

Impact of distress screening and referral on health care utilization and cost among breast cancer patients: a retrospective cohort study*

Melissa F. Miller^{a,*}, Alexandra K. Zaleta^a, Melyssa L. Allen^b, Helen M. Nichols^c, Diane C. Robinson^d

Abstract

Background: Addressing cancer patient distress and unmet needs may reduce health care costs and enhance care utilization. This study examined the impact of a distress screening program (CancerSupportSource; CSS) on health care utilization and costs for breast cancer patients. **Methods:** In a retrospective cohort study with 2 years' follow-up, breast cancer patients receiving care at a community cancer center in Orlando, FL, between 2016 and 2019 were categorized according to exposure status: screened using CSS and acted by using supportive care services (SA); screened only (SO); and not screened (NS). Patients were matched on breast tumor location and age; screened patients were additionally matched on referral need. Outcomes abstracted from medical records included utilization and cost of emergency department (ED) services, hospital inpatient admissions, and outpatient services; and utilization of integrative medicine department, patient/family counseling, and allied health services. **Results:** SA patients ($n=36$), compared to NS ($n=37$), had significantly lower rates of ED visits in negative binomial regression analysis (incidence rate ratio [IRR] 0.43; 95% confidence interval [CI] 0.20–0.93; $P=.031$). There were significantly higher rates of integrative medicine department visits in SA (IRR 4.20; 95% CI 1.63–10.9; $P=.003$) and SO (IRR 3.71; 95% CI 1.49–9.24; $P=.005$) groups compared to NS, and higher rates of patient/family counseling visits in SA (IRR 6.21; 95% CI 1.52–25.3; $P=.011$). There were no significant differences in 2-year health care costs between groups, controlling for age and race/ethnicity. **Conclusions:** These findings highlight the potential value of distress screening and referral for health care utilization, shifting use of higher cost services to lower cost nonemergent and preventive care in cancer, and can inform future prospective research on cost outcomes.

Keywords: Cancer, Cost analysis, Distress screening, Health care utilization

Introduction

Psychosocial distress among cancer patients, if unaddressed, can negatively impact clinical outcomes, including reduced survival rates^[1] and reduced quality of life.^[2] Importantly, distress can also

have a detrimental financial impact on cancer patients and institutions due to increased health care utilization and costs.^[3–9] Cancer patients with depression have more emergency department (ED) visits and inpatient hospital admissions,^[3,5] and higher health care costs have been demonstrated among cancer survivors with mental health diagnoses,^[10] with total annual health care costs that are 113% higher than among cancer patients without depression.^[6] To address critical gaps in unmanaged depression, anxiety, and other unmet needs, the nonprofit advocacy organization Cancer Support Community developed Cancer-SupportSource (CSS), a multidimensional psychosocial distress screening and referral program for cancer patients and survivors with the capacity to identify those at risk for clinically significant levels of anxiety and depression and to provide tailored referrals for patients within their immediate care setting.^[11]

The process of psychosocial distress screening is designed to identify distress and ensure that patients are referred to supportive care services promptly.^[12] Ideally, screening programs connect cancer patients to appropriate resources, reducing levels of distress, and subsequently reducing health care costs and utilization.^[13] Indeed, the Commission on Cancer of the American College of Surgeons has required distress screening since 2015 for cancer centers to maintain accreditation,^[14] and screening is required to meet requirements for American Society of Oncology Quality Oncology Practice Initiative standards, Oncology Care Model quality measures, and National Comprehensive Cancer Network distress screening guidelines.^[15–18]

To date, research demonstrating the impact of distress screening and referral on institutional outcomes, including health care utilization rates and costs, has been mixed.^[14] One body of literature suggests that identifying and addressing

Funding: Institutional research support for this project was provided by Amgen Oncology, Celgene Corporation, and the Hitter Family Foundation; Award/Grant numbers are not applicable.

Disclosure: MFM, AKZ, and HMN report institutional research grants from Amgen Oncology, Celgene Corporation, and the Hitter Family Foundation during the conduct of the study. MFM reports institutional research grants from GlaxoSmithKline, Merck & Co., Inc., and Takeda Oncology outside the submitted work. AKZ reports institutional research grants from Astellas Pharma, Gilead Sciences, Novartis, Pfizer Oncology, and Seagen outside the submitted work. MLA and DCR report no disclosures.

^a Cancer Support Community, Research and Training Institute, Philadelphia, PA,

^b Orlando Health Cancer Institute, Orlando, FL, ^c Cancer Support Community, Washington, DC, ^d Orlando Health Cancer Institute, Orlando, FL.

* Corresponding author. Address: Melissa F. Miller, PhD, MPH Cancer Support Community, Research and Training Institute 520 Walnut Street, Suite 1170, Philadelphia, PA 19106. Tel: +202 650 5373. E-mail address: melissa@cancersupportcommunity.org (M.F. Miller).

Copyright © 2022 The Authors. Published by Wolters Kluwer Health Inc., on behalf of the International Psycho-Oncology Society.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

J of Psychosocial Oncology Research and Practice (2022) 4:2

Received: 16 August 2021 / Received in final form: 24 January 2022 /

Accepted: 21 February 2022

<http://dx.doi.org/10.1097/OR9.000000000000070>

cancer patients' distress can lead to improved overall health and reduced health care costs,^[13,19] whereas unaddressed distress is associated with increased costs and utilization of avoidable high-cost care. These trends are highly salient to the breast cancer care landscape, where the total annual medical cost for treatment of breast cancer is approximately \$16.5 billion, accounting for 13% of all cancer treatment costs in the United States.^[20] Yet, there is limited research that examines how distress screening may be related to both patient and institutional outcomes,^[21] and the impact of psychosocial distress screening and referral on care experiences, health care outcomes, and cost continues to be a critical question, particularly as care reimbursement structures increasingly incentivize lower health care costs.^[14]

CSS has been implemented nationwide throughout Cancer Support Community's affiliate network, which provides psychosocial care and support at no cost to patients and their families, as well as within community-based hospitals and health care partners. The aim of the present study was to explore whether real-world data could be used to assess outcomes of cost and health care utilization in the evaluation of CSS at a community-based cancer center. Using a quasi-experimental design, we conducted a small retrospective cohort study among three groups of breast cancer patients: those who completed CSS and utilized Cancer Support Community supportive services; those who completed CSS only; and those who did not complete CSS. Specifically, we hypothesized that distress screening at a community cancer center would be associated with institutional cost savings and optimized service utilization obtained using patient medical records.

Methods

Study design

In this retrospective cohort study, all participants were being treated actively for breast cancer at Orlando Health Cancer Institute. In 2014, Orlando Health implemented the use of the 25-item version of CSS, a comprehensive, web-based distress screening and referral program in which cancer patients rate concerns and indicate additional desired help.^[11] In compliance with standards set forth by the American College of Surgeons Commission on Cancer for psychosocial distress screening,^[22] a licensed mental health professional trained in the psychosocial aspects of cancer care assessed all cancer screenings in this study, conducted follow-up evaluations, and provided referrals for distress management directly to the patient as indicated by screening results. Cost and health care utilization outcomes were retrospectively abstracted from medical records by hospital staff external to the research team. At the time of the study, hospital databases were not integrated into a central system. To that end, the smaller sample size and matched study design were selected to constrain the resources required by external partners to extract the desired cost outcomes. To minimize confounding and lessen variance in cost outcomes, we restricted the sample to breast cancer patients, given the heterogeneity of treatment experiences across cancer diagnoses. Breast cancer was the largest cancer diagnostic group that completed screening at Orlando Health and thus yielded the largest screening groups. Thus, the study cohort included breast cancer patients that were categorized according to their exposure to distress screening and referral. This study was approved by the Institutional Review Board at Orlando Health (Reference number 1420879-1).

Patient and public involvement

There was no patient involvement in the present study as it was a retrospective chart review. However, the CSS distress screening program was developed with extensive input from cancer patients and community-based oncology and supportive care providers from conception through dissemination.^[11,23] The results from this work will be disseminated throughout CSC's online and affiliate network, a global nonprofit network of CSC and Gilda's Club centers, hospitals and clinic partnerships, and satellite locations that deliver free support and navigation services to cancer patients and their families.

Distress screening and referral program

Cancer-related distress was assessed using the 25-item version of CSS, a multidimensional distress screening and referral program that automatically generates a patient report with key information about concerns and support resources, as well as a clinical report summarizing concerns to facilitate referral to additional assessment and support.^[11,23] CSS asks cancer patients to rate concerns corresponding to key domains (emotional well-being, symptom burden and impact, body image and healthy lifestyle, health care team communication, and relationships and intimacy, plus an item assessing tobacco and substance use) and indicate their desired help for each concern (eg, get written information, talk with a staff member, no action). The 25-item CSS measure has undergone comprehensive evaluation and demonstrated strong psychometric properties including strong internal consistency reliability (Cronbach $\alpha = .94$) and test-retest reliability, a factor structure that is replicable, and adequate convergent and divergent validity when compared to the Patient-Reported Outcomes Measurement Information System-29 (PROMIS-29 v2.0).^[11] At the time of the study, Orlando Health implemented a version of the CSS measure that included an embedded 4-item depression risk scale identifying individuals at risk for clinically significant depression.^[23] If a patient was flagged as at risk for depression, the patient was called within 24 hours by a member of the Integrative Medicine team and further assessed via clinical interview and, as appropriate, referred to support groups or individual counseling. For this study, a composite score for CSS referral need was calculated as the total number of CSS items that a patient requested to discuss with a staff member (range 0–25).

Distress screening at the study site was guided by the following procedure. Clinics scheduled distress screening for the first established patient appointment. Patients were considered established after an initial consultation of a new patient had taken place, a diagnosis of cancer had been confirmed, and the individual decided to be treated at the cancer center. Patients were informed after their initial new patient appointment that their physician would like them to complete a support survey before their next visit. They were invited to choose to complete CSS either online, at home on their own device, or on an electronic tablet at the clinic immediately before their next appointment. Upon arrival to the first follow-up appointment, the clinic front desk staff checked whether distress screening had been completed in advance by the patient. If not, an electronic tablet with the screener was provided to complete screening. Following screening, 2 reports were automatically generated. First, a clinician report with a summary of item-level responses and information about patient depression risk was printed and included with other clinician documents for their oncologist

visit. A second report, designed specifically for the patient, was given to the patient. Included in this report was information (eg, written materials, links to websites) and referrals following pre-determined triage pathways for each screener item for which the patient opted to receive written information or talk with a staff person.

Study cohort and screening group

The study sample was selected from cancer patients initiating a treatment course at Orlando Health Cancer Institute who received an automated email invitation to complete CSS between January 2016 and June 2017 and classified according to whether they completed CSS or not. We then selected those patients who self-reported breast cancer as their primary cancer diagnosis and confirmed their diagnosis via chart review using ICD-10 diagnostic codes. We further classified this “screened” patient population into those who utilized Cancer Support Community supportive services within one year following screening (screened and acted, SA) and those who did not (screened only, SO). Types of programs provided by CSC included: support groups (breast cancer, women’s cancer, advanced cancer, and survivorship); health behavior and lifestyle programs; nutrition classes; art workshops and programs (eg, music therapy, painting, journal writing, creative writing); yoga and tai chi classes; meditation and mindfulness programs; and education programs on a variety of topics (eg, sleep, advance care planning, cognitive function, health insurance, humor). SO patients were matched to SA patients 2:1 on tumor location within the breast using ICD-10-CM codes, for example, C50.111 for malignant neoplasm of central portion of right female breast, then by age and CSS referral score (± 1 through a score of 9; score of ≥ 10 matched to others with high referral need, ≥ 10). Breast cancer patients scheduled for screening but not screened (never screened, NS) were matched to SA patients 1:1 on tumor location and then age. Ages 30 to 75 years were matched in 5-year bands; ages 76 and older in 10-year bands. If there were multiple matches, a random number generator was used to select the match to the sample patient. To prevent the possibility that patients coded as NS did not reschedule and take the screening during the follow-up time period, we excluded patients that were duplicated as cancelled/no-showed and arrived. Patients were excluded from analyses ($n=4$) if they failed to contribute 2 complete years of cost data because they had moved, transferred to another hospital for cancer treatment, or died.

Measures

Sociodemographic characteristics and clinical history. Age (at time of screening or scheduled screening), race and Hispanic ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic other race), insurance coverage (self-pay, HMO, Blue Cross, commercial, Medicaid/Medicare), and presence of ≥ 1 comorbid conditions were abstracted from patient medical records.

Health care utilization and costs. Health care utilization and costs up to 2 years from the date of screening or the date of scheduled screening were extracted using Current Procedural Terminology (CPT) codes for the following services: emergency department (ED) visits, hospital inpatient admissions, and office and outpatient services. Number of ED visits, number of hospital inpatient admissions (and number of days hospitalized, for those admitted), and number of office and outpatient services were separately calculated for each service. Total costs were defined as

the total billed charges associated with the use of the above-listed health care services. We included 29 codes associated with high-cost health care services (Appendix A, <http://links.lww.com/OR9/A31>).

Utilization of integrative medicine department services, patient and family counseling services, and other allied health services (financial counseling, nutrition services, and social work services) were abstracted from medical records via the electronic medical record portal. Utilization for these services was quantified as follows: total number of integrative medicine department services, total number of patient and family counseling services, and yes/no as to whether they ever accessed each allied health service.

Analysis

We used ANOVA and Fisher exact tests to conduct bivariate analyses to examine differences in sample characteristics between screening groups. For modeling 2-year cumulative health care expenditures, we fit a generalized linear regression model using a gamma distribution and log link and reported average marginal effects using the delta method to estimate standard errors. This approach was selected as the distribution of cost data was highly positively skewed with a disproportionately large share of health care costs generated by a small proportion of patients.^[24–26] Similarly, utilization of health care services was positively skewed with a large proportion of participants having no ED visits (65.5%), no hospital inpatient admissions (81.8%), and no use of office and outpatient services (24.3%), integrative medicine department visits (53.4%), or patient and family counseling services (74.3%). Therefore, we used negative binomial regression analysis to model the count over the 2-year period of ED visits, hospital inpatient admissions, office and outpatient services, integrative medicine department visits, and patient and family counseling services, and reported incidence rate ratios (IRRs) and 95% confidence intervals (CI). Model fit statistics (AIC and BIC) indicated negative binomial regression models fit the data better than standard and zero-inflated Poisson models. We also modeled the total number of days hospitalized among those who had an inpatient admission using zero-truncated Poisson regression. We estimated predictive margins associated with SA and SO in separate logistic regression models for the following binary outcomes: nutrition services, financial counseling, and social work services. We conducted unadjusted analyses, as well as analyses adjusted for the participant’s age and race/ethnicity (categorized as non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic other race, and unknown). To evaluate the sensitivity of the study dataset in identifying potential clinical effects of screening, we reported all statistically significant results ($P < .05$), and also described nonsignificant trends (IRR and 95% CI) for analyses in which the IRR corresponded to a medium effect size or larger (IRR $< .54$ or > 1.86)^[27].

Additional sensitivity analyses were conducted as follows. First, we modeled cumulative costs at various time points over the 2-year follow-up continuum, for example, 1, 2, 3, 6, 12, and 18 months, to explore whether screening impacted health care costs closer to the point of screening and referral. The findings were not meaningfully different, and the impact of the screening group on 2-years costs was reported. Second, we analyzed ED visits, hospital inpatient admissions, office and outpatient services, integrative medicine department visits, and patient and family counseling services as dichotomous outcomes (0 = no visits; 1 = ≥ 1 visits) using logistic regression. The measures of

association between screening group and utilization outcomes were similar to those from the main analyses. The exception was for hospital inpatient admissions in which we observed a qualitative difference between negative binomial and logistic regression approaches. However, the discrepancy appeared driven by a differential distribution of number of hospitalizations between SO and NS groups; although there was a greater proportion of SO patients with 1 hospitalization compared to NS, fewer had ≥ 2 hospitalizations. Thus, findings from negative binomial regression are reported. All analyses were conducted using Stata/SE version 16.1.

Results

Among 2208 new patients receiving an automated invitation to complete CSS screening at Orlando Health Cancer Institute from January 2016 through June 2017, 1539 patients completed the screening, of whom 482 reported breast cancer as their primary diagnosis (Fig. 1). Among the 482 breast cancer patients screened, 174 (36%) indicated a referral need, that is, the patient requested to talk with a staff member for at least one CSS item. Of those with a referral need, 151 (87%) did not use a CSC supportive service. A total of 38 (irrespective of referral need: 61% indicating referral need; 39% indicating no referral need) attended at least one program provided by the Cancer Support Community located in Orlando Health Cancer Institute (SA group); 76 breast cancer patients who completed CSS screening but did not utilize Orlando Health supportive services (SO group) were matched to the SA group on age and level of referral need. Additionally, 124 breast cancer patients treated at Orlando Health did not complete any CSS screening during

the study period; 38 of those not screened (NS group) were matched on age to the SA group. Four patients were excluded as described in the methods due to incomplete 2-year cost data, for a total analytic sample size of 148 breast cancer patients.

Sample characteristics

Study participants were, on average, 56.9 years of age (SD = 11.7; range 31–86; Table 1). The sample was 54.1% non-Hispanic White, 14.2% non-Hispanic Black, and 12.2% Hispanic; there was a nonsignificant trend for a greater proportion of non-Hispanic Black patients in the SA group (30.6%), compared to the SO (9.3%) and NS groups (8.1%; $P = .061$, Fisher exact test). The majority of participants in SA and SO groups (68.5%) completed screening within 1 month after receiving their cancer diagnosis.

Health care utilization

ED Visits. In the study sample, 34.5% of patients ($n = 51$) had at least 1 ED visit in 2 years following screening or scheduled screening. In negative binomial models adjusted for age and race/ethnicity (Table 2), the SA group had significantly lower rates of ED visits as compared to the NS group (IRR .43; 95% CI .20–.93; $P = .031$), with the expected number of ED visits in 2 years for an SA patient being less than half (.43) of the expected number of ED visits for an NS patient.

Hospital inpatient admissions. A total of 27 patients in this study (18.2%) were hospitalized during the 2-year study period. In regression analysis, there was a non-significant trend for fewer inpatient hospitalizations in the SA (IRR .41; 95% CI .13–1.32; $P = .135$) and SO (IRR .54; 95% CI .19–1.51; $P = .243$) groups as compared to the NS group.

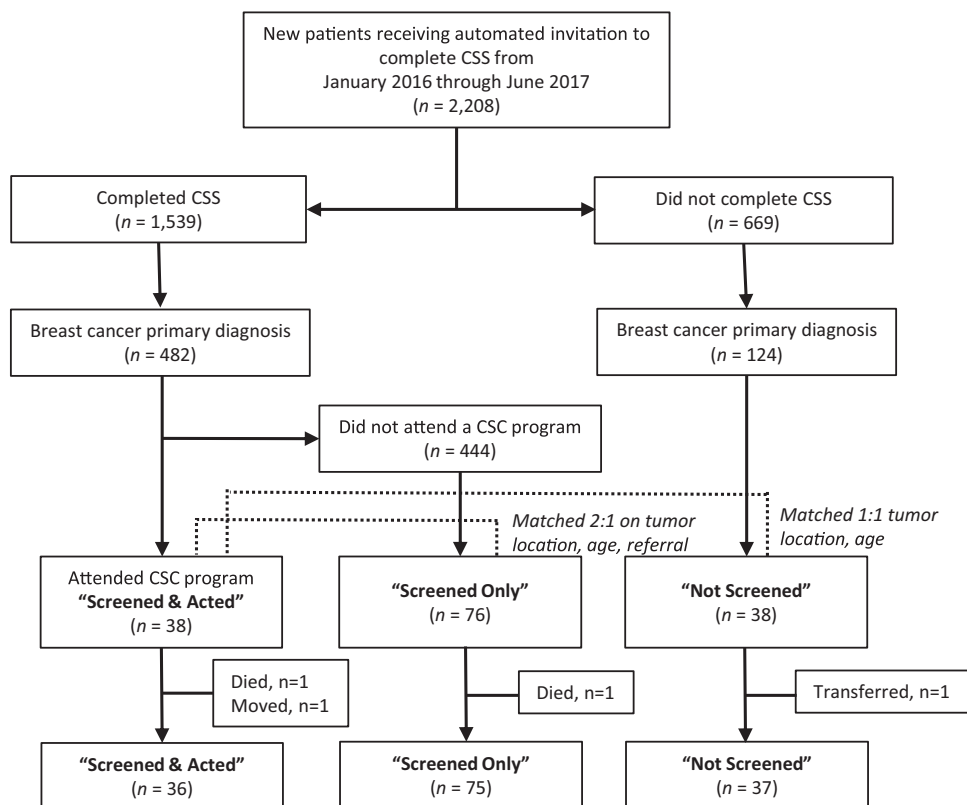


Figure 1. Sample selection flowchart.

Table 1**Sample characteristics, by screening group.**

Characteristic	Screened and acted (<i>n</i> =36) <i>M</i> (<i>SD</i>) <i>n</i> (%)	Screened only (<i>n</i> =75) <i>M</i> (<i>SD</i>) <i>n</i> (%)	Not screened (<i>n</i> =37) <i>M</i> (<i>SD</i>) <i>n</i> (%)	Full sample (<i>n</i> =148) <i>M</i> (<i>SD</i>) <i>n</i> (%)
Age	56.0 (11.3)	56.2 (11.4)	59.1 (12.7)	56.9 (11.7)
Age (y; range:31–86)				
<45 y	7 (19.4)	13 (17.3)	4 (10.8)	24 (16.2)
45–54 y	7 (19.4)	20 (26.7)	11 (29.7)	38 (25.7)
55–64 y	12 (33.3)	23 (30.7)	10 (27.0)	45 (30.4)
65 y+	10 (27.8)	19 (25.3)	12 (32.4)	41 (27.7)
Screening timeframe				
Screened before dx	3 (8.3)	7 (9.3)	n/a	10 (9.0)
<1 wk	5 (13.9)	19 (25.3)	n/a	24 (21.6)
1 wk to <1 mo	17 (47.2)	25 (33.3)	n/a	42 (37.8)
1–2 mo	7 (19.4)	9 (12.0)	n/a	16 (14.4)
2 to <6 mo	2 (5.6)	10 (13.3)	n/a	12 (10.8)
6 to <12 mo	0 (0.0)	4 (5.3)	n/a	4 (3.6)
12 to <17 mo	2 (5.6)	1 (1.3)	n/a	3 (2.7)
Race/ethnicity				
Non-Hispanic White	13 (36.1)	42 (56.0)	25 (67.6)	80 (54.1)
Non-Hispanic Black	11 (30.6)	7 (9.3)	3 (8.1)	21 (14.2)
Hispanic	5 (13.9)	11 (14.7)	2 (5.4)	18 (12.2)
Non-Hispanic other	2 (5.6)	5 (6.7)	4 (10.8)	11 (7.4)
Missing	5 (13.9)	10 (13.3)	3 (8.1)	18 (12.2)
Comorbidities				
Yes	9 (28.1)	18 (27.7)	11 (32.4)	38 (29.0)
No	23 (71.9)	47 (72.3)	23 (67.6)	93 (71.0)
Insurance				
Self-pay	8 (22.2)	11 (14.7)	4 (10.8)	23 (15.5)
HMO	10 (27.8)	28 (37.3)	12 (32.4)	50 (33.8)
Blue Cross	12 (33.3)	14 (18.7)	11 (29.7)	37 (25.0)
Commercial	1 (2.8)	6 (8.0)	5 (13.5)	12 (8.1)
Medicaid/Medicare	0 (0.0)	2 (2.7)	0 (0.0)	2 (1.4)
Missing	5 (13.9)	14 (18.7)	5 (13.5)	24 (16.2)

ANOVA and Fisher exact test showed that screening groups did not differ on these characteristics (all P s > .05).

Days hospitalized. Among those patients with overnight hospital stays ($n=27$), zero-truncated Poisson models adjusted for age and race/ethnicity showed a nonsignificant trend with the expected number of days hospitalized in 2 years for an SA patient at .50 times the expected number of days hospitalized for an NS patient (IRR .50; 95% CI; .24–1.04; $P=.064$) and 0.46 times for an SO patient (IRR .46; 95% CI .17–1.30; $P=.143$).

Office and outpatient services. Among the full sample, 112 patients (75.7%) utilized office and outpatient services; there were no significant differences between screening groups in utilization (expected counts for SA = 13.5; SO = 11.6; NS = 9.7).

Integrative medicine department visits. Nearly half of the study sample ($n=69$; 46.6%) had integrative medicine department visits, with regression models demonstrating statistically significant higher rates in the SA (IRR 4.20; 95% CI 1.63–10.9; $P=.003$) and SO (IRR 3.71; 95% CI 1.49–9.24; $P=.005$) groups compared to the NS group.

Patient and family counseling services. In the sample, 25.6% ($n=38$) had at least 1 patient/family counseling visit. Results from regression analysis showed significantly higher rates in the SA group compared to the NS group (IRR 6.21; 95% CI 1.52–25.3; $P=.011$).

Allied health services. We also explored utilization of allied health services; 29.7% utilized nutrition services, 15.5% social

work, and 10.1% financial counseling. Utilization rates did not differ by screening group for nutrition services and social work; however, the SA group was significantly more likely to access financial counseling compared to the SO group (OR 3.82; 95% CI 1.08–13.5; $P=.037$) and a non-significant trend compared to the NS group (OR 3.31; CI .73–14.9; $P=.119$).

Health care costs

There were no significant differences in 2-year health care costs between screening groups, after controlling for age and race/ethnicity (predicted mean for SA = \$34,157; SO = \$34,611; NS = \$35,915).

Discussion

This small retrospective study provides important foundational information regarding the impact of a distress screening and referral program on health care utilization and cost among breast cancer patients. We found that breast cancer patients who were screened with CSS and utilized Cancer Support Community supportive services within 1 year following screening had fewer ED visits and were more likely to access integrative medicine department services, patient and family counseling services, and financial counseling. Additionally, screened patients demonstrated non-significant trends of fewer inpatient hospital admissions and shorter hospital stays. Taken together, the

Table 2
Adjusted differences in health care utilization over 2 years, by screening group.

	Screened only vs not screened	Screened and acted vs not screened
Emergency department visits		
IRR (95% CI)	.59 (.30–1.18)	.43 (.20–.93)
P	.136	.031
Difference in events	–.43	–.60
Hospital inpatient admissions		
IRR (95% CI)	0.54 (0.19–1.51)	.41 (.13–1.32)
P	.243	.135
Difference in events	–0.23	–.30
Days hospitalized		
IRR (95% CI)	.46 (.17–1.30)	.50 (.24–1.04)
P	.143	.064
Difference in events	–6.38	–5.94
Office and outpatient services		
IRR (95% CI)	1.19 (.83–1.70)	1.39 (.91–2.13)
P	.336	.129
Difference in events	1.85	3.79
Integrative medicine department visits		
IRR (95% CI)	3.71 (1.49–9.24)	4.20 (1.63–10.9)
P	.005	.003
Difference in events	.68	.81
Patient and family counseling services		
IRR (95% CI)	1.64 (.44–6.14)	6.21 (1.52–25.3)
p-value	.464	.011
Difference in events	.26	2.09

Results from negative binomial regression models adjusted for age and race/ethnicity; Differences in events over 2 years are marginal differences based on model predictions, adjusting for age and race/ethnicity; CI = confidence interval, IRR = incidence rate ratio.

*Results from zero-truncated Poisson regression among those who were hospitalized (n=27).

results from this retrospective cohort study highlight the potential value of distress screening for health care utilization.

Our findings of lower ED utilization among screened patients are consistent with previous research showing cancer patients who are screened for distress have a reduced risk for ED visits and hospitalizations when compared to patients who are not screened.^[21] Furthermore, in this study, the observed significant decrease in ED use and increase in optimized health care utilization are consistent with a shift from higher cost services to lower cost nonemergent and preventive care, outcomes that are aligned with the intended goals of distress screening and referral.^[13] In this study, the observed shifts in care utilization did not translate to a significant reduction in combined charges among screened patients. These nonsignificant cost findings can in part be attributed to the relatively small sample size compared to the high variance in patient health care costs. These findings warrant further investigation in larger samples, weighing cost outcomes against patient benefits including quality of life improvements, symptom burden reduction, and/or increases in work productivity. The ratio of monetary cost to patient benefit as an outcome in cost-effectiveness analysis is an important consideration given established gains in quality of life and reduction in risk for depression and anxiety associated with access to psychosocial interventions.^[28–30] It is important to note that traditional cost-effectiveness analysis is limited to investigating only 1 domain of patient benefit at a time, and future research using prospective designs should include careful selection of patient-reported outcomes, particularly as screening in this sample was associated with greater utilization of supportive services including integrating medicine department

services, patient and family counseling services, and financial counseling.

In this study, the observed effect on utilization and cost outcomes compared to the NS group was stronger for the SA group than the SO group, suggesting added benefit for healthcare utilization and cost outcomes when also participating in CSC supportive care services, which distinguished SA and SO groups. Consistent with recommended best practices for distress screening programs to be efficacious in reducing health care costs, they must include the identification of patient needs using a valid screening tool, triage to appropriate services, and evidence-based treatment of symptoms and problems according to patient need.^[31] Our findings underscore that, indeed, participating in supportive care is a critical element of an effective distress screening and referral program as previously noted. With this in mind, we also noted a large proportion (87%) of patients with a referral need did not access CSC supportive care services even though they requested to talk with a staff member for at least one CSS-identified concern. Although it is possible that patients may have been accessing supportive care services outside of CSC that were not measured within the constraints of this study, the uptake of referrals by patients in need remains an important area of opportunity for successful implementation of distress screening and referral with systematic follow-up and re-evaluation.^[32]

Strengths of this retrospective historical cohort study included use of preexisting data to identify exposed (screened) and unexposed (not screened) individuals in the past and trace these patients forward to determine incident cost and health care utilization. Other strengths of the present study included the leveraging of information on ED and inpatient hospital utilization as well as outpatient, integrative medicine, patient and family counseling, and other allied health services to portray a comprehensive picture of the impact of screening on various types of health care utilization in breast cancer patients. The sample size was a limitation, and the study may have been underpowered for cost outcomes. At the time of the study, databases across the hospital system were not integrated into a central location, and the present study relied on human resources external to research staff to access cost and utilization records. Knowing we would have limited sample size, we aimed to minimize confounding and lessen variance in cost outcomes by restricting the sample to breast cancer patients, given the heterogeneity of treatment experiences across cancer diagnoses, and matching screening groups. Future research examining the cost effectiveness of distress screening and referral will benefit from larger sample sizes. We did not abstract data on the cost of integrative medicine department visits, patient and family counseling, and use of other allied health services or costs associated with the necessary treatment of cancer, use of prescription medication, or indirect costs to the patient. Furthermore, we did not measure the cost of the implementation of CSS at Orlando Health, although costs (eg, staff salaries, web-based technology, and program licensing) are moderate in light of overall health care expenditures. Limited information on clinical history (eg, disease severity, comorbidities, cancer treatment) was available, although we limited the sample to breast cancer patients to reduce heterogeneity. We also documented whether patients accessed at least one Cancer Support Community supportive care service (eg, support groups, meditation and mindfulness programs, health behavior programs, or exercise classes), but did not collect detailed information about whether patient access of CSC services

following screening was a direct result of the referral, nor did we document whether patients utilized supportive services external to Orlando Health. We also did not include measures of patient benefit, for example, reductions in psychosocial distress.

Finally, patients self-selected whether to complete CSS screening after being invited and whether they used CSC supportive services, such that increased use of nonemergent services among those in SO and SA groups could be accounted for in part by patient preference to engage in preventive health care services like distress screening as well as across integrative medicine, counseling, and other allied health services. We also observed an interesting trend for a greater proportion of Black patients in the SA group relative to SO and NS. There are several factors that could be driving this pattern, and this study was not designed to answer questions related to racial disparities in healthcare utilization and cost. It is possible the difference in racial distribution across screening groups may be an artifact of sampling; however, our observations bring to question whether Black individuals at risk for higher cost health care utilization are willing to be screened for distress. This is an important area of opportunity for future research.

Despite study limitations, this study provides an important contribution to the literature. The findings indicate distress screening and referral may be important to optimizing overall health care utilization, including more efficient and appropriate use of health care resources. This study was limited to breast cancer patients receiving care at a community-based cancer center; however, CSS was developed to assess distress and unmet needs of patients diagnosed with all types of cancer across various care settings, and it is likely these findings can be extended to patients with other cancer diagnoses and the institutions that serve them. Given that distress screening is often overlooked by clinicians, with one recent study demonstrating that <50% of the clinicians adhere to screening protocols,^[21] more research is needed on distress screening implementation including how to best use distress screening to refer cancer patients to the appropriate support services.^[33] There is also a need for research that determines whether patients who are most distressed actually receive resources and support,^[34] as well as how to best engage patients in using supportive services.^[35] Prospective research methodologies will be an important factor in addressing these critical questions. It is noteworthy that CSS is presently being implemented by community-based supportive care organizations nationwide. This provides an interesting research opportunity as health care providers, payors, and other stakeholders in the health care community seek to understand how to utilize community-based interventions to drive down the cost of care.

Ultimately, this study demonstrated that CancerSupportSource screening and referral administered in a community cancer center is associated with less frequent use of ED services and more frequent use of integrative medicine department services and patient and family counseling. Learnings from the study can be used to inform the research design and key variables needed for a larger, prospective study, including a more diverse sample and the ability to track more costs over a longer period of time. With these approaches implemented, it is possible that the reduced and more appropriate utilization we detected may result in a demonstration of reduced health care costs within breast cancer and other oncology clinics. This has important implications for patients, providers, and institutions.

Conflicts of interest statement

The authors report no conflicts of interest.

Acknowledgments

The authors thank Eberechukwu Onukwugha for her critical review of the analysis plan and comments on the manuscript during writing.

References

- [1] Hamer M, Chida Y, Molloy GJ. Psychological distress and cancer mortality. *J Psychosom Res* 2009;66:255–258.
- [2] Saeedi-Saeedi H, Shahidsales S, Koochak-Pour M, Sabahi E, Moridi I. Evaluation of emotional distress in breast cancer patients. *Iran J Cancer Prev* 2015;8:36–41.
- [3] Himelhoch S, Weller WE, Wu AW, Anderson GF, Cooper LA. Chronic medical illness, depression, and use of acute medical services among Medicare beneficiaries. *Med Care* 2004;42:512–521.
- [4] Lo C, Calzavara A, Kurdyak P, et al. Depression and use of health care services in patients with advanced cancer. *Can Fam Physician* 2013; 59:6.
- [5] Mausbach BT, Irwin SA. Depression and healthcare service utilization in patients with cancer. *Psychooncology* 2017;26:1133–1139.
- [6] Mausbach BT, Yeung P, Bos T, Irwin SA. Health care costs of depression in patients diagnosed with cancer. *Psychooncology* 2018;27:1735–1741.
- [7] Jeffery DD, Art Ambrosio L, Hopkins L, Burke HB. Mental health comorbidities and cost/utilization outcomes in head and neck cancer patients. *J Psychosoc Oncol* 2019;37:301–318.
- [8] Mausbach BT, Decastro G, Schwab RB, Tiamson-Kassab M, Irwin SA. Healthcare use and costs in adult cancer patients with anxiety and depression. *Depress Anxiety* 2020;37:908–915.
- [9] Han X, Lin CC, Li C, et al. Association between serious psychological distress and health care use and expenditures by cancer history. *Cancer* 2015;121:614–622.
- [10] Khushalani JS, Qin J, Cyrus J, et al. Systematic review of healthcare costs related to mental health conditions among cancer survivors. *Expert Rev Pharmacoecon Outcomes Res* 2018;18:505–517.
- [11] Buzaglo JS, Zaleta AK, McManus S, Golant M, Miller MF. Cancer-SupportSource®: Validation of a revised multi-dimensional distress screening program for cancer patients and survivors. *Support Care Cancer* 2020;28:55–64.
- [12] Wevers MR, Schou-Bredal I, Verhoef S, et al. Psychological distress in newly diagnosed breast cancer patients: an observational study comparing those at high risk of hereditary cancer with those of unknown risk. *J Psychosoc Oncol* 2020;2:
- [13] Carlson LE, Bultz BD. Efficacy and medical cost offset of psychosocial interventions in cancer care: making the case for economic analyses. *Psychooncology* 2004;13:837–849.
- [14] Ehlers SL, Davis K, Bluethmann SM, et al. Screening for psychosocial distress among patients with cancer: Implications for clinical practice, healthcare policy, and dissemination to enhance cancer survivorship. *Transl Behav Med* 2019;9:282–291.
- [15] American Society of Clinical Oncology. *QOPI® Certification Program Standards Version 6.1.18*. June 1, 2018.
- [16] National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology: Distress Management Version 2.2020*. March 11, 2020.
- [17] Centers for Medicare & Medicaid Services. *Oncology Care Model Overview*. February 2020.
- [18] American College of Surgeons Commission on Cancer. *Optimal resources for cancer care (2020 Edition)*. Standard 5.2- Psychosocial distress screening. 2020.
- [19] Basch E, Deal AM, Kris MG, et al. Symptom monitoring with patient-reported outcomes during routine cancer treatment: a randomized controlled trial. *J Clin Oncol* 2016;34:557–565.
- [20] Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown MJ. Projections of the cost of cancer care in the United States. *JNCI* 2011;103:12.
- [21] Zebrack B, Kayser K, Bybee D, et al. A practice-based evaluation of distress screening protocol adherence and medical service utilization. *JNCCN* 2017;15:903–912.
- [22] Buxton D, Lazenby M, Daugherty A, et al. *Distress Screening for Oncology Patients*. *Association of Community Cancer Centers* 2014.
- [23] Miller MF, Mullins D, Onukwugha E, Gayer C, Golant M, Buzaglo JS. Discriminatory power of a 25-item distress screening tool Cancer-SupportSource™: A cross-sectional survey of 251 cancer survivors. Chicago, IL: In. American Society of Clinical Oncology Annual Meeting; 2013.

- [24] Berkowitz SA, Seligman HK, Meigs JB, Basu S. Food insecurity, healthcare utilization, and high cost: a longitudinal cohort study. *Am J Manag Care* 2018;24:399–404.
- [25] Basu A, Manning WG. Issues for the next generation of health care cost analyses. *Med Care* 2009;47 (7 suppl 1):S109–S114.
- [26] Manning WG, Mullahy J. Estimating log models: to transform or not to transform? *J Health Econ* 2001;20:461–494.
- [27] Olivier J, May WL, Bell ML. Relative effect sizes for measures of risk. *Commun Stat-Theor M* 2017;46:6774–6781.
- [28] Carlson LE, Angen M, Cullum J, et al. High levels of untreated distress and fatigue in cancer patients. *Br J Cancer* 2004;90:2297–2304.
- [29] Zabora JR, Blanchard CG, Smith ED, et al. Prevalence of psychological distress among cancer patients across the disease continuum. *J Psychosoc Oncol* 1997;15:73–87.
- [30] Faller H, Schuler M, Richard M, Heckl U, Weis J, Küffner R. Effects of psycho-oncologic interventions on emotional distress and quality of life in adult patients with cancer: systematic review and meta-analysis. *J Clin Oncol* 2013;31:782–793.
- [31] Carlson LE. Screening alone is not enough: the importance of appropriate triage, referral, and evidence-based treatment of distress and common problems. *J Clin Oncol* 2013;31:3616–3617.
- [32] Mitchell AJ. Screening for cancer-related distress: when is implementation successful and when is it unsuccessful? *Acta Oncol* 2013;52: 216–224.
- [33] Geske SJ, Johnson RL. Using the distress thermometer to guide electronic referrals to psychosocial services. *J Psychosoc Oncol* 2020; 38:20–35.
- [34] Acquati C, Kayser K. Addressing the psychosocial needs of cancer patients: a retrospective analysis of a distress screening and management protocol in clinical care. *J Psychosoc Oncol* 2019;37: 287–300.
- [35] Funk R, Cisneros C, Williams RC, Kendall J, Hamann HA. What happens after distress screening? Patterns of supportive care service utilization among oncology patients identified through a systematic screening protocol. *Support Care Cancer* 2016;24: 2861–2868.