Attributable Costs of Breast Cancer in Colombia: A Cost-of-illness Study based on Administrative Claims Databases

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BACKGROUND

- Breast Cancer (BC) is associated with a substantial economic burden; however, real-world data regarding this burden for the Colombian Health System is very scarce.[1]
- Colombia, a middle-income country, provides healthcare coverage to its population through several insurance regimes, almost 48% of Colombian population receiving health services through the contributive regime.[2] This regime is composed by formal workers and their families.
- This study describes the economic burden borne by the Colombian Health System in patients with BC affiliated to contributive regime in 2019 from the perspective of the Health System.

METHODS

- This is a retrospective cohort study that exploits the databases used by the Ministry of Health to risk-adjust the capitation payments received by the insurance companies within the health system.
- It includes all women with BC identified by an electronic algorithm previously validated by Saldaña et al[3] at any time from 2015 to 2019 that received at least one healthcare service during 2019, regardless the stage of the disease or its histological classification.
- All costs related to the delivery of services borne by the health system during 2019 were included in the study. Costs not borne by the health system, such as productivity losses, out-of-pocket expenditures, transportation costs or caregiving, were not included.
- To explore possible differences in costs during 2019 across women within the first year of diagnosis of BC or at the end of life, this study identified all patients who received their first diagnosis of BC during 2018 or who died during the first semester of 2021 within the main cohort.

DATA SOURCES

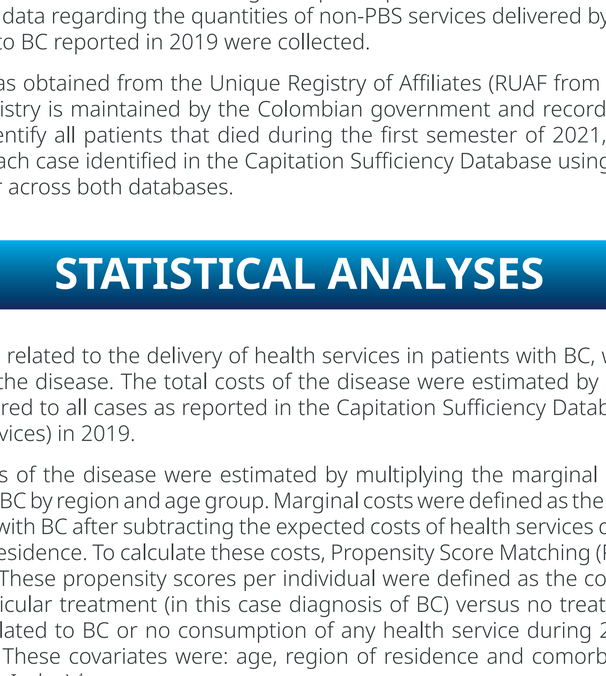
- The costs of the services included in the National Formulary (PBS from Spanish *Plan de Beneficios en Salud*) were calculated using the Capitation Sufficiency Database, an administrative database that contains patient level data on consumption of PBS services in the contributory regime. The services included inpatient and outpatient drugs, diagnostic tests, medical and surgical procedures, rehabilitation, emergency care, hospitalizations and ambulatory care services, and home services.
- The costs of non-PBS services were calculated using data from national platform for services that were not included in the PBS named MIPRES used during their prescription. It has a database that contains publicly available aggregated data regarding the quantities of non-PBS services delivered by the Health System. All the costs associated to BC reported in 2019 were collected.
- The mortality data was obtained from the Unique Registry of Affiliates (RUAF from Spanish *Registro Único de Afiliados*). This registry is maintained by the Colombian government and records all births and deaths in the country. To identify all patients that died during the first semester of 2021, the data contained in RUAF was linked to each case identified in the Capitation Sufficiency Database using a unique anonymized identification number across both databases.

STATISTICAL ANALYSES

- To estimate the costs related to the delivery of health services in patients with BC, we calculated total and attributable costs of the disease. The total costs of the disease were estimated by adding up the costs of health services delivered to all cases as reported in the Capitation Sufficiency Database (PBS services) and MIPRES (non-PBS services) in 2019.
- The attributable costs of the disease were estimated by multiplying the marginal cost and the expected number of cases with BC by region and age group. Marginal costs were defined as the costs of health services delivered to patients with BC after subtracting the expected costs of health services due to age, comorbidity burden or region of residence. To calculate these costs, Propensity Score Matching (PSM) method was used in the main analysis. These propensity scores per individual were defined as the conditional probability of assignment to a particular treatment (in this case diagnosis of BC) versus no treatment (in this case, any other diagnosis unrelated to BC or no consumption of any health service during 2019) given a vector of observed covariates. These covariates were: age, region of residence and comorbidity burden (using de Charlson Comorbidity Index).[4]
- All costs were transformed to 2019 International US Dollars using the Purchasing Power Parity (PPP) conversion factor for Colombia published by World Bank in 2019 (COP$4,343.6 per international dollar).[5]

RESULTS

Figure 1. Prevalence of BC during 2019



Note: the prevalence is conditional to the consumption of at least one health service

RESULTS (cont.)

Table 1. Baseline Characteristics

	Main cohort (n=40,800)	Diagnosis in 2018 (n=5,067)	Deceased in 2020 (n=833)
Age (years)			
20 – 44	6,469	923	107
45 – 64	20,804	2,672	351
65 or more	13,527	1,472	375
Charlson Comorbidity Index			
I – II	19,931	2,943	226
III – IV	11,673	1,476	257
V or more	9,196	648	350
Region of residence			
Atlantica	4,606	628	114
Bogota	11,994	1,335	237
Central	12,316	1,566	223
Oriental	5,216	701	114
Orinoquia	226	35	3
Pacifica	6,442	802	142

Table 2. Marginal costs of PBS services per patient by category of service

Population	N*	All costs	Out-patient	In-patient
All cases	38,820	4,937 (3,688 - 6,186)	3,637 (2,403 - 4,872)	1,198 (1,005 - 1,391)
Diagnosis in 2018	5,802	11,586 (10,594 - 12,578)	9,134 (8,390 - 9,878)	2,350 (1,889 - 2,811)
Deceased in 2020	1,151	13,402 (11,708 - 15,096)	8,175 (6,945 - 9,404)	4,607 (3,593 - 5,620)

* Number of matched pairs in PSM, 95% CI in parentheses

Table 3. Total attributable costs

Type of service	All costs (n=46,148)
PBS	246,622,867 (245,345,897 - 247,899,836)
Non-PBS	149,072,154 (139,885,148 - 158,238,957)
Total	395,656,954 (386,481,279 - 404,930,405)

95% CI in parentheses

CONCLUSIONS

BC increased per capita health spending almost eight times in 2019 compared with general population.[5] Near death patients suffering from BC and consumption of ambulatory services were associated with higher costs in PBS services.

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FINANCIAL DISCLAIMER

This work was funded by Pfizer S.A.S