | | 8.36 ± 1.06 | | Scheffe test | |
| | | | | | | | | | (1,2) (1,3) (1,4) | |
| 95% CI | 4.8–5.9 | | 6.0–6.7 | | 6.5–7.1 | | 8.0–8.7 | | (2,4) (3,4) | |

[a] *Significant at* P < *0.001*

*95% CI = 95% confidence interval of the mean*

*M = mastectomy, RT = radiotherapy, C = chemotherapy*

*s = standard deviation*

all patients receiving adjuvant therapy reported severe sexual inhibition compared to only half (50%) who underwent mastectomy alone (group 1). Moreover, patients who had adjuvant therapy felt more lonely and desperate about the future.

The scores of women receiving radiotherapy, chemotherapy and triple modality reflect a significant impairment in the psychoemotional domain compared to women who underwent mastectomy alone. Moreover patients with triple modality had the worst psychoemotional QL compared to those with radiotherapy or chemotherapy. No significant difference was found between groups 2 and 3 regarding their influence on the psychoemotional well-being of the women.

## Disease/treatment-related symptoms QL domain (Table 5)

More than half of the patients who were treated with triple modality suffered severely from the side-effects of treatment (physical toxicity) including easy fatigue (80%) and vomiting (60%) as well as headache, dizziness, anorexia and diarrhoea (50% each). A similar trend was observed

Table 3 **Impairment of social interaction in the four groups**

| Social functioning impairment | Group 1 (M) *n* = 56 | | Group 2 (M+RT) *n* = 76 | | Group 3 (M+C) *n* = 100 | | Group 4 (M+RT+C) *n* = 40 | | Total *n* = 272 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| *Marital* | | | | | | | | | | |
| None | 8 | 14.3 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 16 | 5.9 |
| Mild | 20 | 35.7 | 20 | 26.3 | 16 | 16.0 | 0 | 0.0 | 56 | 20.6 |
| Moderate | 28 | 50.0 | 24 | 31.6 | 48 | 48.0 | 4 | 10.0 | 104 | 38.2 |
| Severe | 0 | 0.0 | 28 | 36.8 | 32 | 32.0 | 36 | 90.0 | 96 | 35.3 |
| *Social life outside family* | | | | | | | | | | |
| None | 8 | 14.3 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 16 | 5.9 |
| Mild | 16 | 28.6 | 4 | 5.3 | 12 | 12.0 | 0 | 0.0 | 32 | 11.8 |
| Moderate | 32 | 57.1 | 48 | 63.2 | 64 | 64.0 | 0 | 0.0 | 144 | 52.9 |
| Severe | 0 | 0.0 | 20 | 26.3 | 20 | 20.0 | 40 | 100.0 | 80 | 29.4 |
| *Recreation* | | | | | | | | | | |
| None | 4 | 7.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 4 | 1.5 |
| Mild | 28 | 50.0 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 36 | 13.2 |
| Moderate | 20 | 35.7 | 28 | 36.8 | 56 | 56.0 | 8 | 20.0 | 112 | 41.2 |
| Severe | 4 | 7.1 | 44 | 57.9 | 40 | 40.0 | 32 | 80.0 | 120 | 44.1 |
| *Social interaction score* | | | | | | | | | | |
| Range | 1.3–6.3 | | 3.0–8.3 | | 3.6–8.6 | | 7.0–9.3 | | *F* = 74.570[a] | |
| Mean ± *s* | 4.21 ± 1.96 | | 6.29 ± 1.37 | | 6.28 ± 1.34 | | 8.63 ± 0.64 | | Scheffe test<br>(1,2) (1,3) (1,4) | |
| 95% CI | 3.6–4.7 | | 5.9–6.6 | | 6.0–6.5 | | 8.4–8.8 | | (2,4) (3,4) | |

[a] *Significant at* P *< 0.001*

*95% CI = 95% confidence interval of the mean*

*M = mastectomy, RT = radiotherapy, C = chemotherapy*

*s = standard deviation*

Table 4 **Impairment of psychoemotional well-being in the four groups**

| **Psychoemotional functioning impairment** | **Group 1 (M) $n = 56$** | | **Group 2 (M+RT) $n = 76$** | | **Group 3 (M+C) $n = 100$** | | **Group 4 (M+RT+C) $n = 40$** | | **Total $n = 272$** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| *Depression* | | | | | | | | | | |
| None | 4 | 7.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 4 | 1.5 |
| Mild | 12 | 21.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 12 | 4.4 |
| Moderate | 28 | 50.0 | 20 | 26.3 | 40 | 40.0 | 4 | 10.0 | 92 | 33.8 |
| Severe | 12 | 21.4 | 56 | 73.7 | 60 | 60.0 | 36 | 90.0 | 164 | 60.3 |
| *Anxiety* | | | | | | | | | | |
| Mild | 4 | 7.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 4 | 1.5 |
| Moderate | 20 | 35.7 | 4 | 5.3 | 4 | 4.0 | 4 | 10.0 | 32 | 11.8 |
| Severe | 32 | 57.1 | 72 | 94.7 | 96 | 96.0 | 36 | 90.0 | 236 | 86.8 |
| *Body image* | | | | | | | | | | |
| Mild | 12 | 21.4 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 20 | 7.4 |
| Moderate | 32 | 57.1 | 16 | 21.1 | 16 | 16.0 | 4 | 10.0 | 68 | 25.0 |
| Severe | 12 | 21.4 | 56 | 73.7 | 80 | 80.0 | 36 | 90.0 | 184 | 67.6 |
| *Sexual interest* | | | | | | | | | | |
| None | 4 | 7.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 4 | 1.5 |
| Mild | 8 | 14.3 | 0 | 0.0 | 4 | 4.0 | 0 | 0.0 | 12 | 4.4 |
| Moderate | 16 | 28.6 | 0 | 0.0 | 4 | 4.0 | 0 | 0.0 | 20 | 7.4 |
| Severe | 28 | 50.0 | 76 | 100.0 | 92 | 92.0 | 40 | 100.0 | 236 | 86.8 |
| *Loneliness* | | | | | | | | | | |
| None | 4 | 7.1 | 4 | 5.3 | 0 | 0.0 | 0 | 0.0 | 8 | 2.9 |
| Mild | 8 | 14.3 | 8 | 10.5 | 4 | 4.0 | 0 | 0.0 | 20 | 7.4 |
| Moderate | 28 | 50.0 | 28 | 36.8 | 24 | 24.0 | 4 | 10.0 | 84 | 30.9 |
| Severe | 16 | 28.6 | 36 | 47.4 | 72 | 72.0 | 36 | 90.0 | 160 | 58.8 |
| *Desperate about the future* | | | | | | | | | | |
| None | 4 | 7.1 | 4 | 5.3 | 4 | 4.0 | 0 | 0.0 | 12 | 4.4 |
| Mild | 16 | 28.6 | 16 | 21.1 | 12 | 12.0 | 0 | 0.0 | 44 | 16.2 |
| Moderate | 32 | 57.1 | 20 | 26.3 | 16 | 16.0 | 4 | 10.0 | 72 | 26.5 |
| Severe | 4 | 7.1 | 36 | 47.4 | 68 | 68.0 | 36 | 90.0 | 144 | 52.9 |
| *Psychoemotional well-being* | | | | | | | | | | |
| Range | 2.3–8.6 | | 4.3–8.6 | | 5.6–9.0 | | 6.1–9.1 | | $F = 36.027$[a] | |
| Mean ± *s* | 6.28 ± 1.85 | | 7.43 ± 0.98 | | 7.81 ± 0.80 | | 8.53 ± 0.83 | | Scheffe test<br>(1,2) (1,3) (1,4) | |
| 95% CI | 5.7–6.7 | | 7.2–7.6 | | 7.6–7.9 | | 8.2–8.7 | | (2,4) (3,4) | |

[a] *Significant at* P *< 0.001*

*95% CI = 95% confidence interval of the mean*

*M = mastectomy, RT = radiotherapy, C = chemotherapy*

*s = standard deviation*

in patients who received postoperative chemotherapy, with no statistically significant difference between the scores of the two groups in this domain. However, patients who had mastectomy alone or mastectomy and radiotherapy suffered significantly less from such untoward effects of treatment compared to those who had chemotherapy alone or in combination with radiotherapy.

Patients who received postoperative chemotherapy alone (group 3) or with radiotherapy (group 4) suffered from severe degrees of alopecia (30%) as compared to none in patients who underwent mastectomy alone or with radiotherapy.

## Global QL

A global QL score was generated by combining all the QL four domains. The QL was significantly impaired in patients who received adjuvant therapy compared to those who had surgery only. Patients who received chemotherapy (groups 3 and 4) were more affected than those who received radiotherapy alone; having both radiotherapy and chemotherapy was associated with the worst global QL (Figure 1).

## Demographic characteristics and QL

Comparing the mean QL scores of the married and nonmarried patients by Student *t*-

Table 5 **Physical toxicity reported as "severe" in the four groups**

| Physical toxicity | Group 1 (M) $n = 56$ | | Group 2 (M+RT) $n = 76$ | | Group 3 (M+C) $n = 100$ | | Group 4 (M+RT+C) $n = 40$ | | Total $n = 272$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy fatigue | 0 | 0.0 | 24 | 31.6 | 56 | 56.0 | 32 | 80.0 | 112 | 41.2 |
| Dizziness | 0 | 0.0 | 16 | 21.1 | 36 | 36.0 | 20 | 50.0 | 72 | 26.5 |
| Headache | 12 | 21.4 | 28 | 36.8 | 64 | 64.0 | 20 | 50.0 | 124 | 45.6 |
| Anorexia | 4 | 7.1 | 16 | 21.1 | 40 | 40.0 | 20 | 50.0 | 80 | 29.4 |
| Nausea | 8 | 14.3 | 24 | 31.6 | 72 | 72.0 | 32 | 80.0 | 136 | 50.0 |
| Vomiting | 0 | 0.0 | 40 | 52.6 | 80 | 80.0 | 24 | 60.0 | 144 | 52.9 |
| Diarrhoea | 0 | 0.0 | 16 | 21.1 | 40 | 40.0 | 20 | 50.0 | 76 | 27.9 |
| Mouth sores | 0 | 0.0 | 8 | 10.5 | 16 | 16.0 | 12 | 30.0 | 36 | 13.2 |
| Insomnia | 0 | 0.0 | 4 | 5.3 | 8 | 8.0 | 12 | 30.0 | 24 | 8.8 |
| Alopecia | 0 | 0.0 | 0 | 0.0 | 30 | 30.0 | 12 | 30.0 | 40 | 14.7 |
| *Disease/treatment-related symptoms score* | | | | | | | | | | |
| Range | 1.0–5.3 | | 2.2–6.1 | | 4.6–8.1 | | 3.4–9.3 | | $F = 138.872^a$ | |
| Mean ± *s* | 2.39 ± 1.38 | | 4.72 ± 1.01 | | 6.33 ± 0.93 | | 6.70 ± 2.05 | | Scheffe test<br>(1,2) (1,3) (1,4) | |
| 95% CI | 2.0–2.7 | | 4.4–4.9 | | 6.1–6.5 | | 6.0–7.3 | | (2,3) (2,4) | |

[a] *Significant at P < 0.001*

*95% CI = 95% confidence interval of the mean*

*M = mastectomy, RT = radiotherapy, C = chemotherapy*

*s = standard deviation*

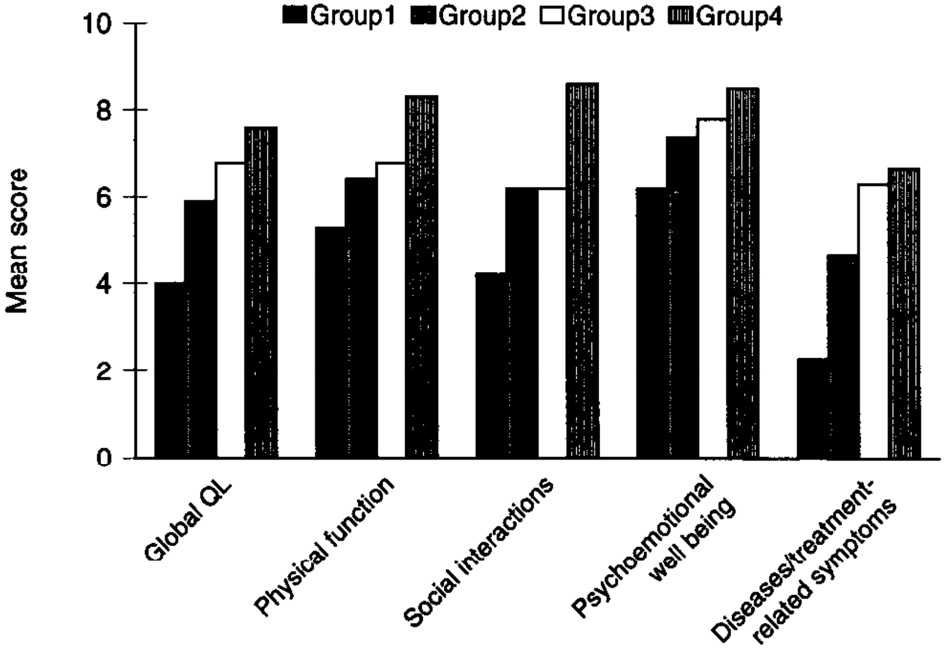

Figure 1 **Mean score of the global quality of life, physical function, social interaction, psychoemotional well-being and disease/treatment-related symptoms domains of the four groups (lower score = better quality of life)**

test revealed no significant difference in all domains. Similarly, there was no significant association between the menopausal status of patients and their QL. On the other hand, the younger the age of the woman, the greater the impairment of her global QL ($r = -0.2$, $P < 0.01$); in particular, there was more suffering from disease/treatment-related symptoms ($r = -0.2$, $P < 0.05$) and less social interaction ($r = -0.2$, $P < 0.001$). Stage I disease was associated with a significantly better QL in all domains compared to stage II disease; consequently a significantly better QL was observed for those who had radical mastectomy compared to those who had modified radical mastectomy.

## Predictors of QL using multivariate regression analysis

Group 1 was different from the other three groups regarding staging of the disease and the type of mastectomy. All patients who had stage I disease (92.8%) and those who underwent radical mastectomy were in this group. Since both stage I and radical mastectomy were associated with better QL, it was very important to control their effects in studying the impact of therapeutic modalities on QL. Stepwise regression analysis was used to predict the QL, controlling the confounders, namely age of patient, stage of the disease and type of operation (Table 6). Triple modality predicted the worst global QL and the greatest effect on the psychoemotional well-being, social interaction and physical functioning do-

Table 6 **Significant predictors of quality of life being affected (stepwise multiple regression analysis)**

| **Variable** | **Regression coefficient** | **SE** | **β** | ***P* value** |
|---|---|---|---|---|
| *Global QL* | | | | |
| Group 4 (M+RT+C) | 0.91 | 0.17 | 0.21 | 0.0000 |
| Group 2 (M+RT) | –0.86 | 0.14 | –0.25 | 0.0000 |
| Stage (I) | –1.65 | 0.22 | –0.43 | 0.0000 |
| Operation (MRM) | 1.52 | 0.24 | 0.35 | 0.0000 |
| (Constant) | 3.71 | 0.48 | | 0.0000 |
| *Physical functioning* | | | | |
| Group 4 (M+RT+C) | 1.96 | 0.29 | 0.39 | 0.0000 |
| Group 3 (M+C) | 0.48 | 0.23 | 0.13 | 0.0386 |
| Stage (I) | –1.11 | 0.27 | –0.24 | 0.0001 |
| (Constant) | 6.40 | 0.17 | | 0.0000 |
| *Social interaction* | | | | |
| Group 4 (M+RT+C) | 2.32 | 0.23 | 0.42 | 0.0000 |
| Stage (I) | –0.87 | 0.31 | –0.17 | 0.0065 |
| Operation (MRM) | 1.89 | 0.35 | 0.34 | 0.0000 |
| (Constant) | 2.52 | 0.70 | | 0.0004 |
| *Psychoemotional well-being* | | | | |
| Group 4 (M+RT+C) | 0.73 | 0.19 | 0.19 | 0.0002 |
| Group 2 (M+RT) | –0.36 | 0.15 | –0.11 | 0.0226 |
| Operation (MRM) | 2.14 | 0.19 | 0.56 | 0.0000 |
| (Constant) | 3.50 | 0.35 | | 0.0000 |
| *Disease/treatment-related symptoms* | | | | |
| Group 2 (M+RT) | –1.63 | 0.18 | –0.36 | 0.0000 |
| Stage (I) | –2.79 | 0.31 | –0.54 | 0.0000 |
| Operation (MRM) | 1.67 | 0.34 | 0.29 | 0.0000 |
| (Constant) | 3.01 | 0.68 | | 0.0000 |

*M = mastectomy, RT = Radiotherapy, C = chemotherapy,*
*MRM = modified radical mastectomy*
*β = standardized regression coefficient; SE = standard error*

mains. Receiving chemotherapy either alone (group 3) or with radiotherapy (group 4) predicted a significant limitation of physical functioning.

## Discussion

Although QL was once described as being "subjective", "immeasurable" and "poorly defined", this is no longer the case. Advances in the measurement of QL have made what was only theoretically possible a reality. The LASA score with its modifications can monitor the impact of the different modalities of treatment on the QL of patients with breast cancer.

The present study indicates that the QL of breast cancer patients, especially in terms of physical functioning and psychoemotional and social well-being, is greatly impaired. This highlights the importance of surgeons, oncologists or nurses actively inquiring into how a patient is adjusting after mastectomy or adjuvant therapy to reveal the impact of therapy; otherwise much of the consequent morbidity remains hidden [*9*].

There is no doubt that the threats facing each woman following mastectomy, namely the possible loss of her femininity, self-esteem, health and role in life, are known to have a profound impact on her QL. This study indicates that the psychoemotional well-being of women was the component of their QL most affected. A much higher prevalence of psychoemotional distress was revealed by this study compared to that reported elsewhere [*9–11*]. Maguire [*10*] and Morris [*11*] stated that at least one in every four women who undergoes mastectomy develops a depressive illness and a fifth are at additional risk of developing anxiety [*12*] or body image disturbance [*13*]. Moreover, up to one-third of these will experience sexual problems [*12–15*]. The greater effect on psychoemotional well-being revealed by this study could be explained mostly by women's fear of marital disruption or because they developed "cancer phobias". Although all the women were free of disease and had been told so repeatedly, they became terrified of recurrence or having cancer in the other breast.

Although patients in this study were interviewed on a single occasion only, three months after mastectomy, Bloom et al. [*16*] reported that postmastectomy women experienced moderate social and psychological distress and disruption in their everyday lives and that this level of distress continued for over a year thereafter. On the other hand, Morris et al. [*14*] reported that three-quarters of their patients no longer felt psychologically distressed by mastectomy after one year and those who remained distressed were those whose personalities had a strong component of emotional liability. Intervention may, therefore, be appropriate at an early stage for patients who are at risk since they are more likely to have long-term problems [*14*].

Clearly, disruption of the QL of mastectomized patients is greater for women with stage II breast cancer, who usually undergo additional treatment following mastectomy and who face a greater threat to life [*16*]. Maguire et al. [*12*] reported a greater disturbance of the QL of patients receiving postoperative radiotherapy compared to those who underwent mastectomy alone. Patients felt exhausted and even lower in spirits because they associated having radiotherapy with a worse prognosis. In addition, during radiotherapy patients may experience a variety of physical changes that may in turn trigger some emotional reactions [*17*]. In the present study, patients who underwent mastectomy alone reported better physical functioning, less social and psychoemotional distress and much less physical toxicity compared to patients receiving radiotherapy, chemotherapy or both.

Although systemic chemotherapy improves the prognosis after radical mastectomy or modified radical mastectomy, little information is available on the quality of survival [*18*]. In the present study, the use of CMF resulted in significantly lower physical functioning than could be accounted for by mastectomy alone. The combination of chemotherapy and radiotherapy following mastectomy (triple modality) resulted in an increased morbidity than that caused by either modality separately. Maguire et al. [*19*] reported a higher incidence of psychoemotional morbidity in patients given chemotherapy and suggested that it was linked to physical toxicity. Cooper et al. [*20*] added that such morbidity was significantly greater in patients completing a one-year course of chemotherapy than those who had radiotherapy alone. This difference was still evident at 18 months. The use of CMF has also been shown to lead to greater psychiatric morbidity compared to mastectomy alone [*19,20*]. Depression may be due to adverse effects like nausea, vomiting, hair loss or to a direct effect on the brain. In turn, depression may reduce the patient's tolerance of the adverse physical effects of treatment, especially the toxicity of chemotherapy. Then, if mood disorder is severe, the patient may even refuse further treatment [*21*]. Anxiety may also stem from the adverse effects of CMF or from the development of a conditioned response [22]. In addition, CMF reduces estrogen levels and elevates follicular stimulating hormone and luteinizing hormone. Thus, premenopausal women undergo artificial menopause and many may experience a profound loss of libido. Such changes in sexuality and other adverse effects like hair loss may intensify any body image problems [*23,24*]. Multivariate analysis, after controlling for the effect of the stage of disease, type of operation and age of the patient, revealed that mastectomy coupled with radiotherapy and chemotherapy predicted the worst QL.

It was noted that patients in this study failed to take preventive action. They waited until side-effects were severe and persistent and then began self-care behaviour. When this failed in relieving distress, they started to seek medical care for their physical symptoms but not for their psychoemotional or social distress. Nondisclosure of the adverse effects of mastectomy or of the physical toxicity resulting from radiotherapy or chemotherapy by the patient is worrying since it misleads clinicians about the consequences of treatment and results in poor compliance [*21*]. Women usually do not disclose their problems because they do not want to burden the health care workers whom they see as busy and harassed. They also believe, albeit wrongly, that they are the only ones who are not coping and are afraid that if they admit this, they will be seen as inadequate. Moreover, they often feel ashamed. They are aware that the medical staff's priority is their physical well-being and consider that it is not justifiable to mention other concerns. They may also perceive their problems as inevitable and about which nothing can be done. Rowland and Holland [*6*] stated that doctors and nurses were either not providing information to alleviate adverse effects of therapy or were presenting information in a form the patient found difficult to recall.

Therefore, patients treated with mastectomy alone or with postoperative radiotherapy and/or chemotherapy should be asked routinely if treatment has been causing any problems or if they have specific side-effects. It is important for health care workers to understand that accurate information and realistic expectations can, and must be, conveyed to patients seeking and receiving treatment for breast cancer. The nursing care of patients receiving radiotherpay and/or chemotherapy, particularly for the treatment of breast cancer, depends on the nurses understanding the scientific principles underlying the mode of treatment and realizing its impact on the QL. Without such knowledge, nurses may be unable to assess patients effectively and therefore be unable to diagnose nursing problems and plan effective care.

In this study, patients were not informed about the different treatment policies and the advantages and disadvantages of each. Since assessment of the QL can provide important information that can help patients make choices among treatment options, it is vital to elicit patient preferences when making treatment decisions. However, it must be remembered that incorporation of individual preferences into the decision-making process is not a substitution for the direct assessment of patient outcome regarding disease-free interval and survival.

From the present study, it can be concluded that: 1) incorporation of symptom relief and QL measures along with the traditional end points (response, disease-free survival and overall survival) is of supreme importance for proper evaluation of the mode of treatment; 2) patients need health education regarding treatment options, potential adverse effects of each treatment and how to cope with these adverse effects to improve their QL; and 3) individual preferences of treatment should be considered when making treatment decisions.

What happens if traditional end points, such as response rate, time to progression and survival, favour a particular treatment but QL evaluation suggests that a different treatment is superior? Unfortunately, there is still no clear solution to this dilemma. However, it is reasonable to consider the use of QL as a primary end point when the goal of treatment is symptom palliation rather than prolongation of survival.

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## Correction

**Determination of the duration of lactational amenorrhoea among mothers in Alexandria, EMHJ Vol.2 No.3. December 1996, pages 396–406, by Khadiga A. Khalil, Hoda Y. Atta, Faten A. Kamel and Randa M. Youssef.**

The term "hazard rate" should be replaced by "hazard ratio" throughout the article.