Incidence and Survival of Digestive Tract Cancer Detected by Endoscopy with Histological Confirmation in a High-Risk Region of Colombia

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Abstract

Introduction: Cancers of the digestive tract are among the leading causes of mortality from non-communicable chronic diseases, both in Colombia and worldwide. These malignancies are often asymptomatic in their early stages, which significantly impacts survival rates and poses a major public health challenge. This study aimed to analyze survival rates following histopathological confirmation of digestive tract neoplasms detected through endoscopy at a regional referral center. **Methods:** A retrospective cross-sectional study was conducted, reviewing biopsy results from endoscopies and colonoscopies performed between 2018 and 2020. Sociodemographic variables were analyzed, and survival rates were assessed using the Kaplan-Meier method and the Log-Rank test. **Results:** A total of 133 cases of gastrointestinal neoplasms were identified: 66.1% in the stomach (n = 88), 23.3% in the colon (n = 31), and 10.6% in the esophagus (n = 14). The median age was 66.7 years (interquartile range [IQR]: 59–79), with a predominance of male patients. Follow-up data showed a median survival of five months from diagnosis to death, with a maximum survival of 2.3 years. **Conclusion:** The majority of patients diagnosed with digestive tract cancer at the regional referral center were male and presented with advanced-stage disease, as reflected in the short survival times observed.

Keywords

Endoscopy, cytopathology, signs and symptoms, gastrointestinal neoplasms, survival analysis.

INTRODUCTION

Cancer is one of the leading causes of mortality in the world due to chronic non-communicable diseases, with approximately 10 million deaths annually. Among these, gastrointestinal cancers occupy the first places in incidence and mortality rates[1]. In Colombia, by 2022, gastrointestinal cancers, including liver, gallbladder and pancreatic cancer, were responsible for 33.1% of cancer deaths[2], highlighting their clinical, economic and social impact.

In the United States, colorectal cancer deaths have steadily declined since 1980, thanks to dietary changes, screening programs, and better access to treatment[3]. In contrast, this type of cancer remains a major cause of mortality in Colombia[4]. In 2023, according to data from the National Administrative Department of Statistics (DANE), stomach cancer was the tenth leading cause of death in the country, with 5309 deaths. Meanwhile, esophageal and colorectal cancers accounted for a total of 5540 deaths. In the department of Boyacá, stomach cancer was the fifth leading cause of death, with 156 deaths, followed by esophageal and colorectal cancers, with 152 deaths[5]. Esophageal cancer has a high incidence and prevalence worldwide and was responsible for 4.3% of deaths from gastrointestinal neo-

plasms in 2022[1], with dismal survival rates (15% to 25% at 5 years) due to its aggressive nature[6,7]. In Colombia, colon cancer is more concentrated in urban centers such as Bogotá, Quindío and Risaralda[8].

These gastrointestinal neoplasms have a multifactorial origin and are associated with *Helicobacter pylori* infection[9,10], living at altitudes above 2000 meters above sea level[11,12], and behavioral factors such as obesity, smoking, and alcohol consumption[13,14], all of which may influence survival[15]. Boyacá is a mountainous department located in central Colombia, which has been identified in previous studies as a high-risk area for the development of gastrointestinal cancer[16]. This situation, combined with the high consumption of tobacco and alcohol in the region[17], motivated the present analysis of the survival of patients with a histopathological diagnosis at a departmental referral center.

MATERIALS AND METHODS

A retrospective cross-sectional study was conducted in a high complexity center in the department of Boyacá, with the objective of characterizing patients over 18 years of age with positive histopathological findings for neoplasms. Between 2018 and 2020, a total of 5935 endoscopies and 1982 colonoscopies were performed, and biopsy results positive for neoplasia were identified. The patients included in the study presented with gastrointestinal symptoms such as abdominal pain, bleeding, anemia or weight loss and, during the endoscopic procedure, macroscopic lesions of malignant appearance. Additional variables, such as TNM classification or surgical specimen analysis, were not included.

Sociodemographic information was obtained from electronic medical records (Servinte Clinical Suite), and histopathological information was collected from pathology reports. Data were stored in a database in Excel 365 and analyzed with IBM SPSS software[18].

Sociodemographic variables included age, sex, origin, social security system affiliation, date of diagnosis and date of death. Other variables included the degree of differentiation, location of the lesion and presence of *H. pylori* (for cases of stomach cancer), and the history of exposure to cigarettes and alcohol intake. The categorization of gastric lesions followed the classification of Lauren and Jarvi[19,20], grouping them into intestinal or diffuse types. Staging was not considered because it included outpatients who did not receive follow-up at the institution.

For the calculation of survival, the time in days that elapsed between the histological diagnosis and the date of death was recorded, which was obtained from the records of the Administrator of the Healthcare Social Security Resources (ADRES). The distribution of quantitative variables in gastric neoplasms was verified using the Kolmogorov-Smirnov test due to the large sample size, while for esophageal and colorectal neoplasms, the Shapiro-Wilk test was used. The medians and their confidence intervals were estimated using the Mann-Whitney U test. For nominal variables, frequency and position measures were calculated, applying the chi-square test or the Fisher's test to assess statistical significance, with a 95% confidence interval (CI).

Survival analysis was performed using the Kaplan-Meier method and curves were compared using the Log-Rank statistical test. The study followed the principles of the Declaration of Helsinki, was approved by the ethics committee of the Hospital Universitario San Rafael de Tunja (Act 0011-2021) and was considered a risk-free investigation, complying with the standards of good clinical practice[21].

RESULTS

During the study period, 133 malignant neoplasms of the gastrointestinal tract were reported. Of these, 18 patients received surgical management during the same hospitalization. In cases of esophageal cancer, no patient underwent surgical resection with curative intent. A total of 64.2% (n = 9) received palliative care through stent insertion, while the remaining patients were either undergoing additional studies or had such an advanced disease that no palliative care could be provided.

The median age was 66.7 years (interquartile range [IQR]: 59-79), with a range between 24 and 92 years. All age groups were represented; however, the highest incidence was observed in the 60-69 age group (25.5%), followed by the 70-79 age group (24.8%). According to sex, a male predominance was observed, with 73 cases (55.3%) (**Table 1**). It is noteworthy that between the ages of 20 and 39 years there were more cases of malignant neoplasms in women. The youngest patient and the oldest patient had gastric adenocarcinomas.

Table 1. Sociodemographic Characteristics of the Population Under Study

Variable		n	%
Sex	Female	60	45%
	Male	73	55%
Health Insurance System Regime	Subsidized	104	78%
	Contributory	21	16%
	Special	8	6%
Origin	Tunja	55	42%
	Other cities in Boyacá	74	55%
	Other departments	4	3%

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In the distribution of neoplasms of the gastrointestinal tract, the highest proportion corresponds to gastric cancer, with 66.2% (n = 88), followed by colorectal carcinoma, with 23.4% (n = 31), and esophageal cancer, with 10% (n = 14) (**Figure 1**).

The most frequent histologic type was adenocarcinoma (n = 114, 85%), with a predominance of the intestinal subtype, which manifested more frequently in patients older than 60 years (**Table 2**).

Upon classification, according to the histological type of neoplasm found, it was determined that adenocarcinoma of the intestinal type was the most frequent, followed by the diffuse type (**Table 3**).

A review of the history according to the location of the neoplasm showed that 12.9% of the patients with colorectal cancer smoked, while 54.2% of the gastric neoplasms had the presence of *H. pylori* (**Table 4**).

On consulting the ADRES data, it was found that, as of April 25, 2023, 87.9% (n = 117) of the patients had died. A survival analysis was conducted on these 117 subjects, who were followed for 4.8 years. Survival was evaluated according to the degree of histopathological differentiation, which showed a statistically significant difference (p = 0.049). Median survival was 22 months from diagnosis to death (95% CI: 16.2-27.8), with a median of 109 days (95% CI: 34.7-183.2) and a maximum survival time of 3.7 years (**Figure 2**).

A total of 87 samples from the esophagogastric junction and stomach were analyzed. In 17.2% of the cases, the presence of *H. pylori* could not be determined due to the lack
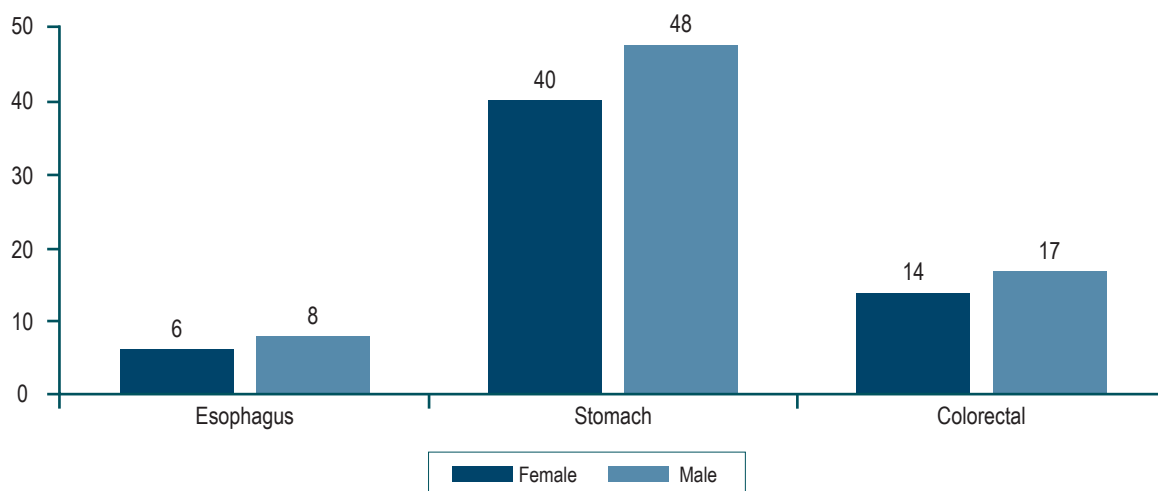

Figure 1. Anatomical Distribution of Gastrointestinal Neoplasms According to Sex. The image is the property of the authors.

Table 2. Distribution of Gastrointestinal Neoplasms According to Age, Sex, Type and Anatomical Localization

	Variable n (%)	≤29 years n (%)	30 to 59 years n (%)	≥60 years n (%)	p^*	Total n (%)
Sex	Female	3 (75)	11 (37)	46 (46)	0.30	60 (45)
	Male	1 (25)	19 (63)	53 (54)		73 (55)
Neoplasm	Adenocarcinoma	4 (100)	27 (90)	84 (83)	0.93	115 (85)
	Carcinoma	0 (0)	0 (0)	9 (9)		9 (7)
	Lymphoma	0 (0)	2 (6)	4 (5)		6 (5)
	Mesenchymal	0 (0)	1 (4)	3 (3)		4 (3)
Localization	Esophagus	0 (0)	3 (10)	11 (11)	0.63	14 (10)
	Stomach	4 (100)	21 (70)	63 (63)		88 (66)
	Colorectal	0 (0)	6 (20)	25 (26)		31 (24)

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Table 3. Histological Classification of Neoplasms According to the World Health Organization[22]

Type of neoplasm	Frequency	Percentage
Adenocarcinoma	2	1.5%
Tubular-pattern adenocarcinoma	7	5.3%
Diffuse-type adenocarcinoma	14	10.5%
Intestinal-type adenocarcinoma	84	63.2%
Mucinous adenocarcinoma	1	0.8%
Adenocarcinoma in situ	3	2.3%
Metastatic adenocarcinoma	1	0.8%
Mixed adenocarcinoma (intestinal pattern)	2	1.5%
Mixed adenocarcinoma (tubular and diffuse pattern)	1	0.8%
Squamous cell carcinoma	7	5.3%
Neuroendocrine carcinoma	1	0.8%
Carcinoma or lymphoma	1	0.8%
Lymphoma	1	0.8%
Diffuse large B-cell lymphoma	1	0.8%
B-cell lymphoma	3	2.3%
Mantle B-cell lymphoma	1	0.8%
MALT-type B-cell lymphoma	2	1.5%
Mesenchymal neoplasm (GIST or mucinous origin)	1	0.8%
Total	133	100

GIST: gastrointestinal stromal tumor; MALT: mucosa-associated lymphoid tissue. Adapted from: Bosman F, et al. 4th edition. World Health Organization; 2010.

Table 4. Distribution of Neoplasms by Location in Relation to the Presence of *H. pylori*, Alcohol and Tobacco Consumption

Location n (%)		Esophagus n (%)	Stomach n (%)	Colorectal n (%)
H. pylori	Absent	13 (92.9)	38 (45.8)	0
	Present	1 (7.1)	45 (54.2)	0
Tobacco use	Yes	3 (21.5)	10 (12)	4 (12.9)
	No	11 (78.5)	73 (88)	27 (87.1)
Alcohol consumption	Yes	1 (7.1)	17 (20)	6 (19.3)
	No	13 (92.9)	66 (80)	25 (80.6)

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of a report and the transfer of the slide to the family; in contrast, 32.1% of the samples tested positive for this microorganism. A survival curve was generated, in which the presence of *H. pylori* did not show statistical significance on survival ($p = 0.45$) (**Figure 2B**).

Based on the findings presented in the survival curve according to the degree of differentiation, and given the clinical significance, survival by type of neoplasm and site of appearance was also verified (**Figures 2C** and **D**). These were not significant, since they obtained a *p*-value of 0.57 and 0.298, respectively. When evaluating the median survival according to the variables studied (**Table 5**), it was observed that people who use tobacco and present poorly differentiated neoplasms have a lower survival, while people under 60 years of age show a higher survival.

DISCUSSION

The present study is relevant because it provides unpublished information on the incidence and survival after histopathological diagnosis of digestive tract cancers in samples obtained endoscopically in a referral center in the department of Boyacá. In Colombia, a continuous increase in the incidence and prevalence of gastrointestinal tract neoplasms is projected, with the exception of gastric cancer[16]. The median age at diagnosis is slightly higher than that reported in Latin America[23-26]. In addition, colorectal, gastric and esophageal cancers are more frequent in men[27], which is consistent with data from regional and international studies[2,28-30].

When comparing the survival presented in other parts of the world and that reported in Colombia[26,31,32], a lower survival was found in our population, which could be attributed to sociodemographic factors or late diagnosis. Although the type of affiliation to the social security system does not seem to be a determining factor, it is possible that this low survival rate is influenced by the fact that more than 50% of the population studied belongs to the subsidized regime and resides in the area of influence of the institution, in the department of Boyacá[33].

Given the high prevalence of *H. pylori* infection reported in Colombia (63.4%)[34], its relationship with survival was analyzed, despite the fact that more than 10% of the data on gastric cancer were not available. Thus, it was observed that, together with the degree of differentiation, the presence of *H. pylori* is associated with a decrease in survival.

The main strength of the study is that it was conducted in a referral center that serves people from several surrounding areas, which allowed histological confirmation of the diagnoses. However, the size of the sample, the absence of tumor staging, the assessment by oncology in the absence of this institutional service and the lack of analysis of
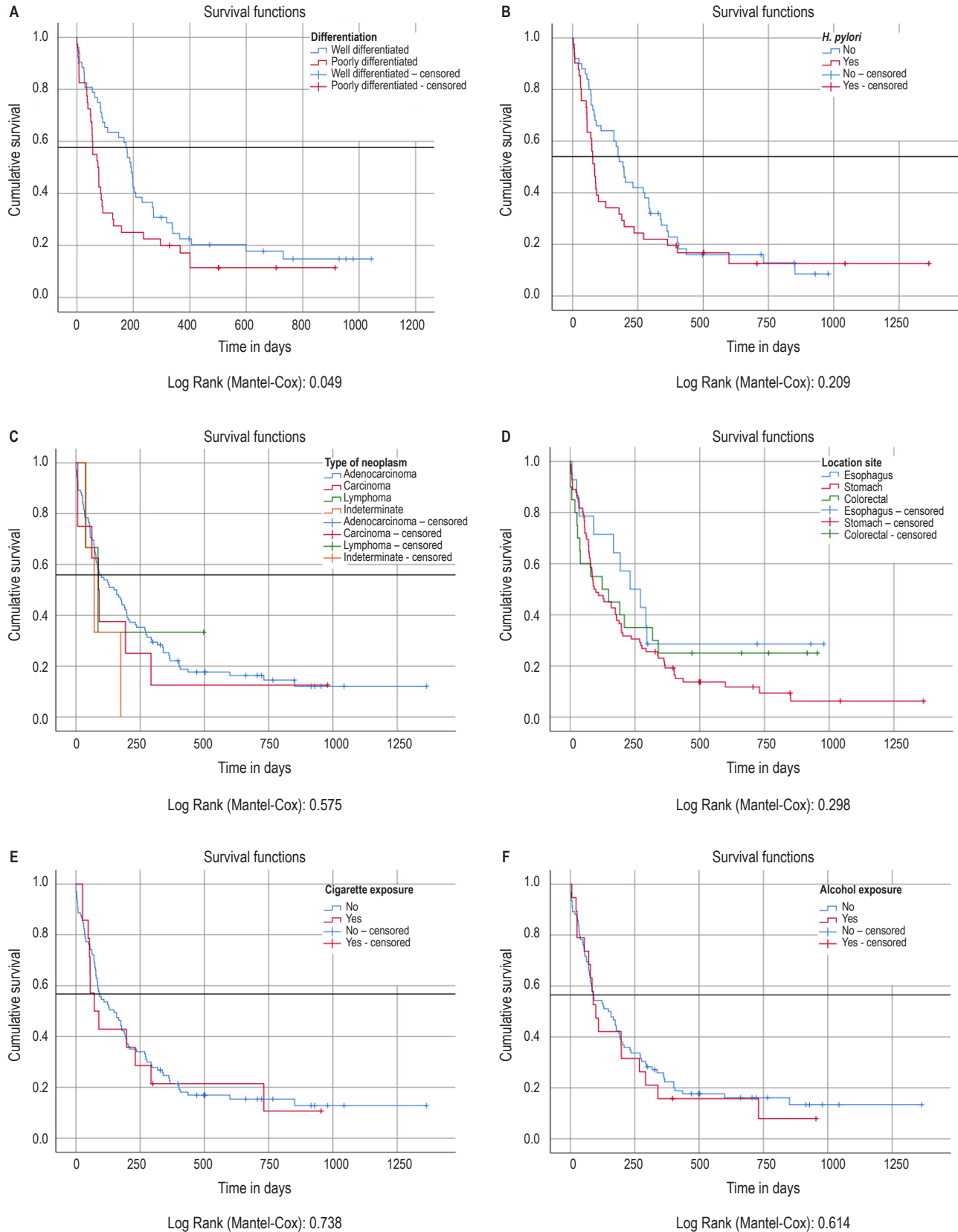
Figure 2. Survival According to Different Variables of Interest. Images property of the authors.

Table 5. Median survival by type of variable

Variable		Estimate (days)	95% confidence interval	
			Lower limit	Upper limit
Age	Under 60 years	236	107.3	364.6
	Over 60 years	92	32.4	151.5
Sex	Female	130	52.8	207.1
	Male	92	0.0	195.2
Differentiation	Well differentiated	191	170.8	211.1
	Poorly differentiated	74	46.7	101.2
Neoplasm	Adenocarcinoma	148	76.2	219.7
	Carcinoma	88	47.8	128.2
	Lymphoma	86	10.7	161.2
	Poorly differentiated	71	16.5	125.4
Localization	Esophagus	231	87.9	374
	Stomach	92	32.3	151.7
	Colorectal	123	0.0	274.2
H. pylori	Absent	193	157.3	228.6
	Present	84	66.4	101.5
Alcohol consumption	Absent	148	69.9	226
	Present	99	63.4	134.5
Tobacco use	Absent	148	76.0	219.9
	Present	71	10.4	131.5
Global		127	57.9	196

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additional comorbidities, especially due to the limitations imposed by the Covid-19 pandemic, represent important limitations[(35,36)].

In conclusion, it highlights the importance of implementing screening to detect these neoplasms in early stages in high-risk patients, given that the cancers diagnosed in this study were in advanced stages, resulting in short survival. It is essential to increase awareness of risk factors and promote healthy lifestyles (no alcohol or smoking). Further studies involving multiple institutions and interdepartmental collaborations are also required to identify factors asso-

ciated with the observed poor survival, including the role of *H. pylori* in this population.

CONCLUSION

The population treated with endoscopies at a departmental referral center for digestive tract neoplasms is primarily composed of men, who were diagnosed at advanced stages, which was reflected in limited survival. This situation could be positively impacted by the implementation of screening programs, community education on risk

factors, and improvements in the quality of endoscopy at primary care levels.

Authors' contribution

All authors contributed to the planning, data acquisition, analysis, interpretation of the data, critical review of the intellectual content, and final approval.

Conflicts of interest

None.

Source of funding

REFERENCES

1. Ferlay J, Colombet M, Soerjomataram I, Parkin DM, Piñeros M, Znaor A, et al. Colombia cancer statistics for the year 2020: An overview. Int J Cancer. 2021;149(4):778-89. https://doi.org/10.1002/ijc.33588
2. Cancer (IARC). Global Cancer Observatory [Internet]. gco.iarc.fr. Disponible en: https://gco.iarc.who.int/
3. Siegel RL, Giaquinto AN, Jemal A. Cancer statistics, 2024. CA Cancer J Clin. 2024;74(1):12-49. https://doi.org/10.3322/caac.21820
4. Bravo LE, García LS, Collazos P, Carrascal E, Ramírez O, Collazos T, et al. Reliable information for cancer control in Cali, Colombia. Colomb Med. 2018;49(1):23-34. https://doi.org/10.25100/cm.v49i1.3689
5. Departamento Administrativo Nacional de Estadística. Defunciones no fetales 2023 [Internet]. [consultado el 21 de septiembre de 2024]. Disponible en: https://www.dane.gov.co/index.php/estadisticas-por-tema/salud/nacimientos-y-defunciones/defunciones-no-fetales/defunciones-no-fetales-2023
6. Pennathur A, Gibson MK, Jobe BA, Luketich JD. Oesophageal carcinoma. Lancet. 2013;381(9864):400-12. https://doi.org/10.1016/S0140-6736(12)60643-6
7. De Vos-Geelen J, Geurts SME, Valkenburg-Van Iersel LBJ, De Jong EJM, Tjan-Heijnen VCG, Van Putten M, et al. Trends in treatment and overall survival among patients with proximal esophageal cancer. World J Gastroenterol. 2019;25(47):6835-46. https://doi.org/10.3748/wjg.v25.i47.6835
8. Hernández G. Epidemiología del cáncer en Colombia: una transicion que debemos conocer. Inst Nac Cancerol. 2021;43(1):64-73. https://doi.org/10.56050/01205498.1586
9. Correa P. Gastric cancer: overview. Gastroenterol Clin North Am. 2013;42(2):211-7. https://doi.org/10.1016/j.gtc.2013.01.002
10. Arias-Sosa LA, Cuspoca-Orduz AF, Siabato-Barrios JA, Eslava-Roa JS. Incidencia y mortalidad del cáncer gástrico en el departamento de Boyacá-Colombia. Acta Gastroenterol Latinoam. 2018;48(3):181-9.
11. Torres J, Correa P, Ferreccio C, Hernandez-Suarez G, Herrero R, Cavazza-Porro M, et al. Gastric cancer incidence and mortality is associated with altitude in the mountainous regions of Pacific Latin America. Cancer Causes Control. 2013;24(2):249-56. https://doi.org/10.1007/s10552-012-0114-8
12. Bravo LE, Collazos T, Collazos P, García LS, Correa P. Trends of cancer incidence and mortality in Cali, Colombia. 50 years experience. Colomb Med. 2012;43(4):246-55. https://doi.org/10.25100/cm.v43i4.1266
13. Uhlenhopp DJ, Then EO, Sunkara T, Gaduputi V. Epidemiology of esophageal cancer: update in global trends, etiology and risk factors. Clin J Gastroenterol. 2020;13(6):1010-21. https://doi.org/10.1007/s12328-020-01237-x
14. Murphy N, Campbell PT, Gunter MJ. Unraveling the etiology of early-onset colorectal cancer. J Natl Cancer Inst. 2021;113(5):505-6. https://doi.org/10.1093/jnci/djaa165
15. Choi Y, Kim N, Yun CY, Choi YJ, Yoon H, Shin CM, et al. Effect of Helicobacter pylori eradication after subtotal gastrectomy on the survival rate of patients with gastric cancer: follow-up for up to 15 years. Gastric Cancer. 2020;23(6):1051-63. https://doi.org/10.1007/s10120-020-01076-2
16. Albero L, Arango A, Ríos AG, Elías C, Turriago P. Mortalidad por cánceres del aparato digestivo en Colombia entre 1980 y 1998. Análisis de tendencias y comparación reginal. Rev Fac Med. 2004;52(1):19-37.
17. Departamento Administrativo Nacional de Estadística. Encuesta Nacional de Consumo de Sustantcias Psicoativas (ENCSPA) 2019 [Internet]. [consultado el 22 de agosto de 2024]. Disponible en: https://www.dane.gov.co/files/investigaciones/boletines/ech/ech/ CP_empleo_ago_22.pdf
18. IBM corp. IBM SPSS Statistics for Windows. IBM Corp., Armonk, NY, EE. UU.; 2017.
19. Sanz Anquela JM, Ruiz Liso JM, Rodríguez Manzanilla L, Alfaro Torres J, Almajano Martínez C, Cuervas-Mons Finat M, et al. Importancia de la clasificación de Laurén del cáncer gástrico. Revisión de una serie de 295 casos. Patología. 1989;22:156-161.
20. Lauren P. the Two Histological Main Types of Gastric Carcinoma: Diffuse and So-Called Intestinal-Type Carcinoma. an Attempt At a Histo-Clinical Classification.

Acta Pathol Microbiol Scand. 1965;64:31-49.
https://doi.org/10.1111/apm.1965.64.1.31

21. Ministerio de Salud y Protección Social. Resolución 8430 de 1993, por la cual se establecen las normas científicas, técnicas y administrativas para la investigación en salud [Internet]; [consultado el septiembre 15 de 2023]. Disponible en: https://www.minsalud. gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/ RESOLUCION-8430-DE-1993.PDF

22. Bosman F, Carneiro F, Hruban R, Theise N. Who classification of tumours of the digestive system. 4.ª edición. World Health Organization; 2010.

23. Bohorquez M, Sahasrabudhe R, Criollo A, Sanabria-Salas MC, Vélez A, Castro JM, et al. Clinical manifestations of colorectal cancer patients from a large multicenter study in Colombia. Medicine (Baltimore). 2016;95(40):e4883. https://doi.org/10.1097/MD.0000000000004883

24. Barrero DC, Cortés E, Rodríquez C, Didí-Cruz M. Características epidemiológicas y clínicas del cáncer colorrectal en pacientes de la ciudad de Ibagué durante el período 2000-2006. Rev Colomb Gastroenterol. 2008;23(4):315-26.

25. Ferreira EJ, Meléndez HJ. Características clínicas, demo-gráficas e histopatológicas de los pacientes con cáncer colorrectal del Hospital Universitario de Santander. Rev Colomb Cirugía. 2012;27(3):213-20.

26. Campo-Sánchez SM, Camargo-Trillos J, Calle-Ramírez JA, Gómez-Wolff LR, Sánchez-Patiño LA, García-García HI. Colorectal cancer survival at an oncologic center in Colombia. A historic cohort study. Rev Gastroenterol México (Engl Ed). 2019;84(2):174-84. https://doi.org/10.1016/j.rgmx.2018.04.002

27. Siegel RL, Miller KD, Goding Sauer A, Fedewa SA, Butterly LF, Anderson JC, et al. Colorectal cancer statistics, 2020. CA Cancer J Clin. 2020;70(3):145-64. https://doi.org/10.3322/caac.21601

28. Global Cancer Observatory. Estimated number of deaths in 2020, worldwide, males, all ages [Internet]; [consultado el 16 de mayo de 2021]. Disponible en: https://gco.iarc.fr/

29. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer. 2015;136(5):E359-86. https://doi.org/10.1002/ijc.29210

30. Triana JJ, Aristizábal-Mayor JD, Plata MC, Medina M, Baquero L, Gil-Tamayo S, et al. Disease Burden of Gastric Cancer in Disability-Adjusted Life Years in Colombia. Rev Colomb Gastroenterol. 2017;32(4):326-31. https://doi.org/10.22516/25007440.175

31. Pardo C, De Vries E, Buitrago L, Gamboa Ó. Atlas de mortalidad por cáncer en Colombia [Internet]. Colombia: Instituto Nacional de Cancerología, Instituto Geográfico Agustín Codazzi; 2017 [consultado el 30 de julio de 2024]. Disponible en: https://www.ins.gov.co/TyS/programas-de-calidad/Documentos%20Programa%20EEDDCARIO/ ATLAS_de_Mortalidad_por_cancer_en_Colombia.pdf

32. Vries E De, Uribe C, Pardo C, Lemmens V, Poel E Van De, Forman D, et al. Gastric cancer survival and affiliation to health insurance in a middle-income setting. Cancer Epidemiol. 2015;39(1):91-6. https://doi.org/10.1016/j.canep.2014.10.012

33. E.S.E. Hospital Universitario San Rafael de Tunja. Informe caracterización de grupos de valor y grupos de interés 2021 [Internet]. Tunja, Colombia: Hospital San Rafael de Tunja; 2022 [consultado el 20 de marzo de 2024]. Disponible en: https://www.hospitalsanrafaeltunja.gov.co/contenido. php?id=316&seccion=transparencia-y-acceso-a-la-infor-macion-publica&slug=informe-de-caracterizacion

34. Portillo Miño JD, Araujo Prado LM, Melo Yepes JM, Carlosama Rosero YH. Características sociodemográficas e histopatológicas en pacientes con cáncer gástrico en una población con alto riesgo en Colombia. Rev Colomb Gastroenterol. 2021;36(1):18-23. https://doi.org/10.22516/25007440.544

35. Jazieh AR, Akbulut H, Curigliano G, Rogado A, Alsharm AA, Razis ED, et al. Impact of the COVID-19 Pandemic on Cancer Care: A Global Collaborative Study. JCO Glob Oncol. 2020;(6):1428-38. https://doi.org/10.1200/GO.20.00351

36. Pamplona J, Solano R, Ramírez M, Durandez R, Mohamed F, Pardo L, et al. High prevalence of SARS-CoV-2 infection in patients scheduled for digestive endoscopy after the peak of the first wave of the pandemic. Gastroenterol Hepatol. 2021;44(9):614-619. https://doi.org/10.1016/j.gastrohep.2021.03.001