

INTRODUCTION

Muscle-invasive bladder cancer (MIBC) is a potentially fatal disease, especially in the setting of locally advanced or node-positive disease. Adverse outcomes have also primarily been associated with low-income status, as has been reported in other cancers. While the adoption of neoadjuvant cisplatin-based chemotherapy (NAC) followed by radical cystectomy (RC) and pelvic lymph node dissection (PLND) has improved outcomes, these standard-of-care treatments may be underutilized in lower-income patients. This study sought to investigate the economic disparities in NAC and PLND receipt and survival outcomes in MIBC.

MATERIALS AND METHODS

Utilizing data from the National Cancer Database, a retrospective cohort analysis was conducted on patients with cT2-4N0-3M0 bladder cancer of urothelial histology who underwent radical cystectomy. The analysis evaluated the impact of income level on the likelihood of receiving neoadjuvant chemotherapy (NAC) and pelvic lymph node dissection (PLND). Multivariate logistic regression models were employed to assess the relationship between income level and treatment patterns, while survival analyses were conducted using Kaplan-Meier curves and Cox proportional hazards models to examine overall survival outcomes.

RESULTS

A total of 25,823 patients with cT2-4N0-3M0 muscle-invasive bladder cancer (MIBC) were included in the analysis. Lower-income patients were significantly less likely to receive standard-of-care treatments, including neoadjuvant cisplatin-based chemotherapy (NAC) and adequate pelvic lymph node dissection (PLND, defined as ≥ 15 lymph nodes). Specifically, 36.9% of higher-income patients received NAC compared to 32.2% of lower-income patients ($p < 0.001$). Similarly, higher-income patients were more likely to undergo adequate PLND compared to their lower-income counterparts ($p < 0.001$).

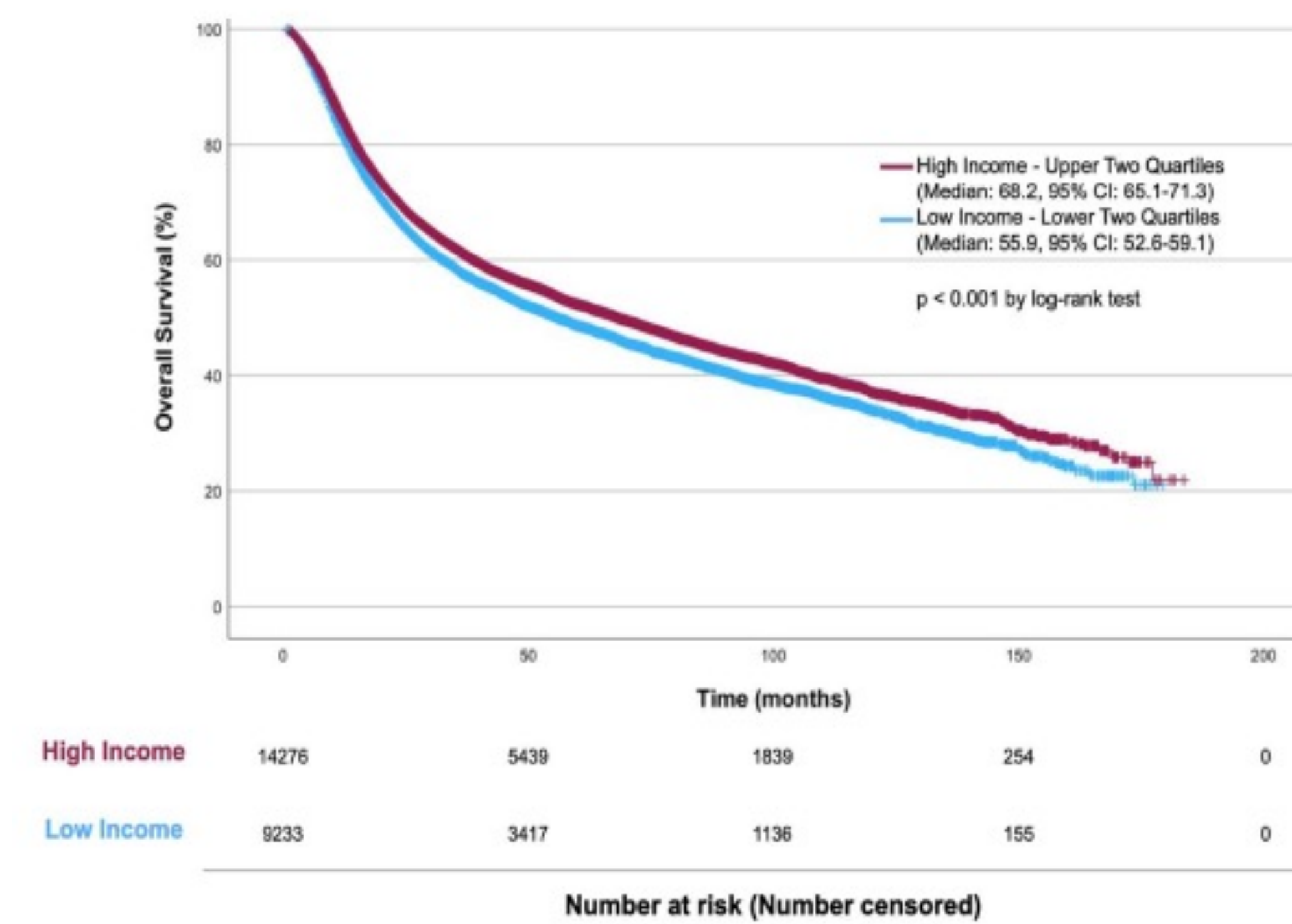
Table 1. Baseline Characteristics of Cancer-Free and Cancer Patients

	Treatment Receipt		p-Value *
	RC Count (%)	RC + NAC + PLND Count (%)	
Median Age	70	66	<0.001
Sex			
Male	13,226, 75.9%	6365, 75.8%	0.864
Female	4200, 24.1%	2032, 24.2%	
Race			
White	15,563, 89.3%	7513, 89.5%	0.909
Black	993, 5.7%	468, 5.6%	
Other	870, 5.0%	416, 5.0%	
CCI			
0	11,597, 66.5%	6069, 72.3%	<0.001
1	3933, 22.6%	1564, 18.6%	
2	1304, 7.5%	496, 5.9%	
3+	592, 3.4%	268, 3.2%	
Insurance			
No Insurance	391, 2.2%	185, 2.2%	<0.001
Private	5133, 29.5%	3232, 38.5%	
Medicaid	777, 4.5%	470, 5.6%	
Medicare	11,125, 63.8%	4510, 53.7%	
Income			
Low Income	7132, 40.9%	2994, 35.7%	<0.001
High Income	10,294, 59.1%	5403, 64.3%	
Facility Type			
Non-Academic	9117, 52.3%	3720, 44.3%	<0.001
Academic	8309, 47.7%	4677, 55.7%	
Year of Diagnosis			
2004-2011	7246, 41.6%	1544, 18.4%	<0.001
20012-2019	10,180, 58.4%	6853, 81.6%	
cT Stage			
2	14,187, 81.4%	6702, 79.8%	0.009
3	2011, 11.5%	1045, 12.4%	
4	1228, 7.0%	650, 7.7%	
cN Stage			
0	16,336, 93.7%	7532, 89.7%	<0.001
1	547, 3.1%	457, 5.4%	
2	463, 2.7%	324, 3.9%	
3	80, 0.5%	84, 1.0%	

Significance was calculated with a 2-sided independent sample t-test and Chi-square. Abbreviations used: Radical Cystectomy (RC); Neoadjuvant Chemotherapy (NAC); Pelvic Lymph Node Dissection (PLND); Charlson Comorbidity Index (CCI). Values of $p < 0.05$ bolded for statistical significance.

RESULTS (Cont.)

Figure 1. Kaplan-Meier Plot of Overall Survival by Income in MIBC Patients Treated with RC.



Survival outcomes also showed substantial disparities, with lower-income patients exhibiting significantly worse median overall survival (OS) compared to higher-income patients (55.9 months vs. 68.2 months, $p < 0.001$). Multivariate analysis confirmed income as an independent predictor of survival, with lower-income status associated with worse outcomes even after controlling for clinicodemographic variables.

Table 2. Multivariate Cox Proportional Hazards Model for Overall Survival in Patients with Urothelial Bladder Cancer Treated with Radical Cystectomy.

	HR	95% CI	p-Value
Age (continuous)	1.026	1.023-1.028	<0.001
Sex (Ref = Male)			
Female	1.022	0.980-1.065	0.315
Race (Ref = White)			
Black	1.073	0.991-1.162	0.084
Other	0.913	0.836-0.997	0.044
CCI (Ref = 0)			
1	1.213	1.162-1.265	<0.001
2	1.451	1.357-1.550	<0.001
3	1.539	1.394-1.700	<0.001
Insurance (Ref = Federal)			
Private	0.931	0.889-0.976	0.003

Treatment at academic facilities and diagnosis in recent years (2012-2019) were positively associated with increased receipt of standard-of-care modalities and improved survival outcomes. Patients treated at academic centers demonstrated significantly better survival compared to those treated at non-academic centers ($p < 0.001$). Despite controlling for clinicodemographic factors, income consistently influenced access to recommended treatments and survival outcomes, emphasizing the persistent disparities in care. These findings underscore the urgent need to improve care delivery for lower-income MIBC patients by regionalizing multimodal urologic oncology services.

CONCLUSION

This study highlights significant socioeconomic disparities in the management and outcomes of muscle-invasive bladder cancer (MIBC). Lower-income patients were less likely to receive standard-of-care treatments, including neoadjuvant cisplatin-based chemotherapy (NAC) and adequate pelvic lymph node dissection (PLND), and demonstrated significantly worse overall survival (OS). Even after controlling for clinicodemographic variables, income independently influenced treatment receipt and survival, underscoring the critical role of socioeconomic factors in MIBC care. Treatment at academic facilities and recent years of diagnosis were associated with improved access to standard treatments and better survival outcomes, suggesting that centralized, multidisciplinary care delivery can mitigate disparities. These findings emphasize the need to regionalize multimodal urologic oncology services and implement targeted interventions to improve access to care for lower-income populations. Addressing these disparities requires focused policy changes to expand access to high-quality cancer care, particularly for economically disadvantaged groups, ensuring equitable outcomes for all MIBC patients.

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