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Impact of payer status on treatment of cervical cancer at a tertiary referral center

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Abstract

Objectives—The study aims to determine the impact of payer status on the likelihood of receiving definitive treatment for invasive cervical cancer at a tertiary medical center.

Methods—All consecutive patients presenting to Johns Hopkins Hospital with a diagnosis of invasive cervical cancer between 1/1/95–12/31/08 were retrospectively identified from the tumor registry. Demographic and clinical information were abstracted from the medical record. Payer status was categorized as private, public, no insurance, or unknown. Treatment was defined as surgery, chemo-radiation, chemotherapy, radiation, or no definitive therapy. The likelihood of receiving no definitive therapy was analyzed using Pearson chi-square analysis, univariate and multivariate models.

Results—A total of 306 patients were identified. Median age was 47 and 60% of patients had early stage disease at diagnosis (stages IA–IIA). Fifty-six percent of the cohort had private insurance, 34% had public insurance, and 6% had no insurance. Having no insurance was the single most significant risk factor associated with receiving no standard therapy. While 7% of privately insured and 4% of publicly insured patients did not receive definitive therapy, 16% of uninsured patients did not receive definitive treatment. In multivariate analysis controlling for age, race, stage, histology, and comorbidities, uninsured payer status was a significant and independent predictor of receiving no definitive treatment (OR 8.01, CI 1.265–50.694, $p=0.027$) than patients with public insurance.

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Conflict of interest statement

The authors of this study have no conflicts of interest to disclose.

Conclusions—In this study, uninsured payer status was significantly associated with a higher likelihood of not receiving standard therapy for cervical cancer. Additional studies are warranted to characterize specific barriers to care for this at-risk population.

Keywords

Cervical cancer; Insurance status; Access; Treatment

1. Introduction

Cervical cancer is a malignancy that is both preventable and treatable. Nonetheless, in the United States in 2010, approximately 12,200 new cases of cervical cancer were diagnosed and 4210 women died from cervical cancer [1].

Many studies have attempted to identify which patients continue to be at risk for receiving a diagnosis of cervical cancer, failing to be screened for cervical cancer, and dying from cervical cancer. These studies have identified socio-demographic factors such as income, education, and access to health insurance as variables associated with a decreased likelihood of being screened for cervical cancer [2–4]. A growing body of literature has focused specifically on payer status and suggests that payer status, independent of other demographic factors, is the most important determinant of screening for cervical cancer [5–11]. Furthermore, among women of similar ethnic or racial backgrounds, those with no insurance are less likely to have been screened for cervical cancer [7].

Mortality rate has been used as a measure of quality of treatment, and several studies have also suggested an association between socio-demographic status and survival. Race/ethnicity is one factor that has been studied extensively, and five-year stage-specific survival for African-American women is significantly lower than that of white women (68% in non-Hispanic White women, 56% in African-American women) [12–17]. While there is no evidence that there is a difference in response to treatment, there is a significant association between access to care and both socio-economic status and race. [17] However, a greater proportion of low-income women with cancer are African American [8], and some studies suggest that after accounting for this association, racial and socioeconomic disparities in treatment no longer exist [18]. It is therefore critical to examine other factors that may contribute to poor survival such as disparate patterns of care. Few studies have examined the association between payer status and treatment for cervical cancer. Therefore, the objective of the current study was to determine the impact of payer status on the likelihood of receiving definitive treatment for invasive cervical cancer at a tertiary medical center.

2. Materials and methods

This study was a retrospective cohort analysis of all consecutive patients diagnosed with invasive cervical cancer at the Johns Hopkins Hospital from January 1, 1995 through December 31, 2008. Approval to conduct this study was granted by the Johns Hopkins Medicine Institutional Review Board (IRB study # 00027904). Patients were identified using the Cancer Registry. Patient characteristics extracted from the medical record included stage at diagnosis, histologic subtype, (medical) co-morbidities, age, and race/ethnicity (as

recorded by the admitting personnel). All histologic types were included in this analysis. Those tumors classified as papillary transitional cell, neuro-endocrine carcinoma, adenosarcoma, small cell carcinoma, rhabdomyosarcoma or malignant melanoma were classified as “other histology”.

For the purpose of this study, age was categorized in groups of 15 year increments. Definitive treatment was defined as surgery, chemo-radiation, chemotherapy alone or radiation therapy alone. Patients who underwent a diagnostic biopsy with no documented subsequent intervention were defined as “no definitive therapy” in this analysis. Insurance type was categorized as private insurance (including HMO's, military insurance, and Medicare patients with documented private secondary insurance), public insurance (Medicare with no secondary insurance and Medical Assistance), uninsured, or unknown.

Payer status was defined as the independent variable, and univariate analysis was performed with each dependent variable (definitive treatment, age, race, stage, histology, comorbidities) using the Pearson chi square test. Multivariate logistic regression models adjusting for age, stage, race/ethnicity, histology, and comorbidities were built to test the independent effect of payer status on the likelihood of receiving no definitive treatment. Model fit was evaluated with the Hosmer–Lemeshow goodness-of-fit test; no interactions between variables were identified. Two-tailed tests with a p-value less than 0.05 were considered to be statistically significant. Data were analyzed using SPSS 16.0.

3. Results

A total of 306 patients were diagnosed with cervical carcinoma, and all patients were included in this analysis. Socio-demographic characteristics of patients diagnosed with cervical cancer are summarized in Table 1. The median age of the study cohort was 47 (range, 22–92). The majority of patients were Caucasian (n = 178, 58%) and had squamous cell carcinoma (n = 214, 70%). Fifty six percent of the patient cohort had private insurance (n = 172), and 34% (n = 105) had public insurance. Patients with no insurance (n = 19) comprised 6% of the cohort.

Demographic characteristics of the cohort differed across payment method groups. Patients with public insurance were more likely to be older than those with either private or no insurance (39% older than 61 years vs. 14% vs. 11%) (p = 0.001) (Fig. 1a). Patients with private insurance were more likely to be Caucasian (67% vs. 46% and 42%) (p = 0.001) (Fig. 1b), and were more likely to be diagnosed at an early stage (stages IA–IIA) (69% vs. 51% vs. 37% respectively) than those with public or no insurance (p = 0.02) (Fig. 1c). Patients with no insurance and those with private insurance were more likely to have comorbidities than those with public insurance (21% and 28% respectively vs. 9%) (p = 0.002) (Fig. 1d). The distribution of histologic variants was similar across insurance groups (p = 0.497).

Likelihood to receive treatment was also evaluated across payment groups. Patients with no insurance were as likely as those with either private or public insurance to receive surgery as primary treatment (53% vs. 58% and 55%, p>0.10); they were also as likely to receive

chemoradiation (16% vs. 22% and 27%, $p>0.10$) and as likely to receive chemotherapy alone or radiation alone (16% vs. 14% vs. 14%, $p>0.10$). However, while few patients with public insurance (4%) received no definitive therapy, 16% of patients with no insurance received no definitive therapy ($p = 0.037$) (Fig. 2).

In multivariate analyses adjusting for the effects of age, stage, histologic subtype, race, and co-morbidities, the association between having no insurance and receiving no definitive therapy was statistically significant. When compared to the reference group, those with public insurance, the odds ratio of receiving a biopsy only was 8.01 ($p = 0.03$) for those with no insurance (Table 2).

4. Discussion

Although many studies have examined the relationship between patient demographic characteristics and the diagnosis and treatment of cervical cancer, few studies have examined the association of payer status and treatment. This association is critical as it may help to better understand the role of the healthcare system in optimizing care for underserved populations. In this study of a demographically diverse patient population, cervical cancer patients were more likely to receive no definitive treatment if they had no health insurance. Prior evidence has shown that patients with no insurance have less access to health care in general, and our data suggests that patients with no insurance may be less likely to receive therapeutic intervention at the same public institution after a cancer diagnosis compared to those patients with any insurance at all. For those patients who received therapeutic intervention, the distribution of treatment type (surgery vs. chemoradiation, etc.) was similar across payment group.

Many behavioral and economic factors are likely to contribute to lower rates of treatment among uninsured patients. Patients without insurance may be more likely to decline definitive treatment because they face financial barriers or have low levels of “health literacy” [19–21]. Physicians may be less likely to offer definitive treatment to patients with no insurance. Patients without health insurance may delay treatment or not follow-up with treatment recommendations, consistent with younger age in this group. Patients with public insurance may also face similar barriers, however, this study suggests that having any insurance coverage decreases the effects of these barriers to therapy acquisition. Greater insurance coverage may be the key to eliminating racial disparities as race was not a significant factor controlling for insurance coverage.

To our knowledge, only one other study has examined the association between insurance status and treatment for cervical cancer. Investigators at the National Cancer Institute extracted SEER data to estimate the association between type of insurance and the likelihood of undergoing guideline therapy in 7134 patients with 11 different types of cancer, including cervical cancer. In the SEER sample cohorts, patients who had public insurance received guideline therapy less often than patients with either private or no insurance [22]. These findings may differ from those at our institution for several reasons; SEER data is collected only from selected geographic areas, and analyses are not stratified by type of treating institution (i.e., private vs. academic institutions). Additionally,

participants in clinical trials are excluded from their analysis. Thus our findings are likely to be more relevant to challenges faced by academic institutions.

The primary limitation of this study is the small number of patients in the target group of interest (patients with no insurance who received a biopsy only) and that the data for this study was derived from a single institution. Therefore, the authors acknowledge the possibility that a patient may have received treatment at a different hospital, which would have a significant effect on the results of this study. Patients may have been presented to an outside hospital for a second opinion, or presented to an emergency department for a cancer-related complication, ultimately resulting in receipt of care at another facility. Few studies have examined the relationship between insurance status and likelihood of receiving a second opinion; however, cost of a second opinion is an important issue to consider, and would likely manifest as more insured patients than non-insured patients seeking second opinions [24]. While this study accounts for several factors that may influence receipt of treatment, additional demographic and socio-economic parameters that were not accounted for in this study may be also be confounders. However, the financial parameters associated with caring for this patient cohort are likely to be similar to those faced by other inner-city academic practices. A larger cohort may allow for stratification by Medicare vs. Medicaid, or by racial or ethnic backgrounds. This study is a retrospective analysis including all patients treated at this institution, and therefore minimizing selection bias. All medical records were reviewed by the same abstractor in order to minimize data error, however, documentation errors may be another limitation.

Cervical cancer is a disease that disproportionately affects low-income women with limited access to health insurance and healthcare services [23]. It is therefore critical to focus research efforts on how to improve outcomes for the populations at highest risk for mortality from this preventable and treatable disease. While state and federal programs aim to improve access to health care by decreasing the financial burden for individual patients, our understanding of the associations between the quality of treatment and healthcare financing is limited. Our findings suggest that public funding programs may reduce the economic barrier to care faced by the uninsured.

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Fig. 1.
Demographic characteristics stratified by type of insurance. 1a. Age, 1b. Race/Ethnicity, 1c. Stage at Diagnosis, 1d. Comorbidities.

Fig. 2.
Treatment stratified by type of insurance.

Table 1

Demographic characteristics stratified by insurance.

	All patients	Private	Public	Self pay	Unknown
	n (%)	n (%)	n (%)	n (%)	n (%)
All	306 (100)	172 (56.2)	105 (34.3)	19 (6.2)	10 (3.2)
<i>Age</i>					
30	27 (8.8)	15 (8.7)	8 (7.6)	2 (10.5)	2 (20.0)
31–45	114 (37.2)	70 (40.7)	33 (31.4)	10 (52.6)	1 (10.0)
46–60	96 (31.3)	63 (36.6)	23 (21.9)	5 (26.3)	5 (50.0)
61–75	55 (17.9)	20 (11.6)	31 (29.5)	2 (10.5)	2 (20.0)
>75	14 (4.5)	4 (2.3)	10 (9.5)	0	0
<i>Race/Ethnicity</i>					
White	178 (58.1)	115 (66.9)	48 (45.7)	8 (42.1)	7 (70.0)
Black	109 (35.6)	45 (26.2)	53 (50.5)	8 (42.1)	3 (30.0)
Other	19 (6.2)	12 (7.0)	4 (3.8)	3 (15.8)	0
<i>Histology</i>					
Squamous	214 (69.9)	110 (64.0)	80 (76.2)	15 (78.9)	9 (90.0)
Adenocarcinoma	58 (18.9)	40 (23.3)	15 (14.3)	2 (10.5)	1 (10.0)
Adenosquamous	23 (7.5)	15 (8.7)	7 (6.7)	1 (5.3)	0
Other	11 (3.6)	7 (4.1)	3 (2.9)	1 (5.3)	0
<i>Stage at diagnosis</i>					
Stage IA	60 (19.6)	36 (20.9)	18 (17.1)	3 (15.8)	3 (30.0)
Stage IB1–IIA	125 (40.8)	82 (47.7)	36 (34.3)	4 (21.1)	3 (30.0)
Stage IIIB–IV	117 (38.3)	51 (29.7)	50 (47.6)	12 (63.2)	4 (40.0)
Stage Unknown	4 (1.3)	3 (1.7)	1 (1.0)	0	0
<i>Comorbidities</i>					
None	242 (79.0)	123 (71.5)	95 (90.5)	15 (78.9)	9 (90.0)
1 or more	64 (20.9)	49 (28.5)	10 (9.5)	4 (21.1)	1 (10.0)
<i>First Treatment[†]</i>					
Surgery	174 (56.8)	99 (57.6)	58 (55.2)	10 (52.6)	7 (70.0)
Chemoradiation	71 (23.2)	37 (21.5)	28 (26.7)	3 (15.8)	3 (30.0)

	All patients		Private		Public		Self pay		Unknown	
	n (%)		n (%)		n (%)		n (%)		n (%)	
RT alone or Chemo alone	42 (13.7)		24 (14.0)		15 (14.3)		3 (15.8)		0	
No treatment	19 (6.21)		12 (7.0)		4 (3.8)		3 (15.8)		0	

The columns of percentages for "First Treatment" do not add up to 100% because the total number of individuals in the radiation categories is different than that for surgery, chemoradiation, biopsy only, and chemotherapy.

Table 2

Biopsy only — multivariate analysis.

Category	Odds ratio	p value
Race (ref group White)		0.438
Black	0.491	0.255
Other	0.432	0.454
Age (ref group 31–45)		0.338
<30	0.484	0.511
46–60	0.369	0.159
61–75	1.954	0.322
>75	0.0	0.999
Histology (ref group Squamous)		0.584
Adenocarcinoma	0.341	0.179
Adenosquamous	1.163	0.860
Other	0.0	0.999
Stage (ref IB1–IIA)		0.767
IA	1.460	0.555
IIB–IV	0.676	0.523
Unknown	0.0	0.999
Comorbidities (ref group None)	1.784	0.396
Insurance (ref group Public)		0.179
Private	2.508	0.169
Self pay	8.009	0.027
Unknown	0.0	0.999