Impact of Healthcare Fragmentation on Survival of Patients with Colorectal Cancer in Colombia

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1. Background

Healthcare fragmentation is a complex phenomenon in which patients experience lack of continuity of care that can lead to poor clinical outcomes. Health systems of low-middle income countries (LMIC) have high fragmentation of care. Patients with colorectal cancer (CRC) are susceptible to experiencing fragmentation of healthcare as they require complex treatments involving multidisciplinary teams (2). We hypothesize fragmentation can have a negative impact on the survival of patients with CRC in Colombia, a LMIC.

2. Objective

We aimed to identify the impact fragmentation of healthcare had on 5-year overall survival of patients treated for CRC in Colombia.

3. Methods

We conducted a retrospective cohort study based on administrative claims provided by the Colombian Ministry of Health. Patients who had their first CRC ICE-10 codes in 2013 and who met a previously validated CRC case selection algorithm combining oncologic procedures and ICE-10 codes were included. Exposure to fragmentation was defined as the number of different providers visited per year per patient. Primary outcome was overall 5-year survival.

We conducted a piecewise linear regression to set a fragmentation cut-off and dichotomize the exposure. We performed univariate analysis to describe heatlhcare fragmentation in Colombia. Poisson regressions were used to estimate crude 5-year mortality incidence rate ratios for quartiles of the fragmentation distribution. We used propensity score matching (PSM) to balance baseline covariates and estimate hazard ratios (HR) with a Cox regression with the matched sample to compare patients more or less exposed to fragmentation. Robust standard errors were used.

We use three sources of information: 1) the UPC sufficiency database. This database contains detailed information on all health services used by individuals affiliated with the contributory regime; 2) The unique database of members (BDUA) which contains information on all members of the health system; 3) The Single Registry of Affiliates (RUAF) contains information on the death certificates of the Colombian population. All databases are anonymized and have a unique identifier that allows records to be crossed between the different sources of information.

4. Results

1678 patients with CCR were identified in 2013, of which 837 (49.88%) were men. The mean age was 63.05 years (SD 14.32). Median fragmentation was 4.40 (p25-p75 2.99-7.49) annual providers for the entire cohort, median fragmentation for departments with the highest number of cases was as follows: Bogotá 4.00 (p25-p75 2.75-7.18), Antioquia 4.99 (p25-p75 3.50-6.87), Valle del Cauca 4.49 (p25-p75 2.75-7.46). *Figure 1* shows the median fragmentation by departments.

Figure 1. Geographic distribution of healthcare fragmentation in Colombia

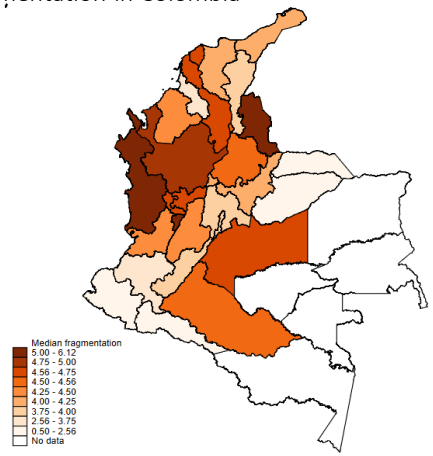


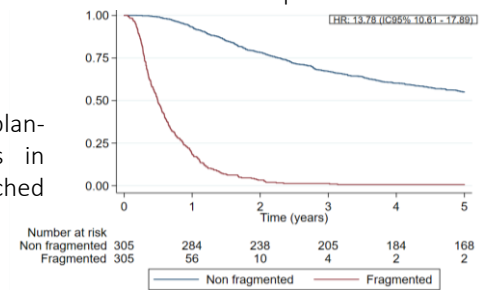
Table 1 shows the results of the analysis of mortality by fragmentation quartiles.

Table 1. 5-year mortality proportion by fragmentation index quartiles

Quartiles	5-year mortality proportion per 100-patients		Incidence rate ratio		
	Proportion	95% CI	IRR	95% CI	p
Q1	26.97	22.93 - 31.43	ref	ref	ref
Q2	29.52	25.35 -34.07	1.09	0.85 - 1.41	0.49
Q3	61.34	56.57 - 65.89	2.27	1.82 - 2.84	<0.00
Q4	97.62	95.62 - 98.72	3.62	2.94 - 4.46	<0.00

The cut-off point calculated with segmented logistic regression was 9.82 annual providers. We designated the fragmented group as those patients with more annual providers than the cut-off point. 309 (18.41%) patients were identified as fragmented. There were 904 (53.87%) deaths in the total cohort. In the fragmented group, mortality was 307 (99.35%). The mortality rate of the complete sample was 16.66 (95% CI 15.61 to 17.79) per 100 subjects per year, the median follow-up was 4.14 years (SD). In the adjusted multivariate survival model for the full cohort, we found that the HR was 23.82 (95% CI 19.57 to 29.00), 305 exposed subjects were matched. In the matched sample the HR was 13.78 (95% CI 10.61-17.89). *Figure 2* shows the survival Kaplan-Meier survival estimates.

Figure 2. Kaplan-Meier analysis in the matched sample



5. Conclusion

Healthcare fragmentation in patients treated for CRC in Colombia is associated with a reduced 5-year overall survival. Fragmentation can be measured as the number of providers a patient attends for their care. Administrative claims are a source where fragmentation of cancer healthcare can be estimated.

6. Limitations

Although the results of the propensity score analysis show that fragmentation decreases survival in patients with colorectal cancer, the assumption that all confounding variables are balanced cannot be verified.

7. References

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