

LETTER TO THE EDITOR

## Equity in Ghanaian Breast Cancer Treatment Outcomes—A modeling study in Komfo Anokye Teaching Hospital

To the Editor:

In high-income countries, much progress has been made in reducing breast cancer mortality (1,2). However, the benefits of decreased mortality are not distributed equitably, meaning that some subpopulations suffer more from breast cancer than others. Studies have revealed differences in breast cancer burden by race (3), urbanization (4), insurance status (5,6), and socioeconomic status (SES) (7). While equity in breast cancer has been studied in middle-income countries (8,9), it has rarely been examined in low-income countries. This letter reports on the equity of breast cancer treatment outcomes in Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana, where we investigated whether lower SES patients present with more advanced disease and have worse health outcomes than other patients. We applied an existing mathematical model to estimate the cost-effectiveness of breast cancer treatments in Ghana (10) using the World Health Organization's CHOosing Interventions that are Cost Effective (WHO-CHOICE) methodology and WHO population model templates (WHO Pop-Mod) (11). The model included the four disease stages defined by the American Joint Committee on Cancer (12). As breast cancer stage is a good predictor of survival (earlier stages have higher survival rates than later stages (13)), the model uses a patient population's stage distribution at diagnosis to predict treatment outcomes.

Between November 2009 and January 2010, we identified SES and breast cancer stage at diagnosis for 90 patients who had, or were still receiving, treatment in KATH. SES based on expenditures was retrieved

using a validated questionnaire, which also contained a question on insurance status (14). Patients were then categorized into SES quintiles, with the first representing the poorest 20% in the population and the fifth quintile representing the richest 20%. We then compared the averted Disability Adjusted Life Years (DALYs) between SES quintiles. The DALY is a summary measure of population health, which represents the sum of the years of life lost due to premature mortality in the population plus the equivalent "healthy" years lost due to nonfatal health conditions (15). DALYs were discounted at an annual rate of 3%. We compared the treatment outcomes of the SES quintiles in terms of DALYs averted with the population not receiving treatment and experiencing the natural progression of the disease.

Our sample's average household expenditures, when corrected for price differences, did not differ from those found in the latest round (5th, in 2005–2006) of the Ghana Living Standards Survey (Table 1). The finding that a large majority in our sample (95%) had health insurance was surprising, as total insurance coverage in Ghana is much lower (55%) and previous studies reported a strong relationship between income and health insurance coverage (14,16–18). From local partners, we learned that many people in Ghana only register with the NHIS once they fall sick (benefits can only be claimed after 6 months) (19).

Although in higher SES groups, more patients were diagnosed in earlier stages than in lower SES groups, this difference was not significant (Table 2). Hence, DALYs averted per year did not differ significantly between quintiles and patients who could access KATH did not experience inequities in treatment outcomes. Because breast cancer survival rates of patients in earlier stages are higher than those of patients with late-stage disease, the patients treated earlier avert most of their DALYs in the future. That is, the survival gain of the treatment for early-stage patients will

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**Table 1. Monthly Average Household Expenditure**

SES quintiles	Patient sample KATH – 2010	Ghana Living Standards Survey (GLSS) 2005–2006	GLSS 2005–2006 brought to 2010 with CPI
Poorest 20%	GHC 124	GHC 68	GHC 117
Second poorest 20%	GHC 177	GHC 104	GHC 176
Middle 20%	GHC 215	GHC 131	GHC 222
Second richest 20%	GHC 260	GHC 162	GHC 276
Richest 20%	GHC 379	GHC 239	GHC 407
Total	GHC 231	GHC 160	GHC 272

**Table 2. Average Number of DALYs Averted for Five SES quintiles in KATH Treated for Breast Cancer**

SES quintiles	Stage distribution <sup>a,b</sup>				DALYs per patient averted	
	Stage I (%)	Stage II (%)	Stage III (%)	Stage IV (%)	discounted at 3% <sup>c</sup>	undiscounted <sup>c</sup>
Poorest 20%	0	11	72	17	1.08	1.56
2nd poorest 20%	0	17	72	11	1.11	1.61
Middle 20%	6	11	72	11	1.10	1.61
Second richest 20%	28	22	39	11	1.10	1.77
Richest 20%	0	22	78	0	1.16	1.71

<sup>a</sup>Stage distributions were not significantly different—Fisher's Exact Test: 0.084 (two-sided).

<sup>b</sup>Assumed to be equal to KATH population.

<sup>c</sup>Compared with no treatment at all.

N = 90.

be seen in the far future, while the survival gain among late-stage patients will be observable in the near future. As a result, the averted DALYs for more favorable distributions can be lower due to discounting. However, 75% of our patients presented at the Komfo Anokye Teaching Hospital with late-stage (III or IV) disease, which signals an awareness problem. To address the increasing burden of breast cancer in low-income countries like Ghana, recent studies advocate increasing awareness, education, and capacity at primary and community healthcare facilities (20–24). As treating early-stage breast cancer is cheaper than treatment of late-stage disease (25), it comes as no surprise that a mass media campaign to increase awareness is one of the most cost-effective interventions in Ghana (10). Although all patients in our sample received treatment, interviews with doctors and local NGOs<sup>a</sup> revealed that countless breast cancer patients in Ghana, in fact, do not. This may be attributed to traditional societal beliefs and cultural taboos (fatalism), which breast cancer survivors and advocates believe will hinder breast cancer advocacy efforts (26), and the low geographic coverage of breast cancer services, which may not exceed 10% (10). Of course, if a large percentage of the untreated also have

health insurance then barriers to access other than financial ones probably exist as well.

As KATH is one of the two breast cancer disease management centers in Ghana,<sup>b</sup> we argue that this sample provides a reasonable picture of current Ghanaian breast cancer patients who receive treatment. Based on this study, we find no significant association between health outcomes in KATH and SES, although the lack of significance can be attributable to a small sample size.

As treatment of early breast cancer is effective in averting DALYs, the best option to improve equity in Ghanaian breast cancer care is to improve awareness and ensure that all patients receive treatment in the early stages of the disease. The Ghanaian government has several options at its disposal to realize this, ranging from initiating a mass media campaign aimed at informing the Ghanaian population to increasing capacity at primary and community healthcare facilities.

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