Drivers of Inpatient Costs in Oncology Patients Undergoing Major Abdominal Surgery. Evidence from a Middle-Income Country

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Jorge Medina, MSc[1], Díaz Rojas Jorge A., PhD[1], Ricardo Merchan, MSc[1], Mauricio Chona, Dr[2], Lina Maria Lopez, N[2], Marjorie Marín, MSc[3], Alvaro Vallejos, MSc[3], Julián Cruz-Pulido, MSc[4], Daniel Fernando Castro-Goyes, MD[5], Ricardo Ballesteros-Ramírez, MSc, PhD[5].

[1]Universidad Nacional de Colombia, Bogotá, Colombia, [2]Nutritional Support, Clínicas Colsanitas, Bogotá, Colombia, [3]Megalabs, Miami, FL, USA, [4]Universidad del Rosario, Bogotá, Colombia, [5]Universidad Javeriana, Bogotá, Colombia.

OBJECTIVE

To identify clinical and sociodemographic factors associated with total inpatient costs in oncology patients undergoing major abdominal surgery at a referral center in a middle-income country.

METHODS

A retrospective observational study was conducted using the institutional database of oncology patients hospitalized between January 2021 and December 2023 in Bogotá, Colombia. Adults with confirmed oncologic diagnoses who underwent major abdominal surgery were included. Cost data were extracted from official itemized hospital invoices trough a Top Down methodology and a hospital perspective. A three-stage modeling strategy was used. First, a multivariable linear model was fitted to assess assumptions and variable significance. Second, a refined log-normal model addressed non-normality and excluded non-significant predictors. Lastly, a non-parametric bootstrapping technique with 1,000 resamples improved confidence interval estimation. Models were estimated using ordinary least squares regression.

Cost (USD)	Median(%)
Total	4472.49(100)
Surgical Procedures	3577.91(80)
Human Talent	267.64(6)
Medications	240.47(5)
Hospitalization	159.91(3.5)
Diagnostics	65.19(1.4)
Other Procedures	47.46(1.1)
Out of pocket	7.98(0.2)

Table 1 Proportion of costs by hospital category and percentage of the total cost

RESULTS

A total of 436 patients were includec Median age was 63 years (IQR 54–71), with 231 males (52.98%). Comorbidities included hypertensio (33.26%), chronic respiratory diseas (5.28%), diabetes (14.22%), and sarcopenia (31.65%). Lower and upper gastrointestinal tumors accounted for 61.47% and 28.44%, respectively. Most surgeries were laparoscopic (86.24%). Tumor staging was localized (40.28%), locally advanced (43.09%), and advanced (16.63%). Median total hospitalization cost was USD 4,472.48 (IQR USD 3,704.73–6,138.73); surgical procedures represented 80%. Key cost drivers included respiratory disease, advanced tumor stage, postoperativ fistulas, infections, and surgeries involving the stomach, esophagus, Sugar Baker technique.

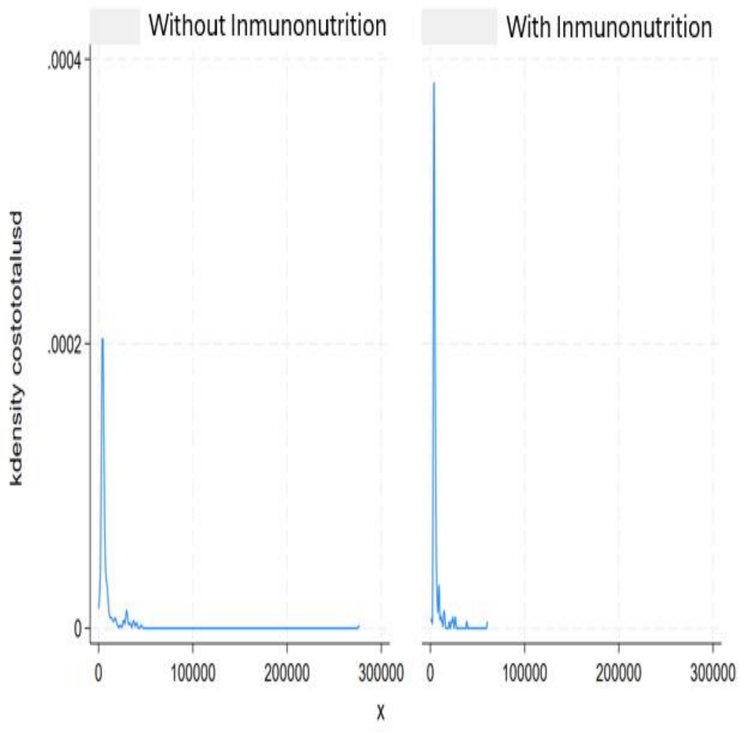

Figure 1. Kernel density distribution of total hospitalization cost according to immunonutrition

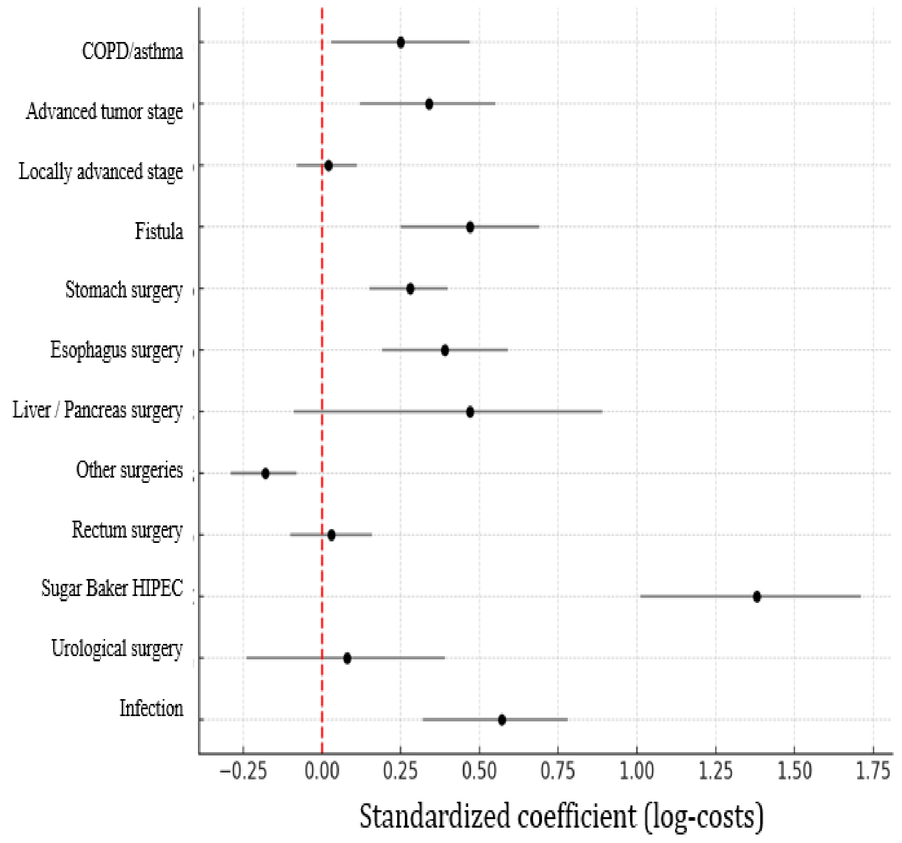

Figure 2. Final model, parameters, and confidence intervals by bootstrapping method for total hospitalization costs

CONCLUSIONS

This study identified factors associated with hospitalization costs in oncology patients undergoing major abdominal surgery. The average cost was USD 7,642, with a median of USD 4,472. Surgical procedures accounted for the largest cost share. Respiratory disease, upper gastrointestinal surgeries, HIPEC, advanced tumor stage, and reduced muscle mass were significantly associated with increased costs. In-hospital infections and fistulas were also independent cost drivers.

These findings highlight the importance of adopting comprehensive care models focused on optimizing preoperative clinical and nutritional status, as well as preventing complications, to improve the efficient use of hospital resources. Furthermore, they emphasize the usefulness of economic analysis as a tool for clinical and institutional decision-making, especially in health care systems with limited resources and a high cancer burden.

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CONTACT INFORMATION

Jorge Medina MD MSc jamedinap@unal.edu.co.