Employment of Nurse Practitioners and Physician Assistants in Breast Cancer Care

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Abstract

Purpose: We sought to examine the employment of nurse practitioners (NPs) and physician assistants (PAs) in surgical, medical, and radiation oncology practices and to identify correlates of NP and PA employment.

Methods: We conducted a mailed survey of attending surgeons, medical oncologists, and radiation oncologists who cared for a population-based sample of women diagnosed with breast cancer between June 2005 and February 2007 in Los Angeles, CA, and Detroit, MI. In addition to information about whether practices employed NPs and/or PAs, physician and practice characteristics were obtained. We estimated the likelihood of the employment of NPs and PAs with multivariable logistic regression.

Results: Overall, 39.6% of physicians reported that NPs and PAs were employed in their practice, although there were significant differences across specialty: medical oncologists (56.3%), radiation oncologists (40.0%), and surgeons (28.7%; $P < .01$). The likelihood of NP and PA employment increased for medical oncologists (compared with surgeons; odds ratio [OR], 2.63; 95% CI, 1.73 to 3.99), physicians with 10 or fewer years in practice (OR, 1.94; 95% CI, 1.18 to 3.16), and practices with university affiliations (OR, 2.20; 95% CI, 1.44 to 3.37). Physicians with fewer than 25% of their patients diagnosed with breast cancer (OR, 0.48; 95% CI, 0.25 to 0.92) and practices with fewer than three physicians (OR, 0.14; 95% CI 0.09, to 0.24) were less likely to employ NPs and PAs.

Conclusions: NP and PA employment was higher with newer physicians and in more heavily resourced practices. Employment of NPs and PAs was relatively modest, which suggests an opportunity for physicians to employ these providers to alleviate workloads.

Introduction

In 2010, approximately 1.5 million new cases of invasive cancer are expected to be diagnosed in the United States.[1] Most of the patients diagnosed will require the care of surgeons, radiation oncologists, and/or medical oncologists during the treatment of their cancers. The National Cancer Institute estimates the number of patients with cancer will increase by 55% between 2005 and 2020.[2] This increase does not match the projections of the physician oncology workforce, given that a study commissioned by ASCO projects only a 14% increase in physicians during the same period.[3]

These data suggest a profound gap in supply and demand for oncology care. In 2009, the Institute of Medicine (IOM) convened a workshop to review the data and propose solutions to this workforce crisis.[4] Panel members proposed new care models to meet projected demand and maintain quality. They endorsed the development of teams, including nurse practitioners (NPs) and physician assistants (PAs), to provide cancer care.

The IOM panel heard reports from clinician leaders and professional groups on the potential roles for NPs and PAs in cancer care. In some regions of the country, oncologists have reported high employment of these clinicians to deliver oncology care. A recent survey of medical oncologists in Washington state revealed that 68% of responding physicians employed NPs and PAs in their practice.[5] The National Comprehensive Cancer Network examined the employment, productivity, and workplace characteristics of NPs and PAs. Although most of the centers reported extensive use of these providers, wide role variation and productivity were observed. Conversely, lower employment of NPs and PAs has been reported in other areas in the United States, especially in private practice settings.[4] Given that available reports rely on medical oncologists, we know little about the employment NPs and PAs in other oncology specialties. We know even less about the correlates of NP and PA employment, including characteristics of physicians and of their practice settings.

Despite increased attention from professional organizations and clinicians to strengthen the oncology workforce, it is unclear how (or whether) the larger oncology community employs NPs and PAs to deliver care. To address this knowledge gap, we conducted a study with two research objectives. First, we examined whether different oncology providers (surgeons, radiation oncologists, and medical oncologists) employed NPs and PAs in their practices. Second, we examined characteristics of physicians, their practices, and increased employment of NPs and PAs. The findings from our analysis could inform policies to bolster the oncology workforce.

Methods

Our protocol received human subjects approval by the institutional review boards at the University of Michigan, the University of Southern California, the Michigan Department of

Community Health, and Wayne State University. The methods used in this study have been published elsewhere.[6-8] The parent study used population-based Surveillance, Epidemiology, and End Results (SEER) cancer registries in metropolitan Detroit, MI, and Los Angeles County, CA, to identify incident cases of invasive breast cancer. From those registries, 2,268 women younger than age 80 years with breast cancer were identified and surveyed between June 2005 and February 2007. As part of a secondary analysis, surgeons, radiation oncologists, and medical oncologists who cared for these patients were identified from patient reports, pathology reports, and records from the registries. The Dillman method was used to solicit physician respondents to a mailed survey. For attending surgeons, 419 were identified by the original study's patients. Of these, 318 responded, yielding at 75.9% response rate (RR). Of 316 medical oncologists approached, 206 responded (RR, 65.1%), and 117 of 160 radiation oncologists responded (RR, 73.1%). Of 641 physician responses, 607 (94.1%) had requisite data.

Measures

The survey included characteristics of physicians and characteristics of their practices. Self-reported physician characteristics included specialty (surgical, medical, or radiation oncology), gender, years in practice, and breast cancer specialization—the proportion of their practice devoted to breast cancer (range, 0 to 100%). Physician-reported practice characteristics included university affiliation (yes or no) and the number of physicians of their own specialty in the practice. The dependent variable—whether or not the physician reported employment of NPs and PAs in their practice—was a dichotomous measure of yes or no. The survey question did not ask physicians to distinguish between NPs and PAs.

Statistical Analysis

We used χ^2 statistics to examine differences in physician and practice characteristics related to physician report of NP and PA employment in their practice. Finally, we used a multivariable logistic regression model to estimate the likelihood of a physician reporting NP or PA employment. Physician characteristics, practice characteristics, and geographic location (metropolitan Detroit or Los Angeles County) were entered into the model. We calculated odds ratios with corresponding 95% CIs. A P value less than .05 was considered statistically significant. All analyses were performed using SAS version 9.1 (SAS Institute, Cary, NC).

Results

Physicians and Practice Characteristics

Table 1 lists differences in physician and practice characteristics according to physician specialty (surgical, medical, and radiation oncology). Across the entire sample, surveyed physicians reported an average of 18 years or more in practice. The majority were male (77.9%) and white (64.4%). Significant differences were observed in physician and practice characteristics across specialties. One third of radiation oncologists were female compared with one quarter of medical oncologists and 18% of surgeons ($P < .01$). Surgeons had lower rates of breast cancer specialization; 63.3% reported that fewer than 25% of their cases were breast cancer–related compared with 45.1% and 33.9% of medical and radiation oncologists, respectively ($P < .01$). With regard to practice characteristics, most physicians reported that their practice did not have a university affiliation. However, radiation oncologists reported significantly more university affiliations (50.4%) than surgeons (27.4%) or medical oncologists (33.7%; $P < .01$). Practice sizes varied significantly, with 48.7% of surgeons reporting fewer than three physicians in their practices compared with 29.1% of medical oncologists and 26.5% of radiation oncologists ($P < .01$).

Physician Characteristics, Practice Characteristics, and Employment of NPs and PAs

Overall, 253 physicians (39.6%) reported employment of NPs and PAs. Physician and practice characteristics and their association to NP and PA employment are listed in Table 2. Medical oncologists employed NPs and PAs more frequently than radiation oncologists and surgeons (56.3% of medical oncologists *v* 40.0% of radiation oncologists and 28.7% of surgeons; χ^2, 39.8, 2 *df*; $P < .01$). Female physicians reported higher employment of NPs and PAs (48.2%) than males (36.9%; χ^2, 5.8, 1 *df*; $P = .02$). Almost half of the physicians who reported 10 or fewer years in practice employed NPs and PAs compared with 33.5% of physicians who had more than 20 years in practice (χ^2, 10.5, 2 *df*; $P < .01$). When considering the relationship to breast cancer specialization, 57% of physicians who devoted more than half of their total caseload to breast cancer reported employment of NPs and PAs compared with physicians who reported less than 25% breast cancer specialization (34.6%) or 25% to 50% specialization (40.1%; χ^2, 13.4, 2 *df*; $P < .01$). When considering practice characteristics, physicians who reported that they worked in university-affiliated practices employed NPs and PAs more frequently (53.7% *v* 32.2%; χ^2, 27.6, 1 *df*; $P < .0001$). A stepwise trend was observed for practice size: physicians in larger practices, as defined by practices with six or more physicians, reported the highest use of NPs and PAs (63.2%), followed by practices with three to five physicians (42.7%), and then by practices with fewer than three physicians (17.2%; χ^2, 100.3, 2 *df*; $P < .01$).

Table 3 lists results from a logistic regression that estimated the likelihood of employing NPs and PAs in the practice, with physician and practice characteristics as independent variables. When compared with surgeons, medical oncologists were significantly more likely to report employment of NPs and PAs in their practices (OR, 2.63; 95% CI, 1.73 to 3.99). Physicians with 10 or fewer years in practice were significantly associated with an increased likelihood of employing NPs and PAs than physicians with more than 20 years in practice (OR, 1.94; 95% CI, 1.18 to 3.16). Physicians with fewer than a quarter of their cases (OR, 0.48) and between 25% and 50% of cases (OR, 0.57) related to breast cancer were less likely to report NP and PA employment than those who reported that a majority of

Table 1. Characteristics of Physicians and Practices According to Physician Specialty

Characteristic	Physician Specialty			P
	Surgery (%; n = 318)	Medical Oncology (%; n = 205)	Radiation Oncology (%; n = 117)	
Physician				
Sex				.01
Female	17.5	24.6	30.1	
Male	82.5	75.4	69.9	
Geographical location				.41
Metropolitan Detroit	40.3	39.3	33.3	
Los Angeles County	59.7	60.7	66.7	
Time in practice, years				.10
≤ 10	29.2	29.9	23.9	
10-20	22.2	29.2	36.3	
> 20	41.5	47.9	39.8	
Breast cancer specialization, % of all cases				< .01
< 25	63.3	45.1	33.9	
25-50	23.9	38.0	57.8	
> 50	12.8	16.9	8.3	
Practice				
University affiliation				< .01
Yes	27.4	33.7	50.4	
No	72.6	66.3	49.5	
No. of physicians in the practice				< .01
< 3	48.7	29.1	26.5	
3-5	24.2	30.6	38.4	
≥ 6	27.0	40.3	35.0	

NOTE. *P* values obtained by χ^2 tests. Percentages may not total 100% as a result of rounding.

their total cases were breast cancer–related. Physicians in university-affiliated practices were more than twice as likely to report NP and PA employment (OR, 2.20; 95% CI, 1.44 to 3.37). Physicians in practices with fewer than three physicians (OR, 0.14; 95% CI, 0.09 to 0.24) or practices with three to five physicians (OR, 0.37; 95% CI, 0.23 to 0.60) were significantly less likely to employ NPs and PAs than those in practices with six or more physicians. Gender and geographic location were not associated with NP and PA employment in the multivariable analysis.

Discussion

From these survey data, the employment of NPs and PAs to care for patients with breast cancer is relatively low, with fewer than half of all surveyed physicians reporting employment of these care providers. Significant variations in the use of NPs and PAs are found according to specialty, years in practice, specialization in breast cancer, university affiliation, and practice size. The IOM oncology workforce report contends that the use of NPs and PAs is increasing, yet that increase has not diffused into community practice. It is likely that practices that would benefit from these providers have not yet adopted this model of care.

Our finding that specialists in larger and university-affiliated practices are more likely to employ NPs and PAs is supported by the ASCO Workforce Study. [3] The IOM report[4] found that employment of NPs and PAs is lower in private practice and that there are differing opinions on the effectiveness of these providers in practice. This suggests a lack of clarity in the role function of NPs and PAs in cancer care. Increased clarity and sharing of effective models of care delivery would assist practices in developing working relationships that improve efficiency and maintain quality.

Several of our findings are worthy of comment. First, newer physicians are more likely to employ NPs and PAs. This bodes well for increased receptivity to the use of NPs and PAs. Given that teaching hospitals use more NPs and PAs, it is likely these physicians interacted with NPs and PAs during the course of residency and fellowship. Second, higher rates of NP and PA employment in medical oncology practices compared with radiation and surgery practices is not surprising, given the higher service use by patients who require symptom management and supportive care between chemotherapy visits. This observation explains why breast cancer specialization was significantly associated with employment of NPs and PAs. Third, physicians who specialize in breast cancer cases may perceive an increased need to deliver supportive and survivorship care and look to NPs and PAs to address those needs. Confirmation of our findings should be examined in other subspecialties, such as hematologic malignancies and bone marrow transplantation.

Table 2. Employment of NPs and PAs According to Physician and Practice Characteristics

Characteristic	Employment of NPs and PAs (%)	*P*
Physician		
Specialty		< .01
Surgical oncology	28.7	
Medical oncology	56.3	
Radiation oncology	40.0	
Sex		.02
Female	48.2	
Male	37.1	
Geographical location		.12
Metropolitan Detroit	43.5	
Los Angeles County	37.2	
Time in practice, years		< .01
≤ 10	48.8	
10-20	41.8	
> 20	33.5	
Breast cancer specialization, % of all cases		< .01
< 25	34.6	
25-50	40.1	
> 50	57.0	
Practice		
University affiliation		< .01
Yes	54.2	
No	32.2	
No. of physicians in the practice		< .01
< 3	17.2	
3-5	42.7	
≥ 6	63.2	

NOTE. *P* values obtained by χ^2 tests.
Abbreviations: NPs, nurse practitioners; PAs, physician assistants.

Table 3. Results of Logistic Regression Estimating Likelihood of Employing NPs and PAs

Characteristic	Odds Ratio	95% CI
Physician		
Specialty		
Surgical oncology	—	—
Medical oncology	2.63	1.73 to 3.99
Radiation oncology	0.90	0.50 to 1.62
Sex		
Female	1.11	0.67 to 1.87
Male		
Geographical location		
Metropolitan Detroit		
Los Angeles County	1.39	0.91 to 2.10
Time in practice, years		
≤ 10	1.94	1.18 to 3.16
10-20	1.61	1.00 to 2.60
> 20 yr	—	—
Breast cancer specialization, % of all cases		
< 25	0.48	0.25 to 0.92
25-50	0.57	0.30 to 1.09
> 50	—	—
Practice		
University affiliation		
Yes	2.20	1.44 to 3..37
No	—	—
No. of physicians in the practice		
< 3	0.14	0.09 to 0.24
3-5	0.37	0.23 to 0.60
≥ 6	—	—

NOTE: Dashes indicate reference category in the logistic regression model.
Abbreviations: NPs, nurse practitioners; PAs, physician assistants.

Limitations

One limitation is the inability to distinguish employment of PAs from NPs as a result of the original wording of the question in the survey. We did not ask the number of these professionals employed in the practice nor how they functioned in their roles. Physicians may seek NPs and PAs but be unable to recruit them. Because our survey was originally designed to study care issues related to patients with breast cancer, we did not measure overall patient volume in the practice, which may be an important determinant of NP and PA employment. A critical gap remains in our understanding of practice outcomes related to the employment of these providers, namely revenue generation and cost savings. Additional measures of productivity and resources—such as the average time for patient visits, the number of patients seen daily, and the availability of registered nurses, medical assistants, and other supportive personnel—would inform our findings. Although the inclusion of large numbers of physicians in two distinct geographic regions is a strength, our findings may not be generalizable to other regions of the country.

Summary

Given the increased incidence, complexity, and survival rates of patients with invasive cancers, a workforce crisis in cancer care delivery is likely to occur soon. The employment of NPs and PAs is one potential strategy to close the gap between demand and supply.

Even with an increase in the employment of NPs and PAs, specific challenges remain. First, NPs and PAs require training and mentoring for successful practice. These efforts require time and resources that practices may be reluctant to expend. Second, competing demands from other specialties may lure NPs and PAs away from oncology. Strategies to recruit and retain these individuals must be developed. Third, the clinical scope of these providers varies by practice and has not yet been defined clearly. In one single-site study of a large cancer center, three dominant models of care teams comprised of physicians,

NPs, and PAs emerged, ranging from independent visits to shared visits including the physician and an NP or a PA.[9] Provider and patient satisfaction were favorable under all three models. An expert panel could devise models of care for specialties and settings for refinement and outcome evaluation. Such an effort would provide much-needed evidence for how to best structure oncology care delivery in the future to meet the needs of both providers and patients.

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