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**ORIGINAL ARTICLE**

# EPIDEMIOLOGICAL PROFILE OF COLORECTAL CANCER PATIENTS AT AN ONCOLOGY CENTER IN RIO GRANDE DO SUL – BRAZIL

Micheli Macagnan Borghetti[1], Natália Lenz Follmann[2], Rebeca Geovanna dos Santos[3], Igor de Oliveira Ferreira[4], André dos Anjos da Silva[5], Gabriela Laste[6]

**Highlights:**
(1) The studied sample was predominantly male, in their sixties, white, and with 8-10 years of formal education.
(2) Most cases were diagnosed via colonoscopy, with adenocarcinoma being the most common histological type (grade 2, stage IIA).
(3) Educational level of 8-10 years was more frequent among deceased patients.
(4) The presence of metastasis showed a significant association with the 60-69 and 70-79 age groups.

## ABSTRACT

*Objective*: To describe the epidemiological profile of patients diagnosed with colorectal cancer (CRC) in the Vale do Taquari region, Rio Grande do Sul (RS), Brazil. Methods: This is a descriptive, retrospective study based on the analysis of medical records from patients diagnosed with CRC between 2017 and 2021. Descriptive statistical methods were employed. To compare proportions between clinical variables, such as staging, metastasis, and outcomes, and their associations with sex, age, and educational level, Pearson's chi-square test and Fisher's exact test were applied, as appropriate. Results: The sample comprised 252 medical records. The study population was predominantly male (59.1%), in their sixties (38.9%), White (94.4%), with 8 to 10 years of education (51.6%), and with a family history of cancer in 29.8% of cases. Most diagnoses were made via colonoscopy (69.9%), with adenocarcinoma (96.8%), histological grade 2 (62.3%), and clinical stage IIA (21.9%). Metastases were present in 38.1% of cases. The most frequently indicated treatment approach was adjuvant therapy (31.4%). An educational level of 8 to 10 years was proportionally more frequent among fatal cases ($X^2 = 43.9$; $P = 0.029$). The presence of metastasis showed a statistically significant association in the 60–69 and 70–79 age groups ($X^2 = 14.8$; $P = 0.022$). Conclusion: The epidemiological profile of CRC in the Vale do Taquari region, RS, Brazil was outlined, underscoring the importance of public policies for timely diagnosis and treatment, as well as the implementation of effective CRC screening programs.

**Keywords:** colorectal neoplasms; epidemiology; diagnosis.

[1] Universidade do Vale do Taquari – Univates. Lajeado/RS, Brazil. https://orcid.org/0009-0002-1057-6532
[2] Universidade do Vale do Taquari – Univates. Lajeado/RS, Brazil. https://orcid.org/0009-0001-1598-9005
[3] Universidade do Vale do Taquari – Univates. Lajeado/RS, Brazil. https://orcid.org/0009-0009-0582-2576
[4] Universidade do Vale do Taquari – Univates. Lajeado/RS, Brazil. https://orcid.org/0009-0007-3459-4969
[5] Universidade do Vale do Taquari – Univates. Programa de Pós-Graduação em Ciências Médicas. Lajeado/RS, Brazil. https://orcid.org/0000-0003-3714-3171
[6] Universidade do Vale do Taquari – Univates. Programa de Pós-Graduação em Ciências Médicas. Lajeado/RS, Brazil. https://orcid.org/0000-0003-1554-6658

## INTRODUCTION

Colorectal cancer (CRC) is one of the most prevalent neoplasms globally, ranking amongst the leading causes of morbidity and mortality both in Brazil and worldwide. According to the Brazilian National Cancer Institute (Inca), approximately 40,000 new cases are diagnosed annually in Brazil, affecting men and women in roughly similar proportions. In 2023, CRC was the second most frequently diagnosed cancer in the Brazilian population and the third leading cause of cancer-related mortality, considering primary tumor location across both sexes[1]. In the Southern region of Brazil, incidence rates are notably high, with estimates of 25.11 cases per 100,000 men and 23.65 cases per 100,000 women[2-4].

Differences in CRC incidence reflect global disparities tied to socioeconomic development. Regions with high Human Development Index (HDI) values, such as Northern Europe (33.6 per 100,000 person-years), exhibit significantly higher incidence rates compared to South America (18.5 per 100,000 person-years) and Central America (10.4 per 100,000 person-years)[5]. However, there has been a consistent rise in CRC incidence in economically transitioning countries, whereas rates have stabilized or declined over the past 15 years in developed nations, reflecting advances in prevention and control strategies[6].

CRC etiology involves both genetic, such as hereditary predisposition, and behavioral factors. The majority of cases are sporadic, resulting from the accumulation of pathogenic variants over a lifetime. This process is often driven by risk factors such as obesity, sedentary lifestyles, excessive alcohol consumption, smoking, and diets rich in processed foods and red meats[6-9]. Conversely, regular physical activity and maintaining a healthy body weight are key protective factors[8,9].

Clinically, CRC encompasses tumors originating in the large intestine, including the colon and rectum. Although it is a serious condition, its potential for cure is high when detected early. Many CRCs begin as benign polyps, which may take 10 to 15 years to progress into malignant lesions, offering a substantial window for early detection[10]. In this context, strategies such as regular screening starting at age 45, as broadly recommended by institutions such as the Centers for Disease Control and Prevention (CDC), have proven effective in increasing cure rates and preventing disease progression[3,11].

In Brazil, early detection strategies include fecal occult blood testing, colonoscopy, and sigmoidoscopy, particularly for individuals at average risk or those presenting suggestive symptoms. Nevertheless, the primary approach still relies heavily on awareness of signs and symptoms, as well as access to diagnostic procedures and timely treatment[10]. These measures, though critical, face implementation challenges that impact equity and efficiency in cancer care, particularly in regions with limited healthcare resources.

The lack of detailed data on the epidemiological profile of CRC patients poses a significant hurdle to the development of more effective care strategies and targeted public policies. Moreover, rising incidence rates may reflect weaknesses in the healthcare system, highlighting the need for improvements in both early diagnosis and treatment[12-14]. Therefore, this study aims to characterize the epidemiological profile of CRC patients treated under the Brazilian Unified Health System (SUS) in the Vale do Taquari region, Rio Grande do Sul (RS), Brazil. By addressing regional particularities, the study seeks not only to understand the specific needs of this population but also to support the development of evidence-based strategies to enhance efficiency, equity, and quality in oncological care.

## METHODS

### Study design:

This research was a quantitative, exploratory descriptive, retrospective study.

## Sample:

A total of 252 medical records of patients with histologically confirmed diagnoses of colorectal cancer, all users of the Brazilian Unified Health System (SUS), were analyzed.

## Selection criteria:

The study included the medical records of patients with a histologically confirmed diagnosis of colorectal cancer, with the following ICD codes: ICD 10 – C17; ICD 10 – C18; ICD 10 – C19; ICD 10 – C20. Eligible patients were SUS users treated at the Bruno Born Hospital Oncology Center (COBB) between January 2017 and December 2021. Records of patients under 18 years of age or with incomplete data were excluded. All records meeting the inclusion criteria were incorporated into the study, totaling 252 records.

## Study period:

Data collection was conducted between October 2022 and September 2023.

## Study setting

Data were collected at the Bruno Born Hospital Oncology Center, located in the Vale do Taquari region of Rio Grande do Sul (RS). The hospital is a regional reference center for the 16th Regional Health Coordination Office (16ª CRS), serving approximately 325,412 inhabitants across 37 municipalities.

## Data collection

Patient data were extracted from electronic records within the Tasy system, accessed using a password provided by the hospital. Patients included in the study had received care between January 2017 and December 2021. Record analysis was performed by a registered nurse, a nursing student, and two medical students.

A structured data collection form was applied to each record, and the information was subsequently tabulated in Microsoft Excel. The variables collected included: demographic data (age, sex, race/ethnicity, marital status, educational level, occupation, place of residence); lifestyle and risk factors (alcohol use, tabacco use, physical activity, comorbidities, personal cancer history, family cancer history); diagnosis (neoplasm type, ICD classification, signs and symptoms, diagnostic method, histological grade, disease stage, metastasis); treatment and outcome (therapeutic approach, chemotherapy, surgery, radiotherapy).

## Statistical analysis

Statistical analysis was conducted employing descriptive statistic methods, presenting absolute and relative frequencies of the variables. To compare proportions across clinical variables (e.g., staging, metastasis, outcome) and their association with sex, age, and educational level, Pearson's chi-square test and Fisher's exact test were applied as appropriate. A p-value $< 0.05$ was considered statistically significant. Analyses were performed using Jamovi software, version 2.3.21.

## Ethical considerations

This study was approved by the Research Ethics Committee of the University of Vale do Taquari – Univates (approval number: 5.603.239). All individuals involved in medical record review were trained and signed a confidentiality agreement ensuring the secure handling of patient data.

## RESULTS

The analysis was conducted using data from 252 patient records. Overall, the results describe the sociodemographic profile, lifestyle habits, and potential risk factors for colorectal cancer, along with information regarding diagnosis, treatment, and clinical outcomes for the studied sample.

There was a predominance of incident cases among men, accounting for 59.1% of the sample. The majority of patients were white (94.4%), between 60 and 69 years of age (38.9%), married (63.1%), and had an estimated educational level of 8 to 10 years of schooling (51.6%) (Table1).

Regarding alcohol consumption, 46.8% of the medical records lacked documentation, while 46.5% reported no alcohol use. As for tobacco use, 18.3% of patients reported being smokers. Physical activity was not recorded in 68.7% of records, while 29.8% of the records documented absence of physical activity. Comorbidities were reported in 60.7% of the sample, with hypertension being the most frequent (39.3%).

A previous personal history of cancer was present in 7.5% of the sample, with the intestine being the most frequently affected site (2%). Regarding family history of cancer, an incidence rate of 29.8% was reported, with siblings being the most commonly affected relatives (14.4%) – as detailed in Table 1.

Table 1 – Sociodemographic profile and potential risk factors among patients diagnosed with colorectal cancer (n = 252)

| Characteristic | Number of patients (%) |
|---|---|
| **Sex** | |
| Male | 149 (59.1) |
| Female | 103 (40.9) |
| **Age Group (years)** | |
| 20 – 29 | 2 (0.79) |
| 30 – 39 | 6 (2.38) |
| 40 – 49 | 17 (6.75) |
| 50 – 59 | 41 (16.27) |
| 60 – 69 | 98 (38.89) |
| 70 – 79 | 65 (25.79) |
| 80 or more | 23 (9.13) |
| **Race/Ethnicity** | |
| White | 238 (94.4) |
| Mixed-race | 7 (2.8) |
| Black | 6 (2.4) |
| Asian | 1 (0.4) |
| **Marital Status** | |
| Married | 159 (63.1) |
| Divorced | 48 (19) |
| Widowed | 42 (16.7) |
| Other | 3 (1.2) |

| | |
|---|---|
| **Educational Level (Years of Schooling)** | |
| Illiterate | 13 (5.2) |
| 4 – 7 years | 59 (23.5) |
| 8 – 10 years | 130 (51.6) |
| 11 – 14 years | 4 (1.6) |
| 15 years or more | 40 (15.9) |
| Not recorded | 6 (2.4) |
| **Occupation** | |
| Retired | 130 (51.6) |
| Farmer | 40 (15.9) |
| Homemaker | 13 (5.2) |
| Other | 69 (27.3) |
| **Area of Residence** | |
| Urban | 162 (64.3) |
| Rural | 90 (35.7) |
| **Alcohol Consumption** | |
| No | 116 (46.5) |
| Yes | 17 (6.7) |
| Not recorded | 119 (46.8) |
| **Tobacco Use** | |
| No | 117 (46.4) |
| Yes | 46 (18.3) |
| Not recorded | 89 (35.3) |
| **Physical Activity** | |
| No | 75 (29.8) |
| Yes | 4 (1.5) |
| Not recorded | 173 (68.7) |
| **Presence of Comorbidities** | |
| Yes | 153 (60.7) |
| No | 42 (16,7) |
| Not recorded | 57 (22.6) |
| **Type of Comorbidities** | |
| Hypertension | 99 (39.3) |
| Diabetes Mellitus | 46 (18.3) |
| Pulmonary Disease (COPD) | 13 (5.2) |
| Other | 50 (20.8) |

| | |
|---|---|
| **Personal History of Cancer** | |
| No | 89 (35.3) |
| Yes | 19 (7.5) |
| Not recorded | 144 (57.2) |
| **Personal History of Cancer (Site)** | |
| Intestine | 5 (2.0) |
| Prostate | 4 (1.6) |
| Melanoma | 2 (0.8) |
| Ovary | 2 (0.8) |
| Uterus | 2 (0.8) |
| Other | 5 (2.0) |
| **Family History of Cancer** | |
| Yes | 75 (29.8) |
| No | 64 (25.4) |
| Not recorded | 113 (44.8) |
| **Family History of Cancer (Degree of Kinship)** | |
| Siblings | 31 (14.4) |
| Father | 28 (11.2) |
| Mother | 17 (6.8) |
| Children | 5 (2.0) |

Source: Prepared by the authors.

The most prevalent histological type was adenocarcinoma, accounting for 96.8% of cases. Among these, 62.3% were classified as histological grade 2 – moderately differentiated. Of this group, 27.4% were rectal cancers, followed by 22.6% located in the sigmoid colon. Regarding cancer staging, 35.1% of medical records lacked this information. Among the records with staging data, 21.9% of cases were classified as stage IIA. Metastasis was documented in 38.1% of the sample. Colonoscopy was the most frequently used diagnostic method, reported in 69.9% of cases (Table 2).

Signs and symptoms were recorded in 82.9% of medical records. The most frequently reported clinical findings included abdominal pain (41.7%), weight loss (37.7%), presence of blood in stool (29%), hematochezia (25%), diarrhea (24.2%), and changes in stool consistency (17.9%) (Table 2).

Table 2 – Diagnostic characteristics of patients with colorectal cancer (n = 252)

| **Neoplasm** | **Number of Patients (%)** |
|---|---|
| Rectal adenocarcinoma | 69 (27.4) |
| Sigmoid adenocarcinoma | 57 (22.7) |
| Right colon (ascending) adenocarcinoma | 39 (15.1) |
| Rectosigmoid adenocarcinoma | 20 (8) |
| Other | 67 (26.8%) |

| | |
|---|---|
| **ICD-10** | |
| C18 | 184 (73) |
| C19 | 9 (3.6) |
| C20 | 57 (22.6) |
| C21 | 2 (0.8) |
| **Presence of signs and/or symptoms** | |
| Yes | 209 (82.9) |
| No | 9 (3.6) |
| Not recorded | 34 (13.5) |
| **Diagnostic method** | |
| Colonoscopy | 176 (69.9) |
| Imaging (MRI, CT, ultrasound) | 24 (9.6) |
| Surgery | 18 (7.2) |
| Not recorded | 34 (13.5) |
| **Histological type** | |
| Adenocarcinoma | 244 (96.8) |
| Adenoma | 3 (1.2) |
| Squamous cell carcinoma | 1 (0.4) |
| Neuroendocrine tumor | 1 (0.4) |
| Not recorded | 3 (1.2) |
| **Histological grade** | |
| 1 – Well differentiated | 18 (7.1) |
| 2 – Moderately differentiated | 157 (62.3) |
| 3 – Poorly differentiated | 18 (7.1) |
| No staging | 1 (0.4) |
| Not recorded | 58 (23) |
| **Disease staging** | |
| Stage I | 14 (5.6) |
| Stage IIA | 55 (21.9) |
| Stage IIB | 6 (2.4) |
| Stage IIC | 1 (0.4) |
| Stage IIIA | 8 (3.2) |
| Stage IIIB | 31 (12.3) |
| Stage IIIC | 5 (2.0) |
| Stage IVA | 38 (15.1) |
| Incomplete or unstaged | 5 (2.0) |
| Not recorded | 89 (35.1) |

| | |
|---|---|
| **Presence of metastasis** | |
| No | 117 (46.4) |
| Yes | 96 (38.1) |
| Not recorded | 39 (15.5) |

Source: Prepared by the authors.

The most frequently employed therapeutic approach in the analyzed sample was adjuvant therapy, recorded in 31.4% of cases. Surgical intervention was performed in 66% of patients, and chemotherapy was administered in 69.5%. The clinical outcome was death in 17.5% of the study population (Table 3).

Table 3 – Treatment approaches and clinical outcome in patients with colorectal cancer (n = 252)

| **Therapeutic approach** | **Number of Patients (%)** |
|---|---|
| Adjuvant | 79 (31.4) |
| Palliative | 61 (24.2) |
| Surgical | 55 (21.8) |
| Neoadjuvant | 34 (13.5) |
| No treatment received | 6 (2.4) |
| Not recorded | 17 (6.7) |
| **Chemotherapy** | |
| Yes | 175 (69.5) |
| No | 59 (23.4) |
| Not recorded | 18 (7.1) |
| **Surgery** | |
| Yes | 166 (66) |
| No | 42 (16.5) |
| Not recorded | 44 (17.5) |
| **Radiotherapy** | |
| No | 140 (55.6) |
| Yes | 44 (17.5) |
| Not recorded | 68 (27) |

Source: Prepared by the authors.

No statistically significant differences were observed for the association between educational level and cancer staging ($X^2 = 42$; $P = 0.22$) (Table 4), nor between educational level and presence of metastasis ($X^2 = 2.37$; $P = 0.66$) (Table 5). However, regarding outcome, an educational level of 8–10 years of schooling was proportionally more frequent among fatal cases ($X^2 = 43.9$; $P = 0.029$) (Table 5).

According to Tables 4 and 5, sex did not present any significant association with staging ($X^2 = 5.36$; $P = 0.80$), metastasis ($X^2 = 0.013$; $P = 0.90$), or clinical outcome ($X^2 = 0.83$; $P = 0.99$).

The presence of metastasis was significantly associated with age groups 60–69 and 70–79 years ($X^2 = 14.8$; $P = 0.022$). However, no statistically significant associations were identified between age and clinical outcome ($X^2 = 41.3$; $P = 0.50$) or between age and staging ($X^2 = 43.6$; $P = 0.84$) (Tables 4 and 5).

Table 4 – Sociodemographic characteristics by colorectal cancer staging (n=154)

| Characteristic | Staging | | | | | | | | | $X^2$ | p-value* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | IIA | IIB | IIC | IIIA | IIIB | IIIC | IVA | Unstaged | | |
| **Sex** | | | | | | | | | | | |
| Male | 10 (6.1%) | 29 (17.8%) | 3 (1.8%) | 1 (0.6%) | 3 (1.8%) | 20 (12.3%) | 2 (1.2%) | 23 (14.1%) | 3 (1.8%) | 5.36 | 0.802 |
| Female | 4 (2.5%) | 26 (16%) | 3 (1.8%) | 0 (0%) | 5 (3.1%) | 11 (6.7%) | 3 (1.8%) | 15 (9.2%) | 2 (1.2%) | | |
| **Age (years)** | | | | | | | | | | | |
| 20-29 | 0 (0%) | 2 (1.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 43.6 | 0.842 |
| 30-39 | 0 (0%) | 1 (0.6%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (0.6%) | 0 (0%) | 2 (1.2%) | 0 (0%) | | |
| 40-49 | 1 (0.6%) | 2 (1.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (0.6%) | 1 (0.6%) | 3 (1.9%) | 0 (0%) | | |
| 50-59 | 0 (0%) | 11 (6.8%) | 0 (0%) | 0 (0%) | 3(1.9%) | 4 (2.5%) | 0 (0%) | 10 (6.2%) | 1 (0.6%) | | |
| 60-69 | 8 (4.9%) | 23 (14.2%) | 6 (3.7%) | 1 (0.6%) | 2 (1.2%) | 11 (6.8%) | 2 (1.2%) | 13 (8%) | 3 (1.9%) | | |
| 70-79 | 3 (1.9%) | 9 (5.6%) | 0 (0%) | 0 (0%) | 2 (1.2%) | 11 (6.8%) | 2 (1.2%) | 8 (4.9%) | 1 (0.6%) | | |
| 80 or more | 2 (1.2%) | 7 (4.3%) | 0 (0%) | 0 (0%) | 1 (0.6%) | 3 (1.9%) | 0 (0%) | 1 (0.6%) | 0 (0%) | | |
| **Education (years)** | | | | | | | | | | | |
| 4-7 | 3 (1.9%) | 12 (7.8%) | 2 (1.3%) | 1 (0.6%) | 1 (0.6%) | 11 (7.1%) | 2 (1.3%) | 3 (1.9%) | 2 (1.3%) | 42.0 | 0.227 |
| 8-10 | 10 (6.5%) | 30 (19.5%) | 3 (1.9%) | 0 (0%) | 5 (3.2%) | 14 (9.1%) | 2 (1.3%) | 23 (14.9%) | 0 (0%) | | |
| 11-14 | 1 (0.6%) | 7 (4.5%) | 0 (0%) | 0 (0%) | 1 (0.6%) | 2 (1.3%) | 1 (0.6%) | 4 (2.6%) | 2 (1.3%) | | |
| 15 or more | 0 (0%) | 4 (2.6%) | 1 (0.6%) | 0 (0%) | 0 (0%) | 3 (1.9%) | 0 (0%) | 3 (1.9%) | 0 (0%) | | |
| Illiterate | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (0.6%) | 0 (0%) | | |

*p-value calculated using Pearson's chi-square test for heterogeneity of proportions.

Source: Prepared by the authors.

# EPIDEMIOLOGICAL PROFILE OF COLORECTAL CANCER PATIENTS AT AN ONCOLOGY CENTER IN RIO GRANDE DO SUL – BRAZIL

Table 5 – Sociodemographic characteristics by presence of metastasis and fatal clinical outcome (n=210)

| Characteristic | Metastasis | | $X^2$ | p-value* | Fatal | $X^2$ | p-value* |
|---|---|---|---|---|---|---|---|
| | Yes | No | | | | | |
| **Sex** | | | | | | | |
| Male | 56 (26.5%) | 68 (32.2%) | 0.0137 | 0.907 | 27 (12.9%) | 0.834 | 0.997 |
| Female | 40 (19.0%) | 47 (22.3%) | | | 18 (8.6%) | | |
| **Age (years)** | | | | | | | |
| 20-29 | 0 (0%) | 1 (0.5%) | | | 0 (0%) | | |
| 30-39 | 3 (1.4%) | 3 (1.4%) | | | 0 (0%) | | |
| 40-49 | 11 (5.2%) | 3 (1.4%) | 14.8 | 0.022 | 5 (2.4%) | 41.3 | 0.501 |
| 50-59 | 22 (10.5%) | 14 (6.7%) | | | 10 (4.8%) | | |
| 60-69 | 28 (13.3%) | 52 (24.8%) | | | 15 (7.2%) | | |
| 70-79 | 26 (12.4%) | 33 (15.7%) | | | 11 (5.2%) | | |
| 80 or more | 5 (2.4%) | 9 (4.3%) | | | 3 (1.4%) | | |
| **Education (years)** | | | | | | | |
| 4-7 | 22 (11.1%) | 32 (16.1%) | | | 7 (3.6%) | | |
| 8-10 | 52 (26.1%) | 56 (28.1%) | 2.37 | 0.668 | 29 (14.7%) | 43.9 | 0.029 |
| 11-14 | 9 (4.5%) | 14 (7.0%) | | | 3 (1.5%) | | |
| 15 or more | 6 (3.0%) | 7 (3.5%) | | | 2 (1.0%) | | |
| Illiterate | 1 (0.5%) | 0 (0%) | | | 1 (0.5%) | | |

*p-value calculated using Pearson's chi-square test for heterogeneity of proportions.

Source: Prepared by the authors.

## DISCUSSION

The findings of this study highlight that colorectal cancer (CRC) was more prevalent among men, White individuals, and those aged 60 to 69 years, aligning with previous reports[7,15-18] and data from the Brazilian National Cancer Institute (Inca)[1].

The predominance of sexagenarians reaffirms age as a significant risk factor for CRC, attributed to the progressive accumulation of cellular damage and genetic alterations over a lifetime, exacerbated by exposure to mutagenic factors such as alcohol consumption, smoking, poor diet, and oxidative processes. Additionally, aging is associated with immunological dysregulation, impairing the body's ability to detect and eliminate tumor cells, which favors neoplastic progression[12,19]. In this study, metastasis was significantly associated with the age groups 60-69 and 70-79 years, underscoring the importance of targeted strategies for early detection and intervention in this specific population.

Men's lower utilization of healthcare services compared to women may also help explain the higher incidence and severity of CRC in this group, often diagnosed at more advanced stages[14]. Studies such as that by Rohenkohl et al.[16], show that men have higher exposure to risk factors, with alcohol consumption (91.4%) and smoking (70.8%) being particularly prominent, whereas women demonstrate greater adherence to routine health exams, enabling earlier diagnoses. Furthermore, female hormones, associated with contraceptive use or hormone replacement therapy, have been linked to a potential protective effect against CRC[20].

Regarding educational level, most individuals had between 8 to 10 years of schooling, a finding consistent with previous studies such as Rohenkohl et al.[16]. This educational bracket was also more common among deceased patients. Lower education is strongly associated with limited understanding of risk and protective factors, lower adherence to screening programs, and reduced access to appropriate oncological treatment, all contributing to late diagnoses and worse prognoses[21]. These findings reinforce the importance of educational strategies and public policies that promote equitable access to healthcare, aiming to reduce disparities in oncological care and improve clinical outcomes for this population.

As for lifestyle habits, this study revealed tobacco (18.3%) and alcohol (6.3%) consumption in the sample, although poor record-keeping in medical charts limited more precise analysis. These findings are also consistent with literature, which links CRC to behaviors such as smoking, alcohol consumption, poor diet, and sedentary lifestyle[6]. Protective factors such as physical activity can reduce risk by improving insulin resistance and mitigating inflammatory processes[22].

In terms of family history, 29.8% of participants had a positive record, with siblings being the most frequently reported relationship (14.4%). Rohenkohl et al.,[16] in a similar study also conducted in Rio Grande do Sul, found a positive family history of cancer in 43.7% of medical records reviewed. Family history is a recognized risk factor, and it is estimated that up to one-third of individuals with CRC have affected relatives, emphasizing the importance of early screening[23].

Histological findings identified adenocarcinoma as the predominant type, with the rectum as the most common site and grade 2 (moderately differentiated) as the most frequent histological grade. These results are consistent with Pucci et al.[24] and with reports from the Inca and the *American Cancer Society*[3,23]. Colonoscopy was the primary diagnostic method, in accordance with current recommendations for standard screening in individuals with average and high risk of developing CRC[25].

Stage IIA was the most frequently reported disease stage, partially consistent with other studies[7,17]. Mello et al. found that 54.88% of CRC cases were diagnosed at stages III/IV[7], suggesting delayed diagnosis. However, in the present study, such data can be deemed inconclusive due to a significant proportion of charts lacking stage information.

Metastasis was documented in 38.1% of records. It is estimated that nearly half of all CRC patients will develop liver metastases over the course of the disease, significantly impacting pronosis[26]. It is important to note that most records (82.9%) included symptoms such as abdominal pain, weight loss, blood in stool, hematochezia, diarrhea, and altered stool consistency, indicating that diagnoses were most often made after symptom onset. These findings stress the importance of early detection, as identifying and removing precancerous intestinal polyps can prevent disease onset. Early diagnosis, when followed by appropriate treatment, can increase the five-year survival rate to up to 90% and significantly reduce mortality[27]. In Brazil, there is still no population-wide CRC screening program. The Ministry of Health currently recommends that individuals with suspected or confirmed CRC or anal cancer be prioritized for referral to proctologists, with criteria adapted to local healthcare regulations[10].

The most common therapeutic approach was adjuvant therapy, followed by chemotherapy and surgery. According to the American Cancer Society (ACS)[23], the choice of therapy depends on disease staging and the patient's clinical status. In general, surgery is the standard treatment for stage I–II CRC and may be complemented by neoadjuvant therapy, to control or reduce tumor size, or adjuvant therapy, to enhance treatment effectiveness.

The overall death rate corresponded to 17.5% of analyzed records. In 2021, an estimated 22,786 deaths from CRC occurred in Brazil, and in 2023, CRC ranked third in mortality by primary tumor location for both men and women [1]. A cohort study by Silva et al.[28], with 683 CRC patients reported a higher mortality rate of 35.7%, with 28.3% of deaths directly attributed to CRC. This percentage surpasses the 14% found by Almeida et al.[29], potentially due to methodological differences or variations in clinical profiles. Additionally, Muzi, Banegas e Guimarães[30] documented a 20.56% increase in CRC-adjusted mortality rates across Latin America from 1990 to 2019 (CI 95% 19.75%–21.25%), revealing a growing and alarming trend. These findings highlight the urgent need for more effective screening and early treatment strategies, particularly in low- and middle-income countries Where access to oncology care remains limited.

A limitation of this study was the absence of detailed patient histories in electronic medical records, which restricted data collection for some variables. This study addressed the epidemiological profile within a specific period and region of Rio Grande do Sul. Although it only portrays a slice of the reality, its findings reveal critical insights for its population profile. To achieve a broader and more precise understanding, continuous investment in research and database improvement is essential. Furthermore, there is a notable lack of epidemiological studies on CRC in Brazil, especially within the context of the Unified Health System (SUS), which enhances the relevance of these results. The data obtained may also be representative of other regions with similar demographic, socioeconomic, and structural characteristics, particularly in municipalities of similar size. As such, this study may serve as a comparative reference for future research across Brazil, contributing to broader and deeper analyses on the subject.

## CONCLUSION

The sociodemographic profile of the studied population was predominantly male, aged between 60 and 69 years, White, and with a low level of education. The presence of metastases was significantly associated with the age groups of 60 to 79 years, highlighting age as a critical risk factor. Furthermore, family history of cancer and educational level were relevant factors, with lower levels of education more frequently observed among deceased cases. Most diagnoses were made via colonoscopy, with adenocarcinomas primarily located in the rectal and sigmoid regions, histologically classified as grade 2 and staged at IIA, with 38% progressing to metastasis. Regarding treatment, the most common therapeutic approach was adjuvant therapy, including chemotherapy and surgical intervention. These

findings underscore the urgent need to strengthen public policies related to the diagnoses, treatment, and screening of colorectal cancer, particularly for high-risk groups such as older men and individuals with a family history of the disease. Early detection and timely intervention are essential for improving prognosis and reducing colorectal cancer-related mortality.

## REFERENCES

[1] Instituto Nacional de Câncer (Inca). Estatísticas de câncer. Rio de Janeiro: Inca; 2023. Disponível em: https://www.gov.br/inca/pt-br/assuntos/cancer/numeros

[2] Instituto Nacional de Câncer (Inca). Tendência de aumento do número de casos de câncer de intestino exige estratégias de prevenção. Rio de Janeiro: Inca; 2021. Available from: https://www.gov.br/inca/pt-br/assuntos/noticias/2021/tendencia-de-aumento-do-numero-de-casos-de-cancer-de-intestino-exige-estrategias-de-prevencao

[3] Instituto Nacional de Câncer (Inca). Câncer de intestino. Rio de Janeiro: Inca; 2022. [access 7 June 2022]. Available from: https://www.inca.gov.br/tipos-de-cancer/cancer-de-intestino#:~:text=Tamb%C3%A9m%20%C3%A9%20conhecido%20como%20c%C3%A2ncer,parede%20interna%20do%20intestino%20grosso

[4] Instituto Nacional de Câncer (Inca). Estimativa 2020: incidência de câncer no Brasil. Rio de Janeiro: Inca; 2019 [access 28 June 2022]. Available from: https://www.inca.gov.br/tipos-de-cancer/cancer-de-intestino#:~:text=Tamb%C3%A9m%20%C3%A9%20conhecido%20como%20c%C3%A2ncer,parede%20interna%20do%20intestino%20grosso

[5] International Agency for Research on Cancer. Cancer today. Available from: http://gco.iarc.fr/today/home

[6] Carvalho TC, Borges AK, Koifman RJ, Silva IF. Time trends in colorectal cancer incidence in four regions of Latin America: 1983-2012. Cad Saúde Pública. 2021;37(10):e00175720. DOI: https://doi.org/10.1590/0102-311X00175720

[7] Mello MR, Moura SF, Muzi CD, Guimarães RM. Clinical evaluation and pattern of symptoms in colorectal cancer patients. Arq Gastroenterol. 2020;57(2):131-136. DOI: https://doi.org/10.1590/S0004-2803.202000000-24

[8] Pacheco-Pérez LA, Ruíz-González KJ, De-La-Torre-Gómez AC, Guevara-Valtier MC, Rodríguez-Puente LA, Gutiérrez-Valverde JM. Environmental factors and awareness of colorectal cancer in people at familial risk. Rev Latino-Am Enfermagem. 2019;27:e3195. DOI: https://doi.org/10.1590/1518-8345.3082.3195

[9] Murphy CC, Zaki TA. Changing epidemiology of colorectal câncer – birth cohort effects and emerging risk factors. Nat Rev Gastroenterol Hepatol. 2024;21:25-34. DOI: https://doi.org/10.1038/s41575-023-00841-9

[10] Ministério da Saúde (BR). Rastreamento. Série A. Normas e Manuais Técnicos. Cadernos de Atenção Primária. Brasília: Ministério da Saúde; 2010 [access 2022 June 20]. Available from: http://189.28.128.100/dab/docs/publicacoes/cadernos_ab/abcad29.pdf

[11] Centers for Disease Control and Prevention (CDC). Division of Cancer Prevention and Control. Colorectal Cancer Screening Tests [Internet]. Atlanta (GA): CDC; 2022 [cited 10 May 2022]. Available from: https://www.cdc.gov/cancer/colorectal/basic_info/screening/tests.htm

[12] Souza LR, Adriano LK, Lenhani BE, Fracasso NV, Koller FJ, Marcondes L. Perfil epidemiológico dos casos de câncer colorretal notificados na Região Sul do Brasil. Rev Eletrônica Acervo Saúde. 2024;24(3):e15088. DOI: 10.25248/reas.e15088.2024

[13] Gomes ACB, Nogueira RMFG, Pereira DB, Mendonça KMB, Minasse CY. Morbimortalidade hospitalar por câncer colorretal na região sudeste entre 2019 e 2023. Braz J Implantol Health Sci. 2024;6(9):1276-1288.

[14] Carvalho AE, Souza RAG, Galvão ND, Melanda FN, Caló RS, Souza BSN, et al. Colorectal cancer mortality trend in Mato Grosso, Brazil, 2000 to 2019. Rev Bras Epidemiol [Internet]. 2022 [cited 10 Dez 2024];25:e220007. DOI: 10.1590/1980-549720220007.supl.1

[15] Oliveira JW, Moraes RA, Mehanna SH, Linhares JC. Colorectal cancer: histopathological profile and prevalence of DNA repair system deficiency in patients submitted to surgical treatment in a university hospital. ABCD Arq Bras Cir Dig [Internet]. 2023 [cited 10 Dez 2024];36:e1771. DOI: 10.1590/0102-672020230053e1771

[16] Rohenkohl CA, Pastorello J, Costa NR, Zabot GP, Cassol OS. Epidemiological profile of patients with colorectal cancer from a hospital in Rio Grande do Sul, Brazil. J Coloproctol (Rio J). 2021;41(1):1-7. DOI: 10.1055/s-0041-1725048

[17] Aguiar S Jr, Oliveira MM, Silva DRME, Mello CAL, Calsavara VF, Curado MP. Survival of patients with colorectal cancer in a cancer center. Arq Gastroenterol. 2020;57(2):172-177. DOI: 10.1590/S0004-2803.202000000-32

[18] Freitas BA, Loth CAT, Swarowsky GL, Lourenço GM, Fillmann LS, Fillmann HS, et al. Are obesity and adenoma development associated as colorectal cancer precursors? ABCD Arq Bras Cir Dig [Internet]. 2020 [cited 10 Dez 2024];33(1):e1500. DOI: 10.1590/0102-672020190001e1500

[19] Moura SF, Mello MRS, Muzi CD, Guimarães RM. Padrão sintomatológico em pacientes do câncer colorretal de acordo com a idade. Rev Bras Cancerol [Internet]. 2020 [cited 10 Dez 2024];66(1):e15474. Available from: https://rbc.inca.gov.br/index.php/revista/article/view/474

[20] Caló RS, Souza RAG, Alves MR, Lima FCS, Galvão ND, Souza BSN, et al. Trends in the incidence of colorectal cancer in Greater Cuiabá, Mato Grosso (Brazil), from 2000 to 2016. Rev Bras Epidemiol [Internet]. 2022 [cited 10 Dez 2024];25:e220013. DOI: 10.1590/1980-549720220013.supl.1

[21] Carvalho GD, Araújo RD, Amorim JM, Sousa WM, Silva MB. Epidemiologia dos pacientes portadores de câncer colorretal em um Centro de Saúde em Teresina – PI. Anais da Mostra de Pesquisa em Ciência e Tecnologia; 2018.

[22] Abar L, Vieira AR, Aune D, Sobiecki JG, Vingeliene S, Polemiti E, et al. Height and body fatness and colorectal cancer risk: an update of the WCRF-AICR systematic review of published prospective studies. Eur J Nutr. 2018;57(5):1701-1720.

[23] American Cancer Society. Colorectal cancer causes, risk factors, and prevention [Internet]. Atlanta (GA): American Cancer Society; 2020 [cited 11 Dez 2024]. Available from: https://www.cancer.org/content/dam/CRC/PDF/Public/8605.00.pdf

[24] Pucci MD, Dasenbrock A, Tanzawa CK, Santos MB. Perfil clínico-epidemiológico do câncer colorretal na região oeste do Paraná, Brasil, 2016-2018. Rev Bras Cancerol. 2023;69(1):1-8. DOI: 10.32635/2176-9745.RBC.2023v69n1.3143

[25] American Cancer Society. Cancer Statistics Center. Estimates [Internet]. 2024 [cited 11 Dez 2024]. Available from: https://cancerstatisticscenter.cancer.org/?_ga=2.56627501.687678083.1664388078-544034726.1664388077

[26] Ernani L, Fernandes ESM, Martino RB, Coelho FF, Mello FPT, Andrade R, et al. Protocolo de transplante hepático para metástase colorretal irressecável. ABCD Arq Bras Cir Dig [Internet]. 2021 [cited 11 Dez 2024];34(4):e1625. DOI: https://doi.org/10.1590/0102-672020210002e1625

[27] Dominguez RGS, Bierenbach AL. Hospital morbidity and colorectal cancer mortality: implications for public health in Brazil. Arq Gastroenterol [Internet]. 2020 Apr [cited 11 Dez 2024];57(2):182-187. DOI: https://doi.org/10.1590/S0004-2803.202000000-34

[28] Silva GM, Souza RAG, Lima FCS, Caló RS, Andrade ACS, Souza BSN, et al. Sobrevida do câncer colorretal na Grande Cuiabá, Mato Grosso, Brasil. Rev Bras Epidemiol [Internet]. 2023 [cited 11 Dez 2024];26:e230022. DOI: https://doi.org/10.1590/1980-549720230022.2

[29] Almeida JS, Sardinha AH, Gonçalves ERG, Lopes MLH. Caracterização dos casos de câncer colorretal no Estado do Maranhão, Brasil. Rev Salud Publica (Bogotá) [Internet]. 11 Dez 2022 [cited 11 Dez 2024];24(6):93726. Available from: http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0124-00642022000600007&lng=en

[30] Muzi CD, Banegas MP, Guimarães RM. Colorectal cancer disparities in Latin America: Mortality trends 1990-2019 and a paradox association with human development. PLoS One [Internet]. 25 Aug 2023 [cited 11 Dez 2024];18(8):e0289675. DOI: https://doi.org/10.1371/journal.pone.0289675

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| Authors' contributions | |
|---|---|
| **Micheli Macagnan Borghetti:** | Conceptualization; Data curation; Investigation; Writing – original draft. |
| **Natália Lenz Follmann:** | Investigation. |
| **Rebeca Geovanna dos Santos:** | Investigation. |
| **Igor de Oliveira Ferreira:** | Investigation. |
| **André dos Anjos da Silva:** | Supervision; Visualization; Writing – review & editing. |
| **Gabriela Laste:** | Conceptualization; Data curation; Formal analysis; Methodology; Project administration; Supervision; Visualization; Writing – review & editing. |
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| **Corresponding author:** | Gabriela Laste<br>Universidade do Vale do Taquari – Univates.<br>Av. Avelino Talini, 171 – Universitário.<br>Lajeado/RS, Brazil. Zip code 95914-014<br>gabrielalaste@univates.br |
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