

Stage at diagnosis, clinicopathological and treatment patterns of breast cancer at Bugando Medical Centre in north-western Tanzania

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Abstract: Breast cancer, although reported to be the commonest female malignancy worldwide has not been extensively studied in north-western Tanzania. The aim of this retrospective review was to describe in our setting, the stage at diagnosis, clinicopathological and treatment patterns among patients with breast cancer. Data were analyzed using SPSS software system. A total of 384 patients were studied. The median age was 45 years (range 21 to 78 years). The male to female ratio was 1: 46.8. Most of the patients were premenopausal (63.8%) and presented late with advanced breast cancer disease. Majority of patients (63.0%) presented with stage III disease. Lymph node and distant metastasis at the time of diagnosis was reported in 70.8% and 21.4% of patients, respectively. Invasive ductal carcinoma (91.7%) was the most frequent histopathological type and most patients (63.8%) had poorly differentiated tumour. Patients with tumour size greater than 6cm had significantly high rate of lymph node metastasis ($P=0.001$) and presence of necrosis within the tumour ($P=0.012$) compared to patients with tumour size less than 6cm in diameter. Patients younger than 45 years had significantly high rate of lymph node metastasis compared to the patients above this age ($P=0.011$). Mastectomy was the main modality of treatment that was used in 99.5% of the patients. Adjuvant chemotherapy and radiotherapy was reported in 44.8% and 11.7% of patients, respectively. Hormonal therapy (tamoxifen) was given postoperatively to all patients. The overall five-year survival rate was 21.8%. The age of patient at diagnosis, stage of disease, extent of lymph node involvement and histological grade were found to be independent predictors of overall survival rate ($P<0.001$). Local recurrence was 17.7% and it was significantly related to the stage of disease ($P=0.003$) and non-adherent to adjuvant therapy ($P=0.021$). Breast cancer patients in this region are relatively young premenopausal women and mostly present late with advanced stage and high rate of lymph node metastasis. There is need to improve public enlightenment of breast cancer and set up screening centres to encourage early presentations.

Keywords: breast cancer, stage, diagnosis, clinicopathology, treatment, Tanzania

Introduction

Breast cancer is one of the commonest malignant tumours in the world and is one of the leading causes of death due to cancer in women (Abdallah *et al.*, 1999; Christobel & Baun, 2000; Okobia & Osiime, 2001; Ikpatt *et al.*, 2002; Ohanaka & Ofoegbu, 2002). The incidence rates of breast cancer show considerable global variation being higher in developed countries than in developing countries (Vorobiof *et al.*, 2001; Ikpatt *et al.*, 2002). In Africa, breast cancer has overtaken cervical cancer as the commonest malignancy affecting women and the incidence rates appear to be rising (Vorobiof *et al.*, 2001; Omar *et al.*, 2003). In Tanzania, breast cancer constitutes the second leading cause of cancer incidence and mortality for women (Ngoma &

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Mtango, 2002), and the lifetime risk for developing breast cancer in Tanzania like in most developing countries is approximately 1 in 20 (Parkin, 2003).

The increase in the incidence of breast cancer in developing countries can be attributed to changes in the demography, socio-economic parameters, epidemiologic risk factors, better reporting and awareness of the disease (Parkin *et al.*, 2005; Adesunikanmi *et al.*, 2006). While mortality rates are declining in the developed world as a result of early diagnosis, screening, and improved cancer treatment programmes, the converse is true in the developing world (Hisham & Yip, 2004; Parkin *et al.*, 2005; Adesunikanmi *et al.*, 2006).

One major determinant whether a cure for breast cancer will be possible or not is the stage at which the patient presents. Several factors determine the stage at which patients with breast cancer present to the hospital. Some of such factors include educational status, financial capability, occupation, location, presence of health care facilities, etc. However, a common denominator of these factors is the level of awareness and attitude toward breast cancer. For those patients that are aware about the disease and have the right attitude toward it, there is an increased chance that they will present early for treatment, while the contrary will be the case for those patients who may not be aware of breast cancer and also have wrong attitude toward the disease (Okobia *et al.*, 2006).

The clinical stage of the disease at presentation is important for the outcome of the patient with breast cancer. However, in most African countries including Tanzania, patients present late with advanced stage of the disease and only palliative care is possible (Amir *et al.*, 1994; Ngoma & Mtango, 2002; Rambau *et al.*, 2011). This can be explained by delay in seeking medical services and poor medical service with no screening programmes for breast cancer. The staging of the patient in conjunction with histological grade can be used to determine the prognosis of the patient. Whereas stage I disease has about 96% 5-year survival rate, this can be as low as 18% 5-year survival rate in stage IV (Elston & Ellis, 1991; Henson *et al.*, 1991; Elston *et al.*, 2005; Rambau *et al.*, 2011).

The management of breast cancer poses a great challenge in resource limited societies as found in Africa. Late presentation of the disease, lack of adequate mammography screening programmes, preponderance of younger pre-menopausal patients and a high morbidity and mortality are among the hallmarks of the disease in Africa (Vorobiof *et al.*, 2001; Adesunikanmi *et al.*, 2006). The results of prevention of breast cancer or breast cancer cure have not been very encouraging more so in the developing countries (Gakwaya *et al.*, 2008). The present day knowledge of this disease does not have any effective primary prevention. It is thus imperative that efforts should be made to detect the disease in its early stages. Mammography has been found to be useful but it is not feasible for mass screening in most developing countries as there is a limited number of units accessible to the general public (Ngoma & Mtango, 2002). Public education towards Breast Self Examination should be propagated because it is practical and affordable (Ngoma & Ngoma, 2004).

The current treatment of breast cancer includes surgery, chemotherapy, radiotherapy, hormonal therapy and targeted therapy using monoclonal antibodies like Bevacuzumab and Trastuzumab as well as palliative and supportive care in advanced cases (Elumelu *et al.*, 2011). The treatment of breast cancer in sub-Saharan Africa is largely limited to surgery because of advanced stage at presentation and limited access to diagnostic imaging as well as adjuvant

therapy. Mastectomy is, therefore, the treatment of choice for the majority of cases (Vorobiof *et al.*, 2001; Omar *et al.*, 2003; Adesunkanmi *et al.*, 2006). The outcome of treatment of breast cancer in our environment has been poor because the majority of these patients present late to the hospital with advanced stage. This is partly due to paucity of local data regarding this condition and lack of community awareness on the importance of early reporting to hospital for early diagnosis and treatment.

Despite the effort made by the Medical Women Association of Tanzania (MEWATA) on breast cancer awareness and screening campaign in most parts of Tanzania, breast cancer continues to be a major cause of morbidity and mortality and majority of these patients still present late with advanced stage (Ngoma & Mtango, 2002; Rambau *et al.*, 2011). This study was therefore, undertaken to describe the stage at presentation, clinicopathological and treatment patterns in a consultant hospital in north-western Tanzania.

Methods and Patients

Study area and design

This was a retrospective study of histologically confirmed breast cancer patients seen at the department of Surgery of Bugando Medical Centre (BMC) over a period of 10-years (January 2002 and December 2011). BMC is a consultant, tertiary care and teaching hospital for the Catholic University of Health and Allied Sciences-Bugando (CUHAS-Bugando) and has 1000 beds. The hospital is located in Mwanza in north-western Tanzania and serves as a referral centre for tertiary specialist care for a catchment population of approximately 13 million people from Mwanza, Mara, Kagera, Shinyanga, Tabora and Kigoma.

The hospital has a newly established Oncology Department which provides care for all patients with histopathologically proven cancers including skin cancers. However, the department does not currently provide radiotherapy services. As a result patients requiring this modality of treatment have to travel long distances to receive radiotherapy elsewhere.

Study population

The subjects of this study included all patients who presented to BMC with histologically confirmed breast cancer during the period under review. Patients with incomplete data were excluded from the study. The details of patients were obtained using data derived prospectively from BMC medical record database, 2002-2011 and also from patients' files kept in the Medical Record Department, the surgical wards, operating theatre and histopathology laboratory. The study variables included demographic data (age, sex), parity, family history of breast cancer, marital status, menopausal status, duration of illness, anatomical side and quadrant, tumour size, pathological nodal status, clinical stage, histopathological type and grade, treatment modalities, outcome and follow up. The outcome variables in this study were survival and local recurrence. This information was collected using a pre-formed questionnaire.

Determination of histological type and grade

Determination of histological type and grade was established by Modified Bloom-Richardson score system which scores for tubular formation, nuclear pleomorphic and mitotic rate within

tumour cells. Other tumour morphological features like presence of necrosis, and involvement of the skin was evaluated. The clinical stage of the disease was assigned to each patient by using TNM (AJCC Cancer Staging Manual). This is a staging system which is expression of anatomical extent of disease based on extent of primary tumour (T), absence or presence of and extent of regional lymph node metastasis (N) and absence or presence of distant metastasis. Other investigations performed include full blood count, serum urea and electrolytes and liver function test. Chest radiograph and abdomino-pelvic ultrasound and CT scan were performed to rule out distant metastasis.

Treatment modalities and follow up of patients

Treatment was based on the tumour stage and patient's performance status. Patients with early or locally advanced disease were treated with modified radical mastectomy (MRM). Patients with metastatic disease were offered simple or toilet mastectomy \pm axillary clearance as indicated. Adjuvant chemotherapy and radiotherapy were given postoperatively. Patients requiring radiotherapy were referred to Ocean Road Cancer Institute in Dar es Salaam. Hormonal therapy using tamoxifen was offered to all patients at a daily dose of 20mg for five years as oestrogen receptors and progesterone receptors were not tested. Follow-up visits were scheduled every 3 months for 2 years and every six months thereafter for a period of five years or death. Survival analysis was carried out with survival defined as the time between the date of commencement of treatment and the date of last follow-up or death (Sant *et al.*, 2004).

Data analysis

Statistical data analysis was done using SPSS software version 17.0 (SPSS, Inc, Chicago, IL, USA). Data was summarized in form of proportions and frequency tables for categorical variables whereas continuous variables were summarized using median and ranges. Chi-square (χ^2) test was used to test for significance of associations between the predictor and outcome variables in the categorical variables) whereas independent student t-test was used in continuous variables. Odds ratio (O.R.) was calculated to test for strength of association between predictor variables. Multivariate logistic regression analysis was used to determine predictor variables that are associated with outcome. Significance was defined as a p-value of less than 0.05.

Ethical consideration

Ethical approval to conduct the study was obtained from the CUHAS/BMC Joint Institutional Ethic Review Committee before the commencement of the study.

Results

Characteristics of patients

During the study period, a total of 399 patients with histopathologically confirmed primary breast cancer were admitted to BMC. Of these, 15 patients were excluded from the study due to incomplete data, leading to a final study population of 384 breast cancer patients. The patients' ages at the time of diagnosis ranged from 21 to 78 years (median= 45 years). The modal age

group was 31-40 years accounting for 49.7% of cases. The majority of patients, 215 (56.0%) were young than 40 years. Eight (2.1%) patients were males and 376 (97.9%) were females with a male to female ratio of 1: 46.8. Most of the patients were married (67.7%). Family history of breast cancer was documented in only 2.3% of cases. Out of 376 female patients, 240(63.8%) were pre-menopausal (Table 1).

Table 1: Characteristics of patients with breast cancer at BMC

Patient characteristics	Response	Number of patients	Percentages
Age in years	<30	24	6.3
	31-40	191	49.7
	41-50	90	23.4
	51-60	63	16.4
	>60	16	4.2
Sex	Males	8	2.1
	Females	176	97.9
Parity	Nulliparous	57	14.8
	Multiparous	200	52.1
	Grandmultiparous	79	20.6
	Not documented	48	12.5
Family history of breast cancer	Yes	14	3.6
	No	306	79.7
	Not documented	64	16.7
Marital status	Married	260	67.7
	Single	44	11.5
	Divorced/widowed/separated	68	17.7
	Not documented	12	3.1
Menopausal status	Pre-menopausal	240	63.8
	Post-menopausal	136	36.2

Clinicopathological pattern

The duration before presentation of the initial tumour ranged from 1 to 36 months with a mean of 11.4 ± 5.2 months. The majority of patients (54.4%) presented to the BMC between 6 to 12 months of onset of symptoms. Three hundred and eighty-two (99.5%) patients presented with a lump followed by ulceration/erythema and nipple retraction in 214 (55.7%) and 204 (55.1%) patients respectively. Nipple discharge and arm swelling was documented in 84 (21.9%) and 12 (3.1%), patients respectively. Right breast was involved in 198 (51.6%) patients. Upper outer (lateral) quadrant was commonly involved in 364 (94.8%) patients.

Majority of patients (54.9%) at the time of diagnosis presented with T3 tumours. Macroscopically, the tumour size at presentation ranged from 1 to 18cm in diameter with a median size of 6cm. Two hundred and two (52.6%) patients had tumours above 6cm in diameter. Lymph node metastasis at the time of diagnosis was reported in 272 (70.8%) patients and most of them (45.3%) had N3 pathologic nodal status. Distant metastasis at presentation was recorded in 82 (21.4%) patients and occurred mostly in the lungs, liver, bone and brain in 46 (56.1%), 23 (28.0%), 20 (24.4%) and 8 (9.8%) patients, respectively. Most of patients presented with stage III disease (63.0%) followed by stage IV (21.4%). Invasive ductal carcinoma was the

most frequent histopathological type accounting for 91.7% of cases. Most patients (63.8%) had poorly differentiated tumour (G3 grade) (Table 2). The presence of necrosis within the tumour was reported in 218 (56.8%) patients.

Table 2: Clinicopathological pattern of breast cancer patients at BMC

Variable	Response	No. patients	%
Duration of symptoms (in months)	1-6	52	13.5
	6-12	209	54.4
	12-24	78	20.3
	> 24	45	11.7
Laterality	Right	198	51.6
	Left	180	46.9
	Bilateral	6	1.5
Anatomical quadrant	Upper outer quadrant	364	94.8
	Upper inner quadrant	7	1.8
	Lower outer quadrant	7	1.8
	Lower inner quadrant	3	0.8
	Nipple	2	0.5
	> one quadrant	134	34.9
Metastasis	Lymph node metastasis	272	70.8
	Distant metastasis	82	21.4
	Not reported	45	11.7
Primary tumour status	T0 (No tumour detected)	1	0.3
	T1(Tumour size < 2 cm)	36	9.4
	T2(Tumour size 2-5 cm)	52	13.5
	T3(Tumour size > 5cm)	211	54.9
	T4 (Tumour of any size with skin, chest wall involvement)	84	21.9
Pathologic nodal status	N0(no nodal involvement)	94	24.5
	N1(ipsilateral, axillary nodes, mobile)	104	27.1
	N2 (ipsilateral axillary nodes, fixed)	174	45.3
	N3(ipsilateral internal mammary nodes)	12	3.1
Clinical stage	Stage 0	2	0.5
	Stage I	18	4.7
	Stage II	42	10.9
	Stage III	242	63.0
	Stage IV	82	21.4
Histopathological type	Invasive ductal carcinoma	352	91.7
	Invasive lobular carcinoma	13	3.4
	Mucinous carcinoma	12	3.1
	Ductal carcinoma in situ	2	0.5
	Other histological type	5	1.3
Histological grade	G1(well differentiated)	8	2.1
	G2 (moderate differentiated)	131	34.1
	G3 (poorly differentiated)	245	63.8

Patients with tumour size greater than 6cm (median tumour size) had significantly high rate of lymph node metastasis ($P=0.001$) and presence of necrosis within the tumour ($P=0.012$) compared to patients with tumour size less than 6cm in diameter. Patients younger than 45 years (which is the median age) had significantly high rate of lymph node metastasis compared to the patients above the median age ($P=0.011$).

Treatment modalities

Surgery, mainly mastectomy, was the main modality of treatment in these patients. A total of 382 (99.5%) patients had mastectomy \pm axillary lymph node dissection. Two patients had an inoperable tumour because it was hard and fixed to the chest wall. None of the patients had breast conservation surgery (Table 3).

Table 3: The types of surgical procedures performed among patients with breast cancer at BMC (N=382)

Types of surgical procedures	Number of patients	Percentage
Modified radical mastectomy \pm Axillary lymph node dissection	56	14.7
Simple mastectomy \pm Axillary lymph node dissection	242	63.4
Toilet mastectomy \pm Axillary lymph node dissection	84	22.0

The use of chemotherapy was documented in 172 (44.8%) patients. Of these, 154 (89.5%) were used as adjuvant therapy and in the remaining 18 (10.5%) patients chemotherapy was used as neo-adjuvant therapy in some patients with grade IIIb to down stage the tumour. The drug combinations were CMF-cyclophosphamide, methotrexate, 5-fluorouracil and CAF-cyclophosphamide, adriamycin and 5-fluorouracil. These drugs were given parenterally and repeated at 3-4 weekly intervals for 6 courses. Only 53 (30.8%) patients completed the courses. Hormonal therapy using Tamoxifen was prescribed to all patients. Adjuvant radiotherapy required in all patients was reported in only 45 (11.7%) patients. No patient had immunotherapy in this study.

Follow up of patients

Follow-up visits were scheduled every 3 months for 2 years and every six months thereafter for a period of five years or death. Follow-up of patients ranged from 3 to 62 months with a median of 12 months. At the end of five year follow up period, only 124 (32.3%) patients were available for follow up and the remaining 260 (65.0%) patients were either lost to follow up or died. Of those who were available for follow up, 92 (74.2%) patients were tumour free at one year. At the end of five years of follow up, only 84 patients were still alive giving an overall five-year survival rate of 21.8%. The 5-year survival rate for patients with early disease was higher than for those with advanced disease ($P=0.000$). According to multivariate logistic regression analysis; age of patient at diagnosis ($P=0.002$), stage of disease ($P = 0.001$), extent of lymph node involvement ($P=0.012$) and histological grade ($P=0.004$) were found to be independent predictors of overall survival. Local recurrence of cancer was reported in 22 (17.7%) patients and this was significantly related to the stage of disease ($P=0.003$) and non-adherent to adjuvant therapy ($P=0.021$).

Discussion

Breast cancer management has been a major challenge to surgeons in developing countries, principally due to the lack of advanced technology and late presentation of patients to the hospital (Kene *et al.*, 2010). In this study, the median age of patients was 45 years which is in agreement with other studies in developing countries (Kene *et al.*, 2010; Rambau *et al.*, 2011), but lower than the median age reported in western countries where the median age at diagnosis is in the sixth decade of life (Ikpatt *et al.*, 2002; Fregene & Newman, 2005; Awadelkarim *et al.*, 2008). In African women, the diagnosis of breast cancer is often made between 35 and 45 years of age. This is approximately 10–15 years earlier than peak incidence for western countries (Vorobiof *et al.*, 2001; Adesunkanmi *et al.*, 2006; Rambau *et al.*, 2011). The reasons for the early age at onset of breast cancer among black women are poorly understood but could probably be connected to the aggressive nature of the disease (Chlebowski *et al.*, 2005; Kene *et al.*, 2010). While numerous theories have been proposed to explain this age difference, including age at menarche, time of first delivery, parity, socio-demographic factors, body mass index, and underlying genetic difference, none are completely satisfactory and more research is needed in this area (Vorobiof *et al.*, 2001; Omar *et al.*, 2003; Adesunkanmi *et al.*, 2006). It has been reported that the occurrence of breast cancer at young age is associated with a worst prognosis and thus prognosis improves with age, with the best prognosis in patients over 75 years (Zavagno *et al.*, 2000; Rambau *et al.*, 2011). In our study, patients aged above 60 years accounted for only 4.2% of cases.

In the present study, more than half of the patients were multiparous which is contrary to the belief that multiparity is associated with decreased risk of developing breast cancer. These would have been the reverse since the higher the number of full term pregnancies, the greater the protection from breast cancer and that there is a reduction in risk of breast cancer by 7% for each birth after the first, in the absence of breast feeding. Also women who breast feed reduce their risk compared to those who do not (Adebamowo & Ajayi, 2000). We could not establish the reason for this observation.

The proportion of patients in this study that was premenopausal was 63.8%, while 36.2% were postmenopausal. This is in contrast with observations in the developed countries where premenopausal patients accounted for less than one-third of the patients (Adelusola *et al.*, 1996). Adebamowo *et al.* (1999) reported a much higher incidence of 80% of premenopausal women in Nigeria breast cancer patients. The reason for high incidence of premenopausal women in the present study may be attributed to the fact that the majority of patients in our study were young in their reproductive age group.

This study showed that most of the patients presented late with advanced disease commonly with clinical Stage III and IV. The findings are similar to several other centres in developing countries (Amir *et al.*, 1996; Adebamowo & Ajayi, 2000; Montazeri *et al.*, 2003; Calleb, 2006; Kene *et al.*, 2010). Similar findings have also been reported by Rambau *et al.* (2011) at the same centre. These findings are at variant with what is reported in developed countries where most of patients presents early with early stage of the disease (Parkin *et al.*, 2005). Late presentation and advanced disease at the time of diagnosis in most developing countries may be explained by delay in seeking medical services, poor breast cancer awareness, poor referral

system and medical service, lack of screening programmes and natural aggressive biological behaviour of tumour (Amir *et al.*, 1996; Parkin *et al.*, 2005; Rambau *et al.*, 2011). The authors could not establish the reasons for the late presentation in the present study. This calls for further study to explain this observation. In order to reduce the late presentation of breast cancer the importance of early diagnosis should be emphasized through adequate information dissemination. There is therefore need for the establishment of standard breast cancer screening programme including installation of mammographic machine in many hospitals.

In this study, the right breast was mostly affected with the upper outer quadrant mostly involved either singly or in combination with other parts of the breast. This is in contrast to previous studies conducted in other centres where the left breast was reported to be the most commonly affected (Odigie *et al.*, 2003; Adesunikanmi *et al.*, 2006; Kene *et al.*, 2010). The upper outer quadrant is also reported to be commonly involved in a West Africa study (Odigie *et al.*, 2003). This may probably be due to the association of the upper outer quadrant with the axillary tail which is a channel for drainage of lymph to the axillary lymph nodes and may carry micro-metastasis more than the other quadrants of the breast. The reason for the right breast predilection is not well understood.

Invasive ductal carcinoma was the commonest histological type of breast cancer in our study and most of patients had poorly differentiated tumour. This is consistent with reports from many centres (Odigie *et al.*, 2003; Ekanem & Aligbe, 2006). This tumour commonly metastasizes to the axillary lymph nodes and the prognosis is poor than that for the other types (Harns *et al.*, 1992). As reported by Rambau *et al.* (2011), the tumour size in this study was significantly associated with younger age (below 45 years) at presentation, high rate of lymph node metastasis, high histological grade tumours and presence of necrosis within the tumour. The association between tumour size and younger age at presentation could explain the reasons for aggressive disease at younger age.

In the present study, more than two thirds of patients had lymph node metastasis at the time of diagnosis and about one-fifth of cases had distant metastasis to the lungs, liver, bone and brain, the rate which is higher than that reported in other studies (Amir *et al.*, 1996; Calleb, 2006; Kene *et al.*, 2010; Rambau *et al.*, 2011). High lymph node and distant metastasis in our study is due to the fact that most patients in the present study present late when the disease is already in advanced stages. In developing countries, most patients are already in advanced stages of disease at the time of diagnosis of breast cancer, which has been proven both in the present study and in literature (Calleb, 2006; Kene *et al.*, 2010; Rambau *et al.*, 2011). The high rate of lymph node metastasis seen in our patients could also be accounted for by the large tumour size at the time of diagnosis.

The treatment of breast cancer requires multidisciplinary approach (Guadagnoli *et al.*, 1998; Cardoso *et al.*, 2003). Treatment modalities of breast cancer include surgery, chemotherapy, radiotherapy, hormonal and immunotherapy. Surgery is considered the primary treatment for breast cancer, with many early stage patients being cured with surgery alone. The goals of breast cancer surgery include the complete resection of the primary tumour, with negative margins to reduce the risk of local recurrences, and pathologic staging of the tumour and axillary lymph nodes to provide necessary prognostic information. In keeping with other studies (Vorobiof *et al.*, 2001; Omar *et al.*, 2003; Adesunikanmi *et al.*, 2006; Calleb, 2006), surgery

was the most common modality of breast cancer treatment in this study. Modified radical, simple and toilet mastectomy with or without axillary clearance were offered to those whose lesions were still operable. None of our patients had breast conservation surgery. This is a reflection of the advanced nature of breast cancer in our patients. Few that presented with early stages were not considered for conservation surgery largely because of non-availability of radiotherapy facilities at BMC. These patients were treated with modified radical mastectomy. Simple and toilet mastectomy with or without axillary clearance were offered to patients with late stages (stage III and IV). Breast conservation surgery is currently the most popular treatment for breast cancer, representing 75 – 80% of all operations (Veronesi *et al.*, 2005). Unfortunately, advanced stages at presentation and poor infrastructure for treatment of breast cancer have made this mode of surgical treatment less popular in many developing countries including Tanzania. Breast reconstruction after mastectomy for breast cancer has become a standard procedure. None of the patients was offered plastic surgery for breast reconstruction following mastectomy due to late presentation and the necessity for prolonged follow-up before the reconstructive procedure.

Combination chemotherapy given as either neo-adjuvant or adjuvant therapy is an important component of breast cancer treatment and it is widely used in many centres across the world (Ibrahimu *et al.*, 2011). In the present study, only 44.8% of patients received chemotherapy and 69.2% among those offered chemotherapy defaulted and did not complete the course. This observation is in keeping with other African studies (Kene *et al.*, 2011; Ibrahimu *et al.*, 2011). Non adherence to chemotherapy is a major challenge in breast cancer treatment especially in resource poor settings. Reasons for non-adherence in most developing countries include financial difficulty, relatively feeling well after commencement of chemotherapy, resorting to alternative treatment and drug side effects (Lawal & Adesunkanmi, 2008; Ibrahimu *et al.*, 2011). We could not establish the reasons for non-adherence to chemotherapy in our study due to the retrospective nature of the study.

Tamoxifen is the only hormonal therapy currently approved for adjuvant therapy in patients with breast cancer (Sweetland, 2004). Tamoxifen alone reduces risk of recurrence and improves overall survival in all age groups in oestrogen positive cancers in both premenopausal and post menopausal women (Calleb, 2006; Gakwaya *et al.*, 2008). Facilities for oestrogen receptor assay at BMC are not available. All our patients are given tamoxifen, once a histological diagnosis is established irrespective of menstrual status.

Adjuvant radiotherapy is an integral part of the management of breast cancer, particularly in patients with large tumours and many positive nodes (Overgaard, 2001). In this study, only 11.7% of patients requiring adjuvant radiotherapy had access to this modality of treatment. Adjuvant radiotherapy is required to reduce the risk of local recurrence following surgery (Gakwaya *et al.*, 2008). Failure to access to this modality of treatment in our patients can be explained by the fact that radiotherapy is not available at BMC and therefore patients requiring this form of treatment had to travel long distances to receive radiotherapy elsewhere. Because of lack of funds at the time of referral for radiotherapy in the majority of patients, only less than 20% of patients were able to travel and received this form of treatment.

Locoregional recurrence of breast cancer occurs in 5% to 40% of patients whose primary disease was initially managed by mastectomy, and up to one third of these patients

will have concomitant distant organ metastases (Chagpar *et al.*, 2003; Buchanan *et al.*, 2006). In this study, local recurrence of cancer was reported in 17.7% of cases, a figure which is higher than that reported in other studies (Schmoor *et al.*, 2000; Buchanan *et al.*, 2006). The reasons for high rate of local recurrence in the present study may be attributed to advanced stage of cancer at the time of diagnosis and non-adherence to adjuvant treatment.

The overall survival rate of 21.8% is significantly low compared to the survival rate of breast cancer patients managed in developed countries which is 95% and above (Smigal *et al.*, 2006). This poor outcome is similar to that report by Anyanwu (2000) in Nigeria. This perhaps could be due to late presentation because of ignorance and lack of screening services. In our patients, the factors that significantly affect prognosis were age of the patient, stage of disease, axillary lymph node status and histological tumour grade. Tumour stage and axillary nodal status have consistently been shown to be the most important independent predictors of overall survival (Park *et al.*, 2011).

The potential limitation of this study is the fact that information about some patients was incomplete in view of the retrospective nature of the study. This might have introduced some bias in our findings. In addition, follow-up was poor and irregular and so it was difficult to know the exact time of recurrence or death. Large number of loss to follow up was also a potential limitation of this study as this may have underestimated the local recurrence and overall survival rates. However, despite these limitations, findings from this study provide local data that can be utilized to improve the care of breast cancer in our local setting.

In conclusion, our study indicate that breast cancer patients in this region present late with advanced disease and high rate of lymph node metastasis and show a trend towards relative young age at diagnosis. Poor breast cancer awareness, poor referral system, lack of screening programs and natural aggressive biological behaviour of tumour may contribute to advanced disease at the time of diagnosis. There is need to improve public enlightenment of breast cancer and set up screening centres to encourage early presentations.

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