

Socioeconomic Inequalities in Colorectal Cancer Survival in Southern Spain: A multilevel Population-based Study

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Conflict of interest

There is no conflict of interest to declare.

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
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Socioeconomic inequalities in cancer survival are well documented worldwide.⁴⁻¹² In the United Kingdom, cancer patients living in wealthier areas have higher survival

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Introduction

In Spain, colorectal cancer (CRC) is the **most frequently diagnosed** cancer with **44,231 new cases** in 2020 [1] and the **main cause** of **15,288 deaths** in 2018 [2].

Socioeconomic inequalities in cancer survival are well documented worldwide, but not yet in Spain.

[1] Estimaciones de la incidencia del cáncer en España, 2020. Red Española de Registros de Cáncer (REDECAN), 2020.

[2] Ministerio de Sanidad, Consumo y Bienestar Social. Gobierno de España, 2020.

Objective

The objective of this project is to study the association of socioeconomic inequalities with overall mortality and survival among CRC patients in southern Spain.

Methods

We conducted a multilevel population-based cohort study, including CRC cases for the period 2011–2013. The study time-to-event **outcome** was **death**, and the primary **exposure** was CRC patients' **socioeconomic status** assessed by the Spanish deprivation index at the census tract level. We used a **mixed-effects flexible hazard model**, including census tract as a random intercept, to derive overall survival estimates by deprivation.

SDI, Spanish Deprivation Index (2011)

- Developed by the **Social Determinants of Health Working Group of the Spanish Society of Epidemiology** and based in the Spanish Census of 2011 (INE).
- Six indicators, mainly related to **employment** and **education**.

Original

Índice de privación en España por sección censal en 2011

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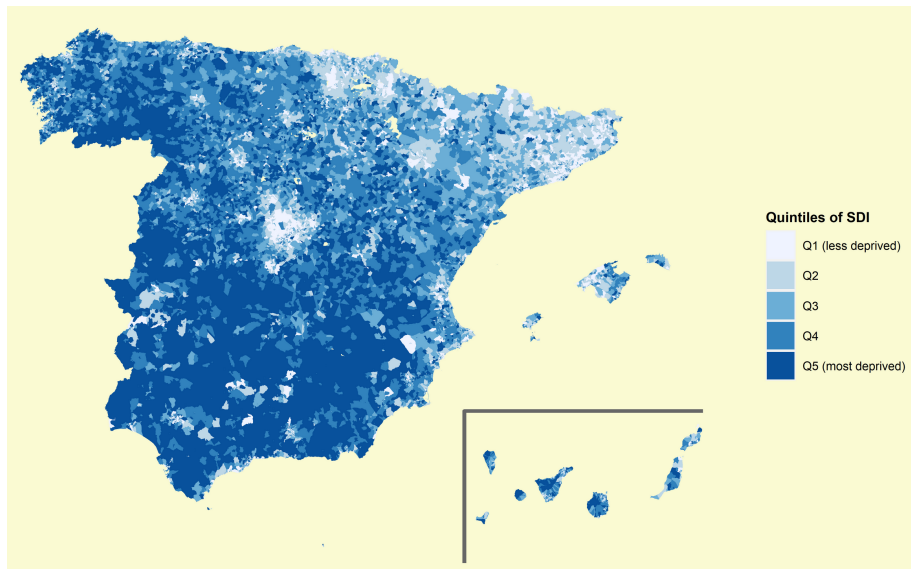
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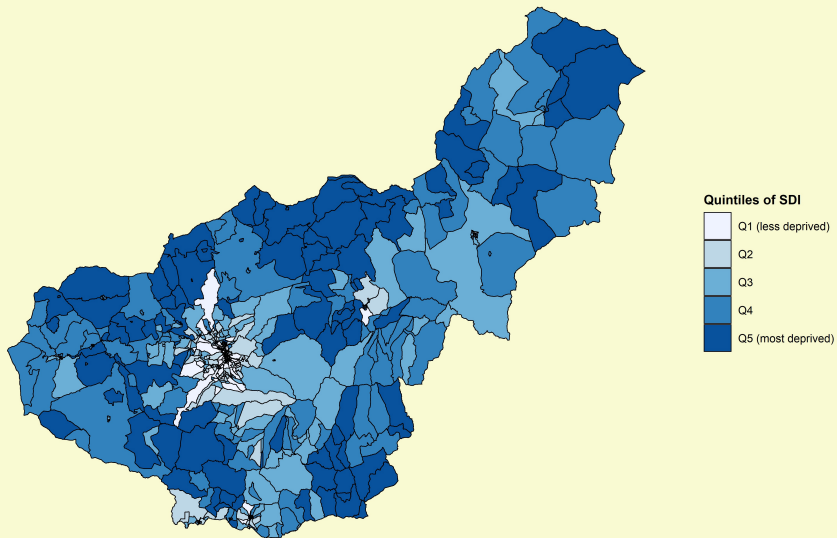
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Duque I, Domínguez-Berjón M, Cebrecos A, et al. Índice de privación en España por sección censal en 2011. Gaceta Sanitaria, 2020. doi:10.1016/j.gaceta.2019.10.008.





Results

Variables		n (%)
Vital status at 10 years	Alive	2,617 (73.1)
	Dead	964 (26.9)
Age at diagnosis, years	<50	265 (7.4)
	50–59	529 (14.7)
	60–69	953 (26.5)
	70–75	695 (19.4)
	>75	1,147(32.0)
Sex	Male	2,112 (58.9)
	Female	1,477 (41.1)
TNM stage at diagnosis	I	641 (17.9)
	II	1,107 (30.8)
	III	1,082 (30.1)
	IV	574 (16.0)
	Missing	185 (5.1)

Among 3,589 CRC patients, 964 (26.9%) died before the end of the follow-up.

Results

Variables	Deaths/Pyr	Mortality Rate per 1000 pyr (95% CI)	Mortality Rate Ratio (95% CI)	p-value
Sex				<0.001
Male	602/6,878	87.5 (80.8–94.8)	Ref.	
Female	362/5,270	68.7 (62.0–76.1)	0.8 (0.7–0.9)	
Age at diagnosis, years				<0.001*
<50	40/1,024	39.1 (28.7–53.3)	Ref.	
50–59	74/1,997	37.0 (29.5–46.5)	0.9 (0.6–1.4)	
60–69	163/3,609	45.2 (38.7–52.7)	1.2 (0.8–1.6)	
70–75	186/2,631	70.7 (61.2–81.6)	1.8 (1.3–2.5)	
>75	501/2,886	173.6 (159.0–189.5)	4.4 (3.2–6.1)	
TNM stage at diagnosis				<0.001*
I	96/2,529	38.0 (31.1–46.4)	Ref.	
II	215/4,215	51.0 (44.6–58.3)	1.3 (1.1–1.7)	
III	238/3,867	61.5 (54.2–69.9)	1.6 (1.3–2.1)	
IV	331/995	332.7 (298.6–370.3)	8.6 (7.0–11.0)	
Quintiles of deprivation				<0.001*
Q1 (less deprived)	178/2,569	69.3 (59.8–80.2)	Ref.	
Q2	175/2,484	70.5 (60.7–81.7)	1.0 (0.8–1.2)	
Q3	198/2,458	80.6 (70.1–92.6)	1.2 (0.9–1.4)	
Q4	204/2,465	82.8 (72.1–94.9)	1.2 (1.0–1.5)	
Q5 (most deprived)	209/2,172	96.2 (84.0–110.2)	1.4 (1.1–1.7)	

Note: *Test for trend p-value.

Abbreviations: pyr, person-years; CI, confidence interval.

CRC mortality is higher among most deprived (Q5), males, those with advanced age (>75 years) and stage IV disease.

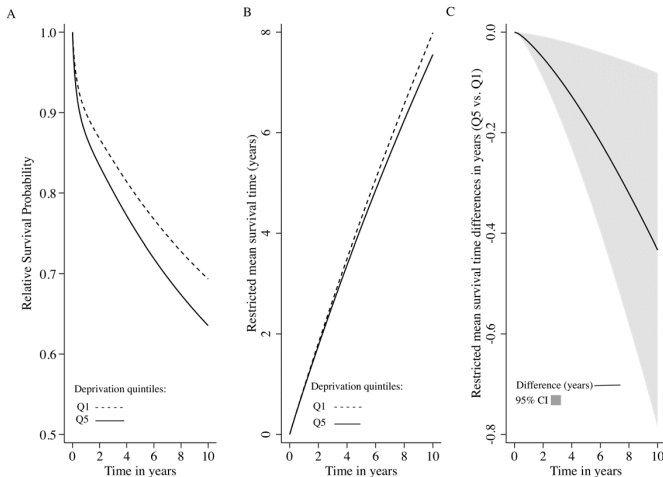
Results

After adjusting for sex, age, cancer stage, and the area of residence, the most deprived CRC patients had a **60%** higher excess mortality risk than the less deprived group:

Excess mortality risk ratio: **1.6, 95% CI: (1.1– 2.3)**

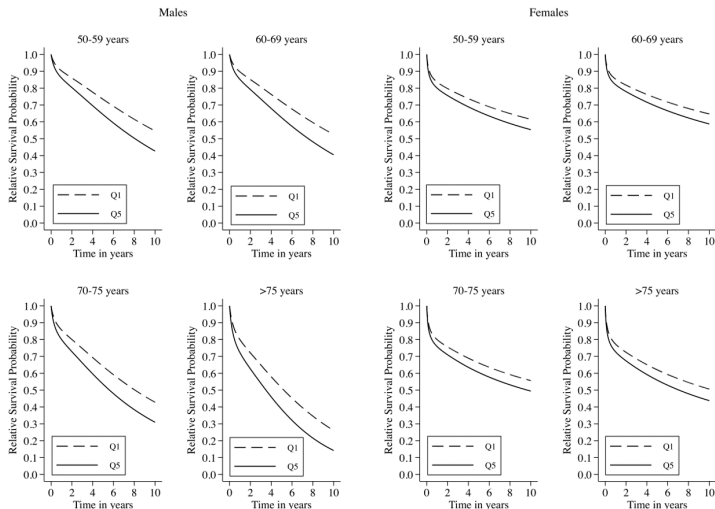
Results

Relative Survival Probability, restricted mean survival time, and restricted mean survival time difference in years by levels of deprivation (Q5 vs Q1).
N = 3,582.



Results

Sex-specific relative survival probability by deprivation (Q5 vs Q1) and age at diagnosis. N = 3,582.



Conclusions

- We found a **consistent association** between **deprivation** and CRC excess **mortality** and **survival**.
- The most deprived CRC patients lived **158 days less** on average than the less deprived ones.
- Our results are **in line with other studies** in the European context where there is well documented survival gap by socioeconomic deprivation among CRC.
- The reasons behind the survival differences by socioeconomic status need **further investigation** in order to **improve equality cancer outcomes** in all social groups.

Thanks for your attention!

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