Full Length Research Paper

Socio Demographic Characteristics and Chemotherapy Compliance among Patients with Breast Cancer at Moi Teaching and Referral Hospital Eldoret Kenya

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Abstract

Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death among women, accounting for 25 % of the total cancer cases (1.68 million) and 15 % of the cancer deaths (520,000) worldwide. Course of Chemotherapy treatment has been shown to reduce morbidity and mortality from the disease Patient's non-compliance to chemotherapy is the ultimate barrier to the treatment effectiveness. This study therefore determined the socio demographic characteristics and treatment compliance among patients with breast cancer. The design was retrospective study and it was conducted by review of clinical records of 301 patients with histological proven cases of breast cancer on chemotherapy at Moi Teaching & Referral Hospital (MTRH).A patient was considered to be non-compliant if they did not present for one or more doses of chemotherapy. Those patients whose hospital records were incomplete were excluded. Patients who had dose reduction and /or omission due to inadequate hematological profile or poor clinical condition were not included as defaulters. Data analysis was done using software for statistical analysis and computation known as R (R Core team, 2016) in accordance to the set objectives. Categorical variables such as clinical stage of the cancer, level of education, gender, employment status among others were summarized using frequencies and the corresponding percentages. Association between compliance of the participants to treatment and categorical predictor variables was assessed using Pearson's Chi Square test. The variables that were associated with compliance to treatment (having a p-value <0.05) were included in a multivariable binary logistic regression model where their joint effect on the outcome (compliance) were assessed. We reported the odds ratios (OR) and the corresponding 95% confidence limits (95% CL).Results were presented using tables and graphs. A total of 301 patient's files were included in the study. Of this number 7 (2.3%) were male participants. Half of the participants were aged > 60 years. Over 80% of the participants were married, 97.0% had more than three children, and 172 (57.1%) were unemployed. Participants aged 51-60 years had more than three times higher odds of compliance compared to those who were aged <50 years, odds ratio (OR): 3.03 (95% CL: 1.26, 7.26). Male and female were comparable, OR: 0.13 (95% CL: 0.01, 1.29). Employed participants were more likely to comply with treatment compared to the unemployed, OR: 3.55 (95% CL: 1.41, 8.91). The study demonstrated that employment status and age are significant determinants to treatment compliance

Key words: *Breast Cancer, Compliance, Chemotherapy*

Introduction

Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death among women, accounting for 25 % of the total cancer cases (1.68 million) and 15 % of the cancer deaths (520,000) worldwide (Park, 2013). In the United States, it is estimated that there will be 231,840 new cases of invasive breast cancer and 40,290 deaths from the disease in 2015, and that one in eight women will develop breast cancer during their lifetime Green (2010). According to statistics by the Kenya Network of Cancer Organizations, breast cancer is now the leading cancer in women in Kenya (34 per 100,000). Studies have shown that when patients don't adhere to their medication regimens, costs for their health care becomes high due to more physician visits, more hospital visits, and longer stays once they're admitted (Adisa *et al.*, 2013a).

Several studies offered reasons to explain why older women were less compliant to chemotherapy. The lower proportion of older women with breast cancer receiving chemotherapy may reflect an increased number of co-morbidities and worse general health among these women. For example, among British oncologists, frailty and concurrent medical conditions were considered quite important or very important to 93.1% and 82.8% of surveyed clinicians, respectively, compared to the 58.6% of oncologists who

considered age to be of importance; of the 10 studies in this review citing the impact of age on chemotherapy use, only two adjusted for co-morbidities, one of which provided data specific to metastatic breast cancer. In both studies, multivariate analyses revealed a stronger inverse association of increasing age and chemotherapy use than that of co-morbidity and chemotherapy use. The higher prevalence of hormone receptor (estrogen or progesterone receptor) positive tumors among postmenopausal women than premenopausal women and, therefore, more frequent use of hormone therapy, also contribute to this observation (Benner *et al.,* 2012). It has been suggested that elderly patients have cancers with lower proliferative indices, and that they will derive less benefit from standard chemotherapy; however, the elderly are frequently underrepresented in cancer clinical trials. Although elderly (65 years of age or older) patients make up 63% of cancer patients in the US, they represent only 25% of the cancer clinical trial participants. Whether this deficit is due to fear and misunderstanding of older patients, physician bias against enrolling older patients, or overly stringent eligibility criteria that limit the number of elderly patients, their underrepresentation makes it difficult to assess the risks and benefits of cancer chemotherapeutic regimens and may partially explain the inverse relationship between age and chemotherapy use. Also, elderly patients may have problems in vision, hearing and memory (Okuno *et al*., 2013). In addition, they may have greater difficulty in following therapy instructions due to cognitive impairment or other physical difficulties, such as having problems in swallowing tablets, opening drug containers, handling small tablets, distinguishing colors or identifying markings on drugs (Shaw *et al*., 2013).

The study reported that being less educated was statistically significantly and inversely correlated to a belief in religious intervention in place of treatment; it is presumed that the treatment likely included chemotherapy due to inclusion of women with advanced stage breast cancer in the study population. From a qualitative perspective, when discussing various adjuvant therapies including chemotherapy, reported that less-educated women in the United States were less informed about breast cancer itself, as well as about resources and treatments. They were less adherent to treatment and less proactive in seeking medical care. In the UK, 13.8% of clinicians ranked education as an important factor influencing their recommendation for palliative chemotherapy to women with metastatic breast cancer.

Information seeking can be explained by age, gender and education. These socio-demographic factors are important in explaining information needs and source use. In addition, some medical factors that are specific to patients with cancer have been confirmed to influence information-seeking behaviour. Patients with cancer do not just undergo one traumatic event; they go through different phases of their illness and treatment. Disease phase is considered to influence the information needs of patients with cancer and their use of information sources. Chemotherapy can be administered with either a palliative or a curative treatment goal (Shaw *et al*., 2013). Curative treatment aims to cure the disease, whereas palliative treatment concentrates on reducing the severity of disease symptoms. The latter can be administered to relieve suffering and to improve quality of life. Both treatment goal and quality of life are expected to influence the need for information and the sources used.

Most of the studies showed that age was related to adherence in chronic diseases, although a few researchers found age not to be a factor causing non-adherence (Benner *et al*., 2012). For elderly people, the results from the various studies are not unidirectional. A large proportion of retrieved studies suggested that they might have higher adherence (Shaw *et al.,* 2013). However, in contrast, some studies found that advancing age affected adherence among elderly people in a negative way. Regarding cancer treatment, all of the studies examined found that older patients received chemotherapy showed less adherence than younger patients (Benner *et al*., 2012); of these studies, provided numerical data to support this conclusion (Shaw *et al*., 2013). Five of the studies demonstrated a statistically significant difference in chemotherapy use between older and younger patients, although only 2 of these provided data specific to metastatic cancer. In a prospective survey of qualified specialists in France, the authors noted that, of the women receiving chemotherapy, 82% in the younger age group received the standard dose and cycle length compared with only 62% of those in the older age group (Benner *et al*., 2012). In a survey administered to medical and clinical oncologists in the UK, asking which factors were important in deciding whether to recommend chemotherapy to patients with metastatic breast cancer, patient age was considered to be quite important or very important for 58.6% of oncologists surveyed. Several studies found that better educated patients might have higher adherence, while some studies found no association (Benner *et al*., 2012). Intuitively, it may be expected that patients with higher levels of educational should be better informed about the disease and therapy and, therefore, demonstrate greater adherence (Okuno *et al*., 2013). However, the study found that even highly educated patients may not understand their medical condition or may not perceive the benefits of adherence to their medication regimen. Other researchers showed that patients with lower levels of education show better adherence. Four studies discussed education level in relation to chemotherapy treatment, as well as other adjuvant therapies, such as radiation and hormone therapy; only 2 provided quantitative data related to chemotherapy and only one was specific to metastatic breast cancer. Peele and colleagues stated that educated women were significantly more likely to adhere to treatment with adjuvant therapy, including chemotherapy, hormone therapy, and combination therapy, although the study did not distinguish between cases based on disease severity and treatment (Okuno *et al*., 2013).

Materials and methods
Study Area
The study was carried out at Moi Teaching and Referral Hospital Eldoret, Uasin Gishu County which is the second National Referral Hospital in Kenya. It is located along Nandi Road in Eldoret 350 kilometers North West of Nairobi city in the Rift Valley Province of Kenya. It was opened in 1917 as a cottage hospital it serves as the main referral hospital and receives patients from western Kenya,

parts of Eastern Uganda, and the Southern Sudan and has a catchment population of approximately twelve million people with bed capacity of eight hundred and thirty five patients. The hospital has Oncology department which is a comprehensive cancer care model that supports screening services, cancer treatment and palliative care. It also offers counseling services, spiritual care, support group and outreach services in Chulaimbo Busia and Webuye in western Kenya. The department also runs several clinics which include gynecological, pediatrics and hematoncology clinics. The department also administer chemotherapy treatment both intravenous and oral treatment to both outpatient and inpatient clients

Research Design: This was a retrospective descriptive study that utilized quantitative research methods of inquiry

*Study population:*The target population included breast cancer patients with confirmed diagnosis of breast cancer and on chemotherapy treatment

Inclusion Criteria
- Adults 18years and above
- Histological diagnosis of malignant tumors of breast
- Patients on chemotherapy treatment regiment

Exclusion Criteria
- Patients who had dose reduction or omission due to inadequate hematological profile or poor clinical condition
- Patients with incomplete hospital records

Sampling
The sample size was determined using Fisher's exact test (Fisher's *et al*., 2013). A sample size of 301patients files was arrived at.

Sampling design
The study used convenience sampling method because it allowed the researcher to use cases that has the required information with respect to the objectives of the study. Records of all patients with breast cancer from January 2013 to December 2015 were obtained by the records clerk and their files were retrieved from registry. Files of patients who met the requirements based on inclusion and exclusion criteria were conveniently selected from the retrieved files one by one until a sample of 301 files achieved.

Data collection
A review of 301 clinical records of histological proven cases of breast cancer seen over two year period of January 2013 through December 2015 were analyzed and information already recorded were obtained from each file using a checklist that was developed based on the objectives of the study. The checklist had information related to socio demographic characteristics, clinical information, treatment records, and chemotherapeutic agents' used. Selection bias was minimized by using a standardized checklist for all participants.

Ethical Considerations
Ethical approval to conduct the study was sought from the Institutional Research Ethics Committee (IREC) at Moi Teaching and Referral /Moi University School of Medicine Permission to carry out the study was obtained from the Hospital management of Moi Teaching and Referral Hospital (MTRH) before data collection. Consent to collect data from the patient records were sought from the head of records department and AMPATH Registry. Patient files were handled with confidentiality .The results were shared only to respective parties.

Data Analysis
Data analysis was done using software for statistical analysis and computation known as R (R Core team, 2016). Categorical variables such as clinical stage of the cancer, level of education, gender, employment status among others were summarized using frequencies and the corresponding percentages. Association between compliance of the participants to treatment and categorical predictor variables was assessed using Pearson's Chi Square test. The variables that were associated with compliance to treatment (having a p-value <0.05) were included in a multivariable binary logistic regression model where their joint effect on the outcome (compliance) were assessed. We reported the odds ratios (OR) and the corresponding 95% confidence limits (95% CL).Results were presented using tables and graphs.

Dissemination of Research Findings
Research findings were used as a, feedback to patients/clinicians for efficient and effective management of breast cancer, publishing in journals and conference proceedings.

Results: *Demographics of the respondents :*

Table 1: Socio Demographic characteristics of respondents

A total of 301 participants were included in the study. Of this number 7 (2.3%) were male participants. Half of the participants were aged > 60 years.

Variable		N (%)
Age (years)		
	≤30	0 (0.0%)
	31-40	5 (1.7%)
	41-50	79 (26.2%)
	51-60	66 (21.9%)
	>60	151 (50.2%)
Sex	**Male**	7 (2.3%)
	Female	93 (97.7%)
Marital status		
	Single	18 (6.0%)
	Married	264 (87.7%)
	Widowed	19 (6.3%)
Number of children		
	1-3	9 (3.0%)
	4-6	156(51.8%)
	7-9	64 (21.3%)
	≥10	72 (23.9%)
Education level		
	Primary	51 (16.9%)
	Secondary	23 (7.6%)
	College	80 (26.6%)
	Missing	147 (48.8%)
Employment status		
	Unemployed	172 (57.1%)
	Self-employed	64 (21.3%)
	Employed	65 (21.6%)

Over 80% of the participants were married, 97.0% had more than three children, and 172 (57.1%) were unemployed. One fifth (21.3%) were self-employed, and another one fifth (21.6%) were employed. Up to 147 (48.8%) of the participants did give the level of education. As shown in table 1 above.

Table 2: Relationship between socio demographic characteristics and chemotherapy compliance

Variable	Compliant		
	No (N = 149)	**Yes (N = 152)**	**ⱡP**
Age (years)			
≤50	41 (27.5%)	43 (28.3%)	
51-60	20(13.4%)	46 (30.3%)	<0.001
>60	88 (59.1%)	63 (41.4%)	
Male	6 (4.0%)	1 (0.7%)	0.065
Marital status			
Married	138 (92.6%)	126 (82.9%)	
Single/Widowed	11 (7.4%)	26 (17.1%)	0.017
Number of children			
<7	69 (46.3%)	96 (63.2%)	
≥7	80 (53.7%)	56 (36.8%)	0.005
Education level			
Primary/Secondary	53 (35.6%)	21 (13.8%)	
College	29 (19.5%)	51 (33.6%)	<0.001
Missing	67 (45.0%)	80 (52.6%)	
Employment status			
Unemployed	94 (63.1%)	78 (51.3%)	
Self employed	44 (29.5%)	20 (13.2%)	<0.001
Employed	11 (7.4%)	54 (35.5%)	

Older participants demonstrated a likelihood of noncompliance ($p<0.001$). Male participants were few, but they appeared to be less likely to comply with treatment (0.7% vs. 4.0%, p = 0.065). Married participants compared to the single or widowed were less likely to comply with treatment (82.9% vs. 92.6%, p = 0.017). The proportion of participants who had seven or more children was low among those who were compliant compared to those who were noncompliant with treatment (36.8% vs. 53.7%), an evidence that those who had seven or more children were less likely to comply with treatment (p = 0.005). Education level was associated with compliance with treatment ($p<0.001$). Results show that those who had a college education and those who had not specified their level of education were more likely to comply with treatment compared to those who had primary or secondary level of education.

The participants who were unemployed and those who were self-employed were less likely to comply with treatment compared to those who were employed ($p<0.001$).

Table 3: Determinants of compliance with treatment

Variable	Unadjusted OR (95% CL)	Adjusted OR (95% CL)
Age (years)		
51-60 vs. ≤50	2.19 (1.11, 4.32)	3.03 (1.26, 7.26)
>60 vs. ≤50	0.68 (0.40, 1.17)	1.29 (0.63, 2.64)
Male	6.34 (0.75, 53.24)	0.13 (0.01, 1.29)
Education level		
College vs. Primary/Secondary	4.44 (2.25, 8.77)	5.60 (1.97, 15.89)
Missing vs. Primary/Secondary	3.01 (1.65, 5.49)	3.21 (1.49, 6.88)
Employment status		
Self-employed vs. Unemployed	0.55 (0.30, 1.01)	0.82 (0.38, 1.80)
Employed vs. Unemployed	5.92 (2.90, 12.09)	3.55 (1.41, 8.91)

OR- Odds Ratio

Participants aged 51-60 years had more than three times higher odds of compliance compared to those who were aged <50 years, Adjusted OR: 3.03 (95% CL: 1.26, 7.26). There was no sufficient evidence from the data to demonstrate a difference in the odds of compliance between those who were aged >60 years and those who were aged <50 years, Adjusted OR: 1.29 (95% CL: 0.63, 2.64). There was no difference between the male and the female participants in the odds of compliance with treatment, Adjusted OR: 0.13 (95% CL: 0.01, 1.29). The participants who had a college education and those who did not specify their education had increased odds of compliance with treatment compared to those who had primary or secondary level of education, Adjusted OR: 5.60 (95% CL: 1.97, 15.89), and 3.21 (95% CL: 1.49, 6.88) respectively. Employed participants were more likely to comply with treatment compared to those who were unemployed, Adjusted OR: 3.55 (95% CL: 1.41, 8.91). There was sufficient evidence to link self-employment with reduced odds of compliance compared to the unemployed participants, Adjusted OR: 0.82 (95% CL: 0.38, 1.80).

Discussion

Socio Demographic Factors and Compliance

Breast cancer is a disease which affects mainly women as shown by this study where by 97.3% were women. Similar findings were found by Adewale O Adisa in his study of evaluation of patient's adherence to chemotherapy in Nigeria. It was also found that majority of the patients were aged above 60years 50.2% in this study which differs with findings of Adewale O Adisa in the same study where by more than a quarter of the patients were aged below 40 years.

Education level was found to be significant determinant to treatment compliance. Results shows that those who had collage education were more likely to be compliant compared to those who had primary and secondary level of education OR: 3.55 (95% CL: 1.41, 8.91),

This study is comparable with findings by Salam *et al* (2013) who found that a suboptimal compliance to cancer management is related to personal factors. Social and lifestyle characteristics may significantly determine compliance. Thus, it is necessary to improve the understanding of these characteristics and to individualize the treatment regimen according to patients' requirements. Programs to increase patient awareness on cancer among adults are essential to improve their understanding of their disease and compliance to advised treatment. Compliance is the best way to control cancer and to prevent its complications. Patient compliance requires a high level of knowledge of the disease, its complications and its management among the patients. Educating, motivating and guiding the patient to manage the disease can go a long way in lowering the burden of disease, on health care services.

The study findings in this study suggesting a high incidence of breast cancer in elderly women with more than half of the patients being above 60 years of age which was also a significant determinant of compliance .It was seen that advanced age that is above 60yrs were less likely to be compliant compared to those who were less than 50yrs odds ratio (OR): 3.03 (95% CL: 1.26, 7.26). This is comparable with studies by Benner et al; 2012 which stated that regarding cancer treatment, all of the studies examined found that older patients received chemotherapy showed less adherence than young patients. Also in a prospective survey of qualified specialists in France the authors noted that of the women receiving chemotherapy,82% in the young age group received the standard dose and cycle length compared with only 62% of those in the older age group Benner *et al.,* 2012.It is also comparable to a survey

administered to medical and clinical Oncologist in the UK, asking which factors were important in deciding whether to recommend, chemotherapy to patients with metastatic breast cancer ,patient age was considered to be quite important or very important for 58.6%of oncologist surveyed.

The similarities in the studies could be explained by the fact that elderly patients may have problems in vision, hearing and memory. In addition, they may have more difficulties in following therapy instructions due to cognitive impairment or other physical difficulties, such as having problems in swallowing tablets, opening drug containers, handling small tablets, distinguishing colors or identifying markings on drugs. (Marques & Pierin, 2013). On the contrary, older people might also have more concern about their health than younger patients, so that older patients' non-compliance is non-intentional in most cases. As a result, if they can get the necessary help from healthcare providers or family members, they may be more likely to be compliant with therapies. (Green, 2013).

Conclusion
The study demonstrated that employment status and age are significant determinants to treatment compliance.

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