Medical Outcomes of Care for Breast Cancer among Health Maintenance Organization and Fee-for-Service Patients

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ABSTRACT

The quality of medical care provided to patients with different types of health insurance coverage has only recently begun to be evaluated. Very few studies have compared the process or outcome of care for cancer. Breast cancer is a good disease to use in medical effectiveness studies because it is relatively easy to diagnose with available technology and is treated effectively if detected early. The primary objectives of this study were to compare type of treatment, stage at diagnosis, and survival for female breast cancer patients newly diagnosed through fee-for-service with third-party coverage or health maintenance organization plans offered by the same medical practice during the same time period. Using a historical cohort design, data from a tumor registry were used to compare type of treatment, stage at diagnosis, and survival for 425 patients diagnosed from 1984 through 1992; 53.6% were members of a health maintenance organization and 46.4% used a variety of fee-for-service plans. Overall, there was no difference between the two groups in type of treatment, stage at diagnosis, or survival. Using fee-for-service as the reference group, Cox regression analysis showed that the unadjusted mortality rate ratio for survival was 0.66 (95% confidence interval = 0.432–1.020), and the rate ratio adjusted for age, race, and stage was 0.80 (95% confidence interval = 0.505–1.257). It was concluded that, despite differences in the type of health insurance coverage, there do not appear to be systematic differences in medical outcomes for breast cancer among women who are treated by the same medical care provider. These findings are of interest in the context of the rapidly changing organization of medical care with its implications for clinical practice and for the quality of care offered to patients with different types of medical insurance coverage.

INTRODUCTION

Interest in systematically evaluating the effectiveness of medical care is relatively recent (1). In 1989, at the request of the Health Care Financing Administration, the Institute of Medicine issued a report proposing two tiers of high priority clinical conditions believed appropriate for evaluation (2). Breast cancer was included in the first tier of the report along with acute myocardial infarction, angina, congestive heart failure, and hip fracture (2, 3).

In addition to being a serious public health problem, breast cancer is a good disease to use in studies of medical effectiveness because it can be detected on clinical examination, is relatively easy to diagnose with available technology, and is treated effectively if diagnosed at an early stage. Studies have shown that regular screening with mammography increases the chances of survival by about 30% in women 50 years of age and older (4–7). Moreover, there are clear indicators of disease severity such as tumor size, metastases, and lymph node involvement, and the treatment options for early stage disease are clearly delineated. Thus, differences in medical outcomes such as stage at diagnosis and survival are likely to be due to differences in patterns of care, including differences in the performance or frequency of screening tests, selection of treatment options, and follow-up treatment.

The quality of medical care provided to patients with different types of medical insurance coverage has only recently begun to be evaluated. The financial constraints and incentives faced by physicians and by patients under different types of plans may influence access to and delivery of medical care and could result in systematic differences in treatment outcomes (8, 9). With regard to HMOs, Luft (10) argued that it is unclear whether or not the average quality level is higher or lower than other types of health care plans and that even HMOs can differ widely in the care provided.

Only eight studies (11–18) have compared the process or outcome of medical care for cancer among patients with different types of medical insurance. Most of those studies compared outcomes of HMO and FFS patients where the two groups used different health care organizations, thus introducing the possibility that any observed differences in care were due to differences in physician training, laboratory procedures, or equipment. Concerning breast cancer, one recent study (16) found that uninsured patients and those covered by Medicaid presented with more advanced breast cancer and had worse survival for local and regional, but not for distant, disease compared with privately insured patients. An earlier analysis on a subset of breast cancer cases in our study population (14) showed no
overall difference in stage at diagnosis; type of treatment and survival were not used as outcomes in that study.

In another recent study, Hynes (18) examined the associations between a number of factors, including type of health insurance (e.g., private, Medicare, Medicaid, or none) and two quality of care outcomes for breast cancer—receipt of a two-step surgical procedure and of postsurgical rehabilitation or education—among breast cancer patients with local or regional disease who were evaluated as part of the National Cancer Institute’s Community Cancer Care Evaluation. Type of health insurance was not associated with receipt of a two-step surgical procedure. Compared with uninsured patients, however, women with Medicaid coverage were more likely to receive postsurgical rehabilitation therapy, but no statistically significant associations were observed for this outcome with the other types of health insurance coverage. Another quality of care indicator, competition (i.e., the physician:population ratio in the local area), was positively associated with receipt of a two-step surgical procedure but was inversely associated with receipt of postsurgical care.

Among the many outcomes relevant to quality assessment (19), type of treatment, disease staging, and survival were chosen for this study. Gonnella et al. (20) stated that measures of illness or disease severity, such as staging, are required to evaluate diagnostic efficiency of physicians, assess quality of care, and understand utilization of health services.

The primary objectives of this study were to compare type of treatment, stage at diagnosis, and survival for female breast cancer patients newly diagnosed through FFS with third-party coverage or HMO plans offered by the same medical practice during the same time period.

MATERIALS AND METHODS

Study Population. The study population was comprised of female patients 18 years of age and over who were diagnosed with breast cancer at the Kelsey-Seybold Clinic, P.A., in Houston, TX, during the period January 1984 through December 1992. Patients had to be in the system at least 6 months prior to diagnosis; referrals for a second opinion were excluded even if they received their treatment at the clinic. A total of 425 patients met the study criteria; 53.6% were members of a HMO and 46.4% used a variety of FFS plans.

From 1949 until 1983, the clinic was a multispecialty private practice located in the Texas Medical Center in Houston, TX. In 1983, the clinic contracted with Maxicare, a HMO, to provide medical services to approximately 100,000 enrollees in the Houston area. According to the federal qualification, Maxicare Texas was a for-profit IPA-type HMO. During most of the study period, the clinic was the only provider for Maxicare in Houston. In November 1988, Sanus, also a federally qualified IPA-type HMO, purchased the interest from Maxicare in the HMO.

During the study period, the clinic had two locations in the Texas Medical Center and 13 satellite clinics covering the greater Houston area. The patient population is generally similar to the population of the greater Houston area in terms of its ethnic composition. Census data for the 1980 Consolidated Metropolitan Statistical Area showed 67% of the population was Caucasian, 18% was African-American, and 15% was Hispanic. By comparison, in 1990 the overall clinic population was 72% Caucasian, 19% African-American, and 9% Hispanic; thus, Hispanics were slightly underrepresented in the overall patient population. During the study period, the clinic employed approximately 60 primary care physicians (e.g., family practitioners, obstetricians or gynecologists, internal medicine physicians, and occupational medicine physicians) and over 80 specialty physicians and surgeons.

In this study population, the same health care provider served both FFS and HMO patients, so all patients saw the same physicians and used the same diagnostic and treatment facilities. Thus, any differences in diagnosis and treatment did not result from differences in equipment, laboratory procedures, or physician training (e.g., the same radiologists read all mammograms, and all cases were staged by the same personnel).

Measurement of the Variables. Type of treatment, clinical stage at diagnosis, and survival were the outcomes used to assess the effectiveness of type of health plan. Type of treatment was categorized into surgery, including lumpectomy or mastectomy, chemotherapy, hormone, and radiation. Clinical staging was done using the classification system adopted by the American Joint Committee on Cancer Staging, and the TNM Committee of the International Union Against Cancer. Stages are described in the appendix. For purposes of the analysis, stage was collapsed into three categories: 0/1, 2, 3/4. In situ cases were included in the analysis because the proportion of HMO (7.5%) and FFS (6.1%) cases were similar.

Vital status was ascertained as of December 31, 1992. Median survival time for the 228 HMO patients was 4.3 years; it was 4.8 years for 197 FFS patients. A tumor registry, established in 1986, included all cases diagnosed after December 31, 1985. Cases are reviewed annually, and vital status is updated through medical record audits and by letters to patients and their physicians. For patients diagnosed before 1986, a list of potentially eligible patients was generated using computerized diagnostic codes, and medical records were reviewed to ascertain information about patients and to determine whether or not a clinic visit had occurred after December 1992. If no visit was documented in the medical record, letters were sent to inquire about the health status of the patient; nonrespondents were contacted by telephone. Survival status as of December 31, 1992 was documented for all but 16 of the 425 patients. Seven women had moved out of the country, six could not be located, and three had changed providers and had requested that they not be contacted. For those women, date of last contact was used in the survival analysis.

Potentially confounding factors examined in relation to type of health plan included demographic factors (age, race/ethnicity, occupation and employment status, and marital status), behavioral factors (how the tumor was detected, e.g., patient, physician, or mammography), and breast cancer risk factors (family history, age at menarche, age at menopause, parity, and age at first live birth).

Information on all variables was abstracted from the medical record. Data on demographic factors, findings on clinical examination, histopathological findings, and final diagnosis were almost always recorded in the medical record. Risk factor information was less frequently recorded, but there was no
systematic pattern of missing values by type of health plan. An evaluation of the usefulness of medical record data for studying patterns of cancer care (21) concluded that hospital patient records are quite complete with respect to demographic data, stage of disease, and surgical procedures while other information such as risk factors and screening behavior is less completely recorded, a finding consistent with our data.

Statistical Analysis. Cross-tabulations were used to examine the distribution of breast cancer cases by type of health plan in relation to the factors listed above using SPSS-PC+ software (22). Chi-square analysis was used to test for associations between type of health plan and each of the variables. Survival times of the two groups were compared using the Kaplan-Meier method (23). Cox regression was used to assess the effects of health plan membership controlling for other variables; mortality rate ratios and 95% CIs were calculated. In the multivariate analysis, age was analyzed as a continuous variable. Survival analysis was done with BMDP software (24).

RESULTS

Demographic, Behavioral, and Breast Cancer Risk Factors and Health Plan Membership. Of the demographic factors shown in Table 1, age and employment status were statistically associated with type of health plan. Women who were members of the HMO were more likely to be younger and to be employed outside the home; however, among women who were employed, there was no difference by health plan in the type of occupation. Although not statistically significant, there was a higher percentage of African-American women among the HMO patients.

The majority of patients in both types of plan detected their tumors themselves (Table 1). With the exception of age at first birth, there were no differences in breast cancer risk factors between the groups.

Type of Treatment. There were no differences overall in the percentages of women treated with surgery or for type of surgery (mastectomy or lumpectomy), although a somewhat higher percentage of HMO patients in the youngest age group had mastectomies (Table 2). Likewise, there was no difference in the percentages of women receiving axillary node dissection by health plan, 82% and 85% of FFS and HMO patients, respectively. Overall, similar percentages of HMO and FFS patients received radiation and hormone therapy, and, in general, there were no marked differences within age groups by type of treatment. Although not statistically significant, a slightly higher percentage of HMO patients received chemotherapy; this difference was found only in the youngest age group (Table 2).

Stage at Diagnosis and Health Plan Membership. Overall, there were no differences by health plan membership for clinical stage at diagnosis. Approximately 40% of women in both health plans had their breast cancer diagnosed at an early stage (Table 3). There also were no statistically significant differences within the three age categories examined, although there was a tendency for members of the HMO in the two oldest age groups to be diagnosed at an early stage compared with women using FFS plans (Table 3).

Survival and Health Plan Membership. Health plan, age, race/ethnicity, and stage at diagnosis were included in the multivariate model. Employment status, although statistically significant in the bivariate analysis, was excluded because of its strong association with age and because there was no difference in the type of occupations among employed women (suggesting that employment status was not an indicator of socioeconomic status in this study population). Using FFS patients as the reference group, the unadjusted mortality rate ratio for the effect of health plan membership was 0.66 (95% CI = 0.432–1.020). After adjusting for age, the rate ratio was 0.76 (95% CI = 0.474–1.204); after adjusting for age, race/ethnicity, and stage at diagnosis, the rate ratio was 0.80 (95% CI = 0.505–1.257).
Table 2  Type of treatment for breast cancer by type of health plan and age group

<table>
<thead>
<tr>
<th>Type of treatment by age group</th>
<th>Type of health plan</th>
<th>FFS (%)</th>
<th>HMO (%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Surgery Overall n</td>
<td>92.4</td>
<td>93.4</td>
<td>0.05</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>n &lt;50 yr</td>
<td>88.9</td>
<td>94.6</td>
<td>0.87</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>n 50-64 yr</td>
<td>90.0</td>
<td>91.6</td>
<td>0.01</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>n ≥65 yr</td>
<td>97.2</td>
<td>95.2</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Mastectomy Overall n</td>
<td>79.1</td>
<td>82.6</td>
<td>0.57</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>n &lt;50 yr</td>
<td>67.5</td>
<td>78.3</td>
<td>1.29</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>n 50-64 yr</td>
<td>81.9</td>
<td>85.1</td>
<td>0.10</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>n ≥65 yr</td>
<td>72.9</td>
<td>85.0</td>
<td>1.00</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy Overall n</td>
<td>25.4</td>
<td>33.8</td>
<td>3.16</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>n &lt;50 yr</td>
<td>182</td>
<td>213</td>
<td>1.02</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>n 50-64 yr</td>
<td>45</td>
<td>112</td>
<td>1.07</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>n ≥65 yr</td>
<td>80</td>
<td>95</td>
<td>4.8</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>n Radiation Overall n</td>
<td>28.9</td>
<td>28.5</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>n &lt;50 yr</td>
<td>197</td>
<td>228</td>
<td>3.07</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>n 50-64 yr</td>
<td>33.3</td>
<td>32.1</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>n ≥65 yr</td>
<td>45</td>
<td>112</td>
<td>0.11</td>
<td>0.74</td>
<td></td>
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<tr>
<td>n Hormone Overall n</td>
<td>16.2</td>
<td>15.8</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>n &lt;50 yr</td>
<td>197</td>
<td>228</td>
<td>2.88</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>n 50-64 yr</td>
<td>30.6</td>
<td>28.4</td>
<td>2.74</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>n ≥65 yr</td>
<td>72</td>
<td>21</td>
<td>9.5</td>
<td>0.40</td>
<td></td>
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</tbody>
</table>

Table 3  Stage at final diagnosis for breast cancer by type of health plan and age group

<table>
<thead>
<tr>
<th>Age group (yr)</th>
<th>Stage at final diagnosis</th>
<th>FFS (%)</th>
<th>HMO (%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>0/1</td>
<td>38.6</td>
<td>41.7</td>
<td>2</td>
<td>4.82</td>
</tr>
<tr>
<td>n</td>
<td>197</td>
<td>228</td>
<td>37.8</td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td>n &lt;50</td>
<td>2/3</td>
<td>13.2</td>
<td>9.6</td>
<td>1.43</td>
<td>0.49</td>
</tr>
<tr>
<td>n</td>
<td>197</td>
<td>228</td>
<td>46.7</td>
<td>59.8</td>
<td></td>
</tr>
<tr>
<td>n 50-64</td>
<td>3/4</td>
<td>15.5</td>
<td>8.0</td>
<td>3.07</td>
<td>0.21</td>
</tr>
<tr>
<td>n ≥65</td>
<td>45</td>
<td>112</td>
<td>35.0</td>
<td>47.4</td>
<td></td>
</tr>
<tr>
<td>n Radiation</td>
<td>0/1</td>
<td>43.1</td>
<td>66.7</td>
<td>2</td>
<td>42.1</td>
</tr>
<tr>
<td>n</td>
<td>80</td>
<td>95</td>
<td>50.0</td>
<td>42.1</td>
<td></td>
</tr>
<tr>
<td>n ≥65</td>
<td>2/3</td>
<td>15.0</td>
<td>10.5</td>
<td>2.88</td>
<td>0.24</td>
</tr>
<tr>
<td>n Hormone</td>
<td>0/1</td>
<td>43.1</td>
<td>66.7</td>
<td>2</td>
<td>42.1</td>
</tr>
<tr>
<td>n</td>
<td>80</td>
<td>95</td>
<td>50.0</td>
<td>42.1</td>
<td></td>
</tr>
<tr>
<td>n ≥65</td>
<td>2/3</td>
<td>15.0</td>
<td>10.5</td>
<td>2.88</td>
<td>0.24</td>
</tr>
<tr>
<td>n</td>
<td>72</td>
<td>21</td>
<td>43.1</td>
<td>66.7</td>
<td></td>
</tr>
</tbody>
</table>

a. Women may have received more than one type of treatment; thus, statistical tests were done separately for each type of treatment within each age group by health plan.

b. χ² tests were done using Yates' correction for continuity and 1 df.

Includes only women who had surgery. The two types of surgery were mastectomy and lumpectomy.

DISCUSSION

Our findings are in agreement with studies reporting that disease-related outcomes for HMO patients were more likely to report prior mammography and mammography. Screening mammograms were covered for HMO patients, but insurance coverage for screening mammograms under FFS plans was not routine during the study period. Other studies (27–30) have shown that women in HMOs or those who had private insurance, or insurance that covered screening, were more likely to report prior mammography than women who did not have insurance or who used community clinics. A recent study examined differences in preventive care between FFS and HMO patients served by the same providers and found that HMO patients were more likely than FFS pa-
sidents to have had annual clinical breast examinations and biannual mammography (31). However, another study (32) found no difference in self-reported prior mammography between age-eligible members of an HMO and a community-based control group prior to the introduction of an intervention to increase breast cancer screening. It is possible that greater frequency of screening among HMO cases could contribute artifactually to the nonsignificant deficit in mortality in HMO compared with FFS patients due to lead-time bias. However, the similarity of the distribution of risk factors for breast cancer in our two groups and the similar stage distribution make it unlikely that one of the groups was being screened more intensively. Moreover, the proportion of women in our study who detected the tumors themselves was similar to the proportions reported by others for women not undergoing routine breast cancer screening (33–35). Thus, it seems reasonable to conclude that factors that brought cases to medical attention such as screening did not operate differentially in the two groups.

Another limitation of our study was its observational design. Because patients selected their own health plans, they may have differed on prior health status or other characteristics that may have influenced their chances of early diagnosis or survival. We found no differences by health plan membership in behavioral or breast cancer risk factor in bivariate analysis, and we controlled for age, race/ethnicity, and stage at diagnosis in the survival analysis. As in other similar studies (11, 13, 15, 16), we used all-cause, rather than cause-specific, mortality. Thus, some of the mortality observed here was due to causes other than breast cancer.

The issue of the precision of our estimates was addressed through the use of CIs. Although the data are consistent with an interpretation of no difference in survival by type of health plan, we lacked sufficient statistical power to detect an excess or a deficit in mortality of 20–30%, the magnitude of the rate ratios observed here.

A strength of the study is that it is among the first to examine quality of medical care by type of health plan within the same provider organization. Thus, medical outcomes were assessed net of the effects of differences in physician training, equipment, and laboratory procedures, a problem in most prior studies because HMO and FFS patients were cared for in different medical care settings. Our findings probably can be generalized to other large multispecialty group practices where physicians treat both FFS and managed care patients and perhaps to other contexts where physicians accept a mixture of FFS and prepaid patients.

There is still relatively little information about the quality of care provided by different types of managed care arrangements compared with FFS plans, particularly care provided by IPA-type HMOs, the fastest growing model (36), and by preferred provider organizations and point-of-service plans (37). Even less is known about the impact of different types of health plans on cancer care. The findings by Hynes (18) of the differential effects of type of health insurance and of competition on the two quality of care outcomes she studied indicate a need to investigate a variety of quality of cancer care outcomes in relation to an array of predictor variables including patient characteristics and preferences, type of health insurance, physician and organizational characteristics, and local environment factors (18). There also is a need to define more precisely our terminology describing the many types of managed care (37).

Miller and Luft (37) argue that because of the limited data available for most dimensions of health outcome performance, monitoring performance must be a crucial element of any health system reform plan. In this context, as noted by Hynes (18), attention specifically needs to be directed toward how health care reform will affect the quality and effectiveness of cancer care. Data from HMOs and other managed care settings, particularly when supplemented by data from other medical care sources, may provide an opportunity to collect and monitor quality of care outcomes including morbidity and mortality as well as patient satisfaction and preferences (38).

At issue in our study was whether or not there were differences in the patterns of care by type of health plan that might lead to differences in medical outcomes for breast cancer. Our findings of no difference in type of treatment, stage at diagnosis, or survival support the view that there were no systematic differences in the care offered to FFS or HMO breast cancer patients in this study.

APPENDIX: DESCRIPTION OF THE CLINICAL STAGES FOR BREAST CANCER

Clinical staging for breast cancer was done using the third edition of the Manual for Staging of Cancer (33). The following is an explanation of this staging classification for breast cancer.

Stage 0 is constituted by carcinoma in situ, no regional lymph node metastasis, and no distant metastasis.

Stage 1 is constituted by a tumor of 2 cm or less in greatest dimension, no regional lymph node or distant metastasis.

Stage 2A is constituted by either of two possible combinations: (a) evidence of any tumor 2 cm or less with metastasis to movable ipsilateral axillary lymph node(s) and no distant metastasis or (b) a tumor of more than 2 cm but not more than 5 cm and no regional lymph node or distant metastasis.

Stage 2B is constituted by either of two possible combinations: (a) tumor size of more than 2 cm but not more than 5 cm, metastasis to movable ipsilateral axillary lymph node(s) and no distant metastasis or (b) tumor of more than 5 cm and no regional lymph node or distant metastasis.

Stage 3A is constituted by either of two possible combinations: (a) any tumor 5 cm or less with metastasis to ipsilateral axillary lymph nodes fixed to one another or to other structures with no distant metastasis or (b) tumor size more than 5 cm with metastasis to movable or fixed ipsilateral axillary lymph nodes and no distant metastasis.

Stage 3B is constituted by either of two possible combinations: (a) tumor of any size with direct extension to chest wall or skin, absence or presence to any extent of regional lymph node involvement and no distant metastasis or (b) any size or extent of primary tumor, metastasis to ipsilateral internal mammary lymph node(s) and no distant metastasis.

Stage 4 is comprised of any size or extent of primary tumor, absence or presence to any extent, or regional lymph node involvement, and distant metastasis.
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