

# Histopathological Profile of Gastrointestinal Cancer

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## ABSTRACT

**Background:** Gastrointestinal (GI) epithelial cancers are a leading cause of cancer-related deaths worldwide. The objective of this study was to analyse the epidemiology, symptomatology and histopathology of gastrointestinal epithelial malignancies in a GI pathology laboratory based in Kathmandu, Nepal.

**Methods:** An observational study was conducted to using the data collected from biopsy specimens, pathology reports, clinical information, and endoscopic reports of patients diagnosed from March, 2017 to December, 2018 in Samyak Pathology Lab (SPL), Kathmandu. Nonepithelial tumors were excluded. Data analysis was done using Microsoft Excel 365.

**Results:** Of 203 GI epithelial malignancies, there were 25 (12.3%) esophageal, 81 (39.9%) gastric, 29 (14.3%) duodenal/ampullary, and 68 (33.5%) colorectal carcinomas. Gastric cancer had a mean age of 59.7 years and a male-to-female (M: F) ratio of 2.4. Common symptoms included abdominal pain, nausea/vomiting, and weight loss. The mean age for esophageal cancer was 65.8 years and the M: F ratio was 2.6. Dysphagia was the commonest symptom. Duodenal cancer had a mean age of 57.2 years and an M: F ratio of 1.2. Among these, 17 were periampullary carcinomas, and obstructive jaundice was the most common symptom. For colorectal cancer, the mean age was 54 years, and the M: F ratio was 1.6. Common symptoms included per-rectal bleeding, abdominal pain, and altered bowel habits.

**Conclusions:** Gastric cancer was the most common type of gastrointestinal (GI) epithelial cancer in this study, followed by colorectal, duodenal/ampullary, and esophageal cancer. There was a male predominance. The rise in colorectal carcinoma points to lifestyle changes as a contributing factor.

**Keywords:** Colorectal neoplasms; epidemiology; gastrointestinal neoplasms; Nepal; stomach neoplasms.

## INTRODUCTION

Cancer is a leading cause of death and a barrier to increasing life expectancy in almost every country of the world.<sup>1</sup> GLOBOCAN 2020 reveals that cancers of the gastrointestinal tract carry the highest burden in terms of both incidence and mortality.<sup>2</sup> A recent study shows that gastric cancer is the most common among gastro-intestinal tract malignancies in Nepal, followed by colorectal cancer.<sup>3</sup> However, unlike gastric cancer which shows a decreasing trend in terms of incidence, colorectal cancer shows an increasing trend in Nepal.<sup>3</sup>

However, there is a dearth of literature when it comes to detailed epidemiology of GI tract malignancies in Nepal.

This study aims to analyse the detailed epidemiology, symptomatology and histopathology of gastrointestinal tract epithelial malignancies viz. gastric, esophageal, colorectal, and small bowel cancers in Samyak Pathology Lab, a histopathology lab specializing in gastrointestinal and liver pathology, based in Kathmandu, Nepal.

## METHODS

This is an cross-sectional study conducted at Samyak Pathology Lab (SPL), Kathmandu, Nepal, which analyzed all cases of gastro-intestinal tract epithelial malignancies diagnosed between March, 2017 to December, 2018. SPL is a tertiary diagnostic center that receives cases from different hospitals across Kathmandu Valley as well

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as hospitals and polyclinics outside Kathmandu. This allowed us to incorporate a wide range of cases in our study. Ethical clearance was obtained from the Ethical Review Board, Nepal Health Research Council (NHRC), reference no. 1721, protocol id 922/2019 P. The reports were accessed using the patient's identification number keeping their names confidential. The carcinomas of the alimentary canal arising from the GI epithelium were included in this study. The cancers of the lips, oral cavity, salivary glands, pancreas, biliary system, liver, neuroendocrine tumors, and non-epithelial neoplasms like lymphomas, sarcomas, gastrointestinal stromal

tumors (GIST), polyps were excluded from this study. Only biopsies were included. In cases where subsequent resection specimen was available, the resections were not included in the study. This being a retrospective record review, sample size calculation was not done and all eligible cases were included in the study. Computerized data containing records of all biopsy specimens diagnosed as GI epithelial carcinomas in SPL were included. All the cases were diagnosed by a certified GI pathologist (BB). The data was entered and analyzed using Microsoft Excel 365.

## RESULTS

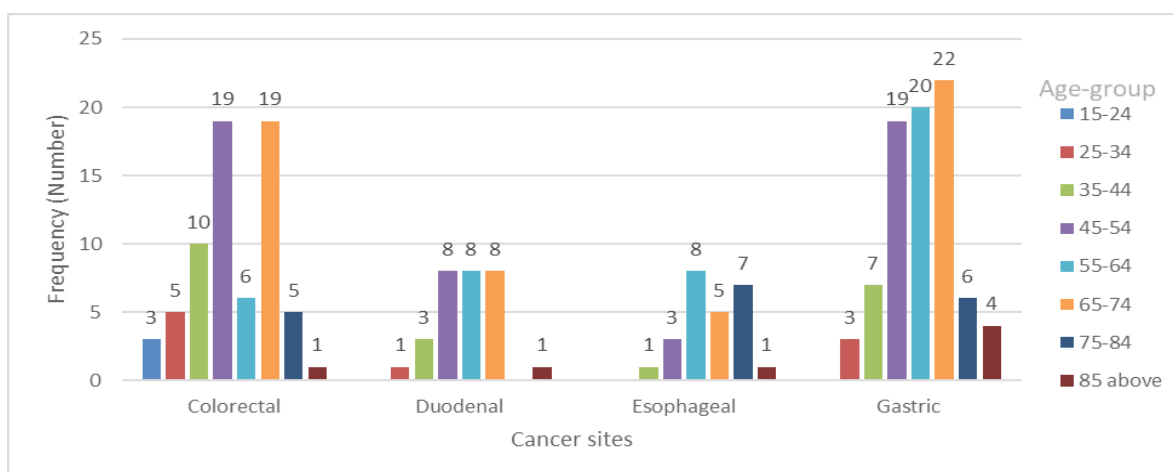
A total of 203 gastrointestinal (GI) epithelial malignancies were diagnosed at Samyak Pathology Lab (SPL) during the study period. The overall distribution of cancer types, along with mean age at presentation and male-to-female ratios, is summarized in Table 1.

**Table 1. Frequency, Age at Diagnosis, and Sex Distribution of GI Epithelial Malignancies. (N = 203)**

Cancer Type	Number of Cases(% of total)	Mean Age at Presentation	Male to Female Ratio
Esophageal cancer	25 (12.3%)	65.8 years	2.6:1
Gastric cancer	81(39.9%)	59.7 years	2.4:1
Duodenal cancer	29(14.3%)	57.2 years	1.2:1
Colorectal cancer	68(33.5%)	54 years	1.6:1
• Rectal cancer(subset of colorectal cancer)	25(12.3%)	52 years	1.8:1

### Age Distribution by Cancer Type

Figure 1 shows the age distribution of different GI tract epithelial malignancies. As evidenced in the figure, while GI epithelial malignancies are more common in older adults, younger patients also present with GI epithelial malignancies across a wide age range.



**Figure 1. Age-distribution of different GI epithelial malignancies.**

The x-axis shows different GI cancer types (colorectal, duodenal, esophageal and gastric). The y-axis represents the number of patients. Within each cancer type, colored bars indicate different age groups, illustrating the age distribution of patients, with the age-group index displayed in the legend on the right.

Esophageal cancer cases (n = 25) comprised 64% squamous cell carcinomas (n = 16) and 36% adenocarcinomas (n = 9).

Gastric cancer (n = 81) was exclusively adenocarcinomas. Of these, 39 cases (48.6%) involved the proximal stomach, 29 cases (35.8%) the distal stomach, and 11 cases (13.6%) were unspecified. Two cases showed involvement of both proximal and distal sites.

Duodenal cancers (n = 29) were all adenocarcinomas. The periampullary region was involved in 17 cases (58.6%), while the proximal (D1 and D2) and distal (D3 and D4) duodenum were involved in 7 (24.1%) and 3 (10.3%) cases, respectively. Two cases had unspecified sites.

Among colorectal cancers (n = 68), 67 cases (98.5%) were adenocarcinomas and one was undifferentiated. Left-sided tumors were observed in 39 patients (57.4%), right-sided in 23 (33.8%), both sides in three (4.4%), and the site was unspecified in three cases (4.4%). Rectal cancers constituted 25 of the 68 colorectal cancers (36.8%), with 96% being adenocarcinomas.

Dysphagia was the predominant symptom in esophageal cancer, reported in 14 out of 15 cases with recorded symptoms (93.3%).

In gastric cancer, symptom data were available for 42 patients. Epigastric pain was the most common symptom, present in 26 patients (69.1%), followed by nausea or vomiting in 7 (16.7%), weight loss in 7 (16.7%), and dysphagia in 5 (11.9%). Among the 15 duodenal cancer patients with symptom records, obstructive jaundice was the most frequent symptom (66.7%, n = 10), followed by abdominal pain, nausea/vomiting, and weight loss—each reported in 2 patients (13.3%).

In colorectal cancer, symptom data were available for 39 patients. Per-rectal bleeding was reported in 20 patients (51.3%), abdominal pain in 15 (38.5%), and altered bowel habits in 9 (23.1%).

## DISCUSSION

This observational study analyzed 203 cases of gastrointestinal (GI) epithelial malignancies diagnosed over two years at a tertiary pathology center in Nepal. Gastric cancer was the most common, followed by colorectal, duodenal, and esophageal cancers. A notable observation was the relatively younger age at presentation across all types of GI epithelial malignancies.

Our findings align with previous studies and GLOBOCAN 2020 estimates for Nepal, which report gastric cancer as the most prevalent GI malignancy, followed by colorectal cancer.<sup>4,5</sup> The preponderance of gastric cancer has been attributed to modifiable and non-modifiable risk factors. While genetics and other non-modifiable risk factors have been suggested in disease epidemiology, tackling known modifiable culprits like *Helicobacter pylori* infection, gastric ulcers, gastroesophageal reflux disease, smoking, alcohol, diet exposure to toxic chemicals, and obesity could significantly reduce disease burden.<sup>6</sup>

When it comes to the global burden, colorectal cancer beats gastric cancer in its incidence and mortality. Studies in the past have linked the incidence of colorectal cancer to a 'Westernized' lifestyle. Fat-rich, high calorie, fibre-deficient diets, fried and processed meat, obesity, and sedentary lifestyle have been linked to increasing colorectal cancer incidence.<sup>7</sup> With the ongoing epidemiological transition, Nepal has experienced a shift in overall disease burden, with non-communicable diseases claiming two-thirds of total mortality in 2015 compared to just a third in 1990.<sup>8</sup> The high prevalence of colorectal cancer in Nepal could be attributed to increasingly westernized lifestyle and dietary factors, the same that is also attributed to the shift in disease burden.

Of note, recent studies have shown in Nepal, people of the younger age groups share a high burden of colorectal cancer. This finding too, is consistent with our study of colorectal cancer diagnosed more often in people of younger age groups compared to other cancers of the gastrointestinal tract.<sup>9,10</sup> An interesting finding from our study was the higher prevalence of duodenal cancers (29 cases, 14.3% of total) compared to esophageal cancers (25 cases, 12.3% of total) which differs considerably from the GLOBOCAN estimates.<sup>2</sup> Duodenal cancers are considered rare even in the global context and so less is known about their epidemiology and behavior.<sup>11</sup> The relatively higher incidence of duodenal cancers reflected

in our study could be related to gastroenterologists preferring to send biopsies of duodenal cancer to SPL as these can be histopathologically challenging and may represent a bias. Even developed countries like Japan had no established guidelines for its management as of 2021.<sup>12</sup> The male-to-female ratio of duodenal cancer is 1.2 as per our study which differs in trend from other cancers of the GI tract that have a relatively higher male preponderance. This suggests that further research about the behavior of duodenal adenocarcinomas in the Nepalese context could help lay a foundation for understanding the epidemiology and behavior of this rare but aggressive tumor.

Esophageal cancers too are aggressive cancers with two main histological types-squamous cell and adenocarcinoma. These histological types differ in their pathophysiology, with squamous cell cancers being attributed mainly to cigarette smoking and alcohol, and adenocarcinomas to gastroesophageal reflux disease, obesity, and smoking.<sup>13</sup> The relative prevalence of these two histological types is 64% and 36% for squamous cell cancers and adenocarcinoma respectively, which is consistent with another study done at a tertiary care center in Nepal.<sup>14</sup>

This study is unique in that it encompasses 203 cases of gastrointestinal tract malignancies in Nepal over two years with meticulous details of each type. However, it is limited by its cross-sectional design and restricted study period (2017-2018), which may not fully capture evolving trends. Symptom data were missing for several patients, limiting the clinical context. Referral bias may also have inflated the number of duodenal cancer cases.

Despite these limitations, the study highlights the changing landscape of GI cancers in Nepal and the increasing burden in younger populations. Future multicenter, prospective studies and improved national cancer registries will be critical in refining our understanding of GI epithelial malignancies.

## CONCLUSIONS

Gastric and colorectal cancers were the most common gastrointestinal malignancies in Nepal, with younger-age involvement seen across all cancer types, especially colorectal cancer. The observed patterns highlight the need to re-evaluate existing screening approaches and emphasize the importance of establishing robust national cancer registries to guide future prevention and control strategies.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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