Journal of Pharmaceutical Research Vol. 11, No. 4, December 2012 : 118-122.

EVALUATION OF OUTCOMES OF BREAST CANCER WITH A SPECIAL FOCUS ON ECONOMIC IMPACT AND QUALITY OF LIFE - A PILOT STUDY

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Received on : 11.01.2012 Revised : 16.11.12 Accepted : 17.11.12

ABSTRACT
Objectives: A pilot study is conducted to evaluate the outcomes of pharmacological management of breast cancer in a hospital setting. Method: Patient interviews were held to study the economic out come and standardized tool EORTC QLQ C 30 and its breast specific module EORTC QLQ BR 23 was utilized to measure the quality of life. Fifty two subjects diagnosed at different stages of the disease were studied. Results: The respondent's age ranged between 28-67 years, mean age 47.05(SD=9.33). The educational status varied from illiterate to university, the illiterate (28.84%), primary education (25.0%), class 5-10 (36.53%), intermediate undergraduate (7.69%), and post graduate studies (1.92%). Most of the participants (84.6%) were married and cohabiting with their spouses and few (15.38%) were widowed. The TNM staging of breast cancer was observed as first stage (none), stage II (42.3%), stage III (40.4%), and stage IV (15.4%), stage unknown (1.9%). All patients were treated with a multimodality approach for management. The cost analysis revealed that there are significant, differences among different modalities of treatments (Rs.1.01 lakh, Rs.1.17 lakh, Rs.1.53 lakh). The average direct cost of treatment for group I (4cycles of AC chemo, Rs.1.01 lakh), and group II (6 cycles of chemo Rs.1.17 lakh) and group III (8 cycles of chemo Rs.1.53 lakh).The quality of life study revealed that there are differences in the functional scales as well as symptoms scales among the patients treated with different treatment regimens. Discussions and Implications: Breast cancer is a very commonly diagnosed cancer among women all over the world .Early diagnosis and timely treatment can prolong the disease free survival of such patients with an improved quality of life. This research revealed different approaches of treatment for breast cancer management, in a private hospital setting in south India and the cost involved in three approaches, and their quality of life .The follow up after one year showed that most of them are leading a disease free life with better quality of life.

Key words: *Breast cancer; Outcomes Evaluation; Quality of life; cost analysis.*

INTRODUCTION

Cancer is a group of more than 100 different diseases and abnormal growth. Cancer begins when a cell breaks free from the normal restraints on cell division and begins to follow its own agenda for proliferation. It is a major health problem that occurs in all ethnicities.[1] Breast cancer is a very commonly diagnosed cancer among women and it is found to be the 2nd most common cause of cancer death among women. The World Cancer Report in 2003 revealed that cancer has emerged as a major health problem in developing countries as well, matching its effect in industrialized nations. Breast Cancer rates could increase by 50%, leading to 15 million new cases by the year 2020. According to WHO, although cancer rates in India are considerably lower than those seen in more developed countries, there has been a steady increase in the crude incidence rates of all cancers affecting both men and women in India over the last 15 years.[2] Urbanization, industrialization, changes in life styles, population growth and ageing population, all have confounding effect on an epidemiological outbreak in the country. The increase in the number of cancer cases in India highlights the importance of steps to curb the growth of this deadly disease. A pilot study was conducted to measure the economic and humanistic outcomes of breast cancer and its management in an oncology hospital setting. The literature review revealed so for no such studies were conducted in Indian patient population which mandates the need for the study.

METHODS

A cross sectional study was conducted on 52 breast cancer patients who were under treatment in an oncology referral hospital of south Karnataka between July 2009 to November 2009.This pilot study aimed at

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finding out the economic outcome and the quality of life of breast cancer patients after preliminary treatments. Women of all ages who were diagnosed to have breast cancer under treatment and understand the languages Kannada, English or Malayalam were included in the study. Patient data collection form was devised with columns and rows including age, education, marital and professional status, clinical characteristics, and economic background and treatment details of breast cancer patients. Information on demographics, diagnostic tests, treatment details and other clinical characteristics were obtained from the patient's medical record, laboratory reports, histopathology reports, patient treatment charts and discharge summaries of individual patients.

A standardized tool prepared by the European Organization for Research and Treatment of Cancer, EORTC Quality of Life Questionnaire QLQ C 30 version 3 and its breast cancer specific module EORTC QLQ BR23 was used for measuring quality of life and treatment related symptoms with prior permission[3, 4]. The tool was translated to the vernacular language (Kannada) by language experts and reliability analysis was carried out before use (Guttmann split half =0.76). The tool, EORTC QLQ C 30 is multidimensional (measures different dimensions of Quality of Life), composed of 30 items both multi item scales (multiple questions to measure 1 dimension) and single item (single question to measure 1 dimension of quality of life) measures. The multi item functional domains were physical, role, emotional, cognitive and social functioning. There were few multi item symptoms scales; namely fatigue, nausea vomiting, pain, and one global health scale. The six single items measuring symptoms were dyspnoea, insomnia, appetite loss, constipation, diarrhea and financial difficulties. These were coded with the similar response categories 1-4, where one meaning not at all true and 4 meaning very much true. Global health status/(overall assessment of one's quality of life by the patient) there were 2 questionnaires to assess the global health status (q.No.29 and 30). Quality of Life was scored as a visual analogue scale ranging from 1-7, where 1 means very poor and 7 means excellent. All the scores, multi and single item scores were transformed into 0-100 scales scores. A high scale score represents high level of functioning or global QOL. On the other hand, for the symptoms a high score means higher level of symptoms or problems. The breast cancer specific module, QLQ BR 23 comprises of 23 questions assessing disease symptoms, side effects of treatment, body image, and sexual functioning. In addition, single items assess sexual enjoyment, upset by hair loss and future perspective. The scoring was done same as QLQ C 30. Two items, sexual functioning and sexual enjoyment was not included in the analysis as most of the patients did not answer these questions.

Information regarding the costs was obtained by chart review and directly asking to the patient or their relatives. The cases were then grouped into three, based on the chemotherapeutic regimen, prescribed and the economic outcome and the quality of life at the point of treatment were compared amongst the three.

Ethical issues

The study was carried out after getting ethical clearance from the institutional ethical committee of Kasturba Hospital Manipal, (Ref. No. IEC114/09). The quality of life of breast cancer patients was measured by distributing the tool to the study participants after getting informed consent from them.

Data analysis

The data were analyzed according to the study objectives using SPSS software package version 11.5. Both descriptive and inferential statistics are used to describe the study. The quality of life assessment is carried out by converting the scores first to raw scores, then to percentage scales for each dimensions of quality of life, using the guidelines as given by EORTC in SPSS soft ware. The quality of life expressed as mean and standard deviation (Descriptive statistics). The economic outcome was found by enquiring the different details of treatment, and calculating the cost involved in each.

RESULTS

A total of 52 breast cancer patients were interviewed in this pilot study. The raw scores were computed and then converted to percentage. The demographic and clinical characteristics are depicted in Table 1. Most of the participants were of 48years age; mean age was 47.05(SD=9.33), median and mode 48 years. Majority of the group were married and cohabiting with their spouse, while few were widowed. Most of the subjects of this study was less educated and house wives (88.5%), while very few (11.5%) were employed. The mean global health of the patients was 55.28(SD=24.36). The best functional outcomes found for the functional scales were physical, role, emotional and role functioning (>70%) and future perspectives scored low (<40%). Among the symptoms scale, the subjects were upset by the hair loss scored the highest and constipation was as low as 9.3%.

To compare the quality of life of different treatment groups one way analysis of variance was applied which revealed that there were no significant differences among the three treatment groups in most of the subscales as measured by quality of life measuring questionnaire (EORTC QLQ C 30 and QLQ BR 23). Only one functional scale, social functioning was found to have significant difference among the three groups (P=0.042). Likewise, one symptom scale, nausea and

vomiting gave significant p value (P=0.021). One way ANOVA was carried out for comparing the Quality if life of breast cancer patients after treatment with 3 drugs regimen. Other aspects were not considered.

Table 1: Demographic and disease characteristics of the study participants.

Variable		No	%	p valu
Age	< 35yrs	3	5.8	0.430
	36-50 yrs	29	55.8	
	51-64	19	36.5	
	>65yrs	1	1.9	
Education	Illiterate & Primary	28	53.8	0.826
	Inter-under graduate	4	7.7	
	Post graduation	1	1.9	
Marital status	Married and cohabiting	44	84.6	0.430
	Widowed	8	15.38	
Occupation	Employed	6	11.5	0.960
	Unemployed	46	88.6	
Family income	< 50,000 per annum	25	48.1	0.186
	500001-1lakh per annum	19	36.5	
>l lakh per annum		8	15.4	
Disease stage	stage 1	0	0	0.161
	Stage 2	22	42.3	
	Stage 3	21	40.4	
	Stage 4	8	15.4	
	Unknown stage	1	1.9	
BMI	< 18	5	9.6	0.139
	18.1-24.9	32	61.5	
	25-30	8	15.4	
	30.1-35	5	9.6	
	unknown	2	3.8	
Histo-Pathology				
Infiltrating ductal carcinoma		46	88.5	0.438
	Others	6	11.5	
Hormone receptor status of tumor				
	Estrogen Receptor +ve	24	46.2	0.140
	Estrogen Receptor –ve	24	46.2	
	Unknown	4	7.7	
Progesterone receptor +ve		20	38.5	0.718
	Progesterone receptor –ve	28	53.8	
	Unknown	4	7.7	
	HER2 +ve	23	44.2	0.284
	HER 2 –ve	22	42.2	
	Unknown	7	13.46	

HER - Human Epidermal Growth Factor Receptor

All patients were treated with or planned for a multimodality treatment approach (surgery, chemotherapy, Radiotherapy (RT) and /or hormone) for breast cancer management. The subjects were grouped into three on the basis of drugs regimen used for pharmacological management and the economic outcome and the humanistic outcome was compared amongst the three groups. The pharmacological management details showed that 42.3% of cases were treated with 8 cycles regimen, 4 cycles of Adriamycin-cyclophosphamide combination and 4 cycles of paclitaxel, adjuvant to surgery, followed by radiotherapy (group 3). Another 36.5% of cases were treated with 4 cycles of adriamycin-cyclophosphamide combination once in 21 days (group 1). Nine of them (17.3%) were treated with 6 cycles of 5-Fluorouracil, Adriamycin and cyclphosphamide combination regimen supplemented with surgery and radiotherapy (group 2). Two subjects (3.8%) were managed without any drugs, but with surgery, radiotherapy and hormone. All cases with ER/PR positive status were suggested with hormone treatment for a period of 5 years.

The economic outcome

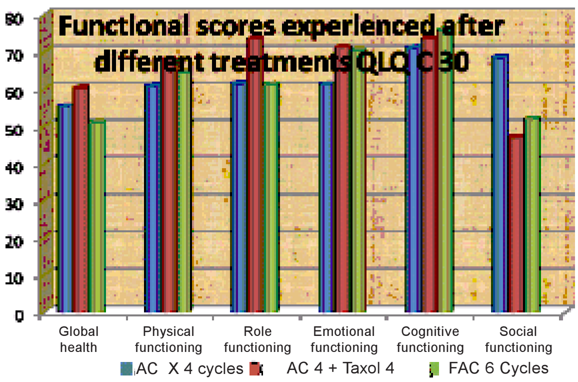
Almost all patients were prescribed with multimodality treatment, i.e., with surgery, chemotherapy and external beam radiotherapy to the chest wall. In addition to this all the cases of which the tumors were hormone responsive, were supplemented with hormones tamoxifen/letrozole as adjuvant hormone therapy. The cost of treatment was computed as direct medical costs; including consultation cost, drugs cost, investigations cost, cost of surgical treatment and cost of radiotherapy. The subjects were grouped into three according to the drugs combination as group I (AC x 4 cycles regimen), Group II (6 cycles of 5-Fluorouracil, Adriamycin and Cyclphosphamide) and group III (AC x 4 cycles + paclitaxel 4 cycles regimen). The cost incurred in each group of patients is given in Table 2. Cost comparison by one way ANOVA revealed that there are significant differences amongst the cost of drugs and total direct costs among the 3 groups of patients (p=<0.0001,P=<0.001,df=2), degrees of freedom in this case is 2.

Table.2: Comparison of direct cost of treatment of breast cancer patients in a tertiary care oncology center

Sl. No	Different costs Of treatment	Group I AC X 4 cycles Mean costs (S.D) in INR	Group II FAC x 6 cycles Mean cost (S.D) in INR	group III AC x 4 + Taxol 4 Mean costs (S.D) in INR
1	Consultation cost	642(100.61)	805(63.88)	1050(173.73)
2	Cost of drugs	27294(30319.66)	43009.77(16960)	78698.59(6502.50)
3	Surgical treatment	22257(7259.19)	22250 (9484.84)	21454(6345.05)
4	Investigations	16728(3228.8)	16973 (1474.22)	18528(4690.68)
5	Radiotherapy and related expenses	34080(4091.41)	34080(4091.41)	34080(4091.41)
7	Total direct cost	101001(13658.64)	117117(13370.67)	153808(13357.42)

Quality of life (Humanistic outcome)

Figure 1-3 show the functional scales and global health of breast cancer patients as measured by EORTC QLQ core questionnaire C30 and its breast cancer specific module QLQ BR 23 at a point of their treatment. Among the 6 functional scales in QLQ C 30, cognitive function scored highest, a mean value of 78.11%, when all the three groups of patients were considered. Emotional functioning, role functioning and physical functioning also were scored above 60%, in all the three groups. However global health scored less than 50% in all the three groups, mean value 40.85%. Among the symptoms scales, upset by hair loss scored as high as 75.5% and constipation scored as low as 9.3%. Financial difficulties scored 55.2%. There was a trend of increased financial difficulty from 4cycles of drugs to 6 cycles and then to 8 cycles. Systemic therapy side effects scored above 40% in all the three groups of patients. Pain symptoms were prominent to an extent of 27.7- 36.5% in all the three groups.



Note: *AC=Adriamycin, cyclophosphamide, FAC=AC+5-fluorouracil*

Fig. 1: Comparing functional scores of quality of life in different treatment groups.

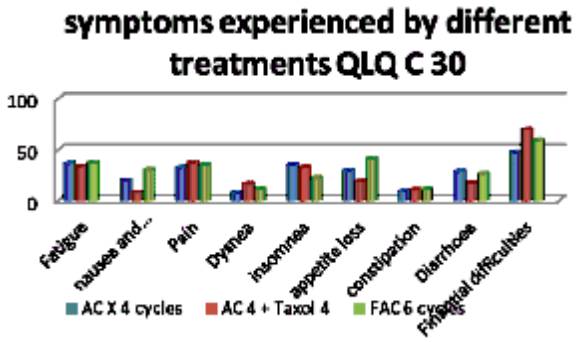


Fig. 2: comparing symptoms scales of quality of life in different groups

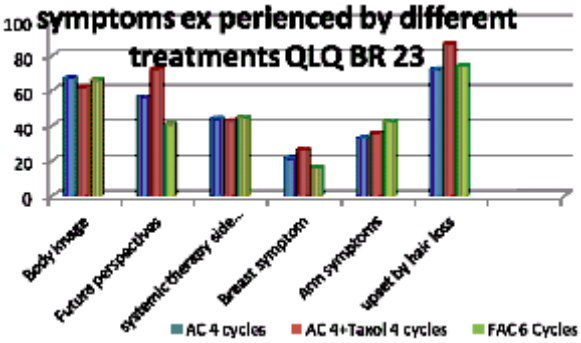


Fig .3: Comparing different domains of quality of life in QLQ BR 23 tool.

Discussion

This pilot study on 52 breast cancer patients provided data on the economic and humanistic outcomes of breast cancer diagnosis and treatment of patients in an Indian private hospital set up. Health related quality of life (QOL) is now considered as important end point in cancer clinical trials.[5, 6] Assessing QOL in cancer patients can be a basis for improved patient care. In a descriptive study of published literature on non-medical outcomes in breast cancer patients, the most frequently reported outcomes were health related quality of life.[7, 8, 9]

The cost analysis in this study shows that the diagnosis and treatment of breast cancer puts the patient and his family on a heavy financial burden. As depicted in Table 2, the cost of treatment increases steadily as one goes from 4 cycle regimen to 8 cycle regimen. The number of drug cycles prescribed is mainly on the basis of stage of cancer and other risk factors. An early detection and timely treatment will definitely cut down the cost of treatment and prolong survival of breast cancer patients. Early detection is possible by regular breast self examinations, clinical examinations and/or mammography screening, which is not very common among Indian women.

The quality of life analysis shows that there are limitations in different functional domains of breast cancer patients. The average global health of patients from the pooled data is 55.28(SD=24.36). Global health was highest among group III patients, where the cost was the highest. However social functioning was least in group III (46.96%) and highest in group I. Financial concern was highest in group III and least in group I. Social functioning is very low as 55.5% when compared with other functional scales. This indicates that the personality and behaviors of women are affected by the disease and measures are to be taken in order to improve the overall quality of life and functioning of breast cancer patients after diagnosis and treatment of the disease.

When compared among the 3 different treatment groups, except social functioning, the functional scales of quality of life are found better in patients in group II (AC+TAXOL group) and it is found worst in group III(FAC). The symptoms scores are maximum in group III and least in group II. This means that treatment regimen II is more acceptable by the patients. However, when we consider the cost of treatment, the cost is also highest in group II.

A gradual decrease in functional scores and an increase in symptoms scores are observed, as it goes from group I to group III. This may be because of the longer duration of treatment and also due to the nature of drugs used. Among the symptoms scales, financial difficulties were found to be of great concern, measured to a mean score of 59.87% ranged from 47.33-73.02% from group I to group III. Systemic therapy side effect score is prominent to a mean value of 43.63%. This is an indication for the clinicians to take maximum precautions while treating with the chemotherapeutic agents. Among the symptoms scales of breast cancer specific module, upset by hair loss was as high as 86.3% in group III, 71.92% in group I. All other symptoms scored to a lesser extent. There are slight differences in the symptoms scores amongst the three groups of patients. However, one way- ANOVA gave no significant results(table 2). Only social functional score and one symptom score, nausea and vomiting gave significant p value; (P=0.042 and 0.01) respectively. Psychological and social supports extended to such patients can take care of this issue. Mind, body or spiritual therapies such as hypnosis, breathing exercises, prayer, music and meditation are few of such, which could focus on emotional and psychological aspects of such patients.[10, 11, 12.] Studies abroad have revealed similar results which were utilized to make changes in care giving and the implementation of changes were really worthy as indicated by various QOL studies. Our studies were able to establish baseline data on issues of the quality of life of breast cancer patients[13].

CONCLUSION

Study of quality of life in breast cancer patients is important in assessing treatment outcomes. This study

examined the economic and humanistic outcomes of breast cancer diagnosis and its management. Along with medical treatment, it is also necessary to give mind body therapies to improve the quality of life.

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