

Cancer in the Himalayas: A Study of Gastrointestinal Malignancies in the Himalayan Population

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Abstract

This study provides a detailed look at the different types of gastrointestinal cancers diagnosed and treated at Indira Gandhi Medical College (IGMC), Shimla, between August 2018 and August 2020. The research focuses on demographic characteristics, incidence rates, sex distribution, and treatment modalities of patients from Himachal Pradesh, a region characterized by unique climatic, dietary, and socio-economic factors. A total of 410 patients with biopsy-proven gastrointestinal malignancies were analysed, revealing colorectal cancer as the most prevalent (39.5%), followed by gastric cancer (36.1%), hepatobiliary cancer (11.7%), oesophageal cancer (10.7%), and small intestinal cancer (1.0%). The mean age of patients was 56.29 years, with a male predominance (60.5%). Statistical analysis revealed significant findings regarding age distribution and sex ratios across different malignancies. This study highlights the importance of focused cancer awareness and screening programs in the Himalayan region to address the increasing number of gastrointestinal malignancies.

Keywords: Gastrointestinal malignancies, epidemiology, Himalayan population, colorectal cancer, gastric cancer, Cancer Awareness

Introduction

Gastrointestinal (GI) malignancies are a global health concern, accounting for approximately 26% of all cancer cases according to the World Health Organization (WHO).¹ The incidence of these malignancies, including colorectal, gastric, esophageal, and liver cancers, varies considerably across geographical regions due to factors like diet, environment, genetics, and healthcare access.² In India, the burden of GI cancers is on the rise, but detailed data, particularly from the Himalayan region, remains limited. This study aims to address this gap by analysing the spectrum of GI malignancies at IGMC, Shimla, with a specific focus on demographic characteristics, incidence rates, and treatment modalities employed.

The Himalayan region, encompassing parts of northern India, Nepal, Bhutan, and Tibet, boasts diverse topography and climatic conditions. This unique environment fosters a distinct population with dietary habits characterized by high consumption of processed foods and limited intake of fruits and vegetables.³ These dietary patterns, coupled with environmental factors such as altitude and limited healthcare access, may potentially influence the incidence and outcomes of GI malignancies within this population. Understanding the specific epidemiology of these cancers in the Himalayan region is crucial for developing targeted public health strategies and improving patient outcomes in this underserved area.

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The primary objectives of this study were to:

1. Analyse the demographic characteristics of patients diagnosed with gastrointestinal malignancies at IGM, Shimla.
2. Determine the incidence rates of various gastrointestinal cancers in the Himalayan population.
3. Assess the sex distribution and age-related patterns of these malignancies.
4. Evaluate the treatment modalities employed for managing gastrointestinal cancers in this population.

Materials and Methods

This retrospective study was conducted at Indira Gandhi Medical College (IGMC), Shimla, over a two-year period from August 2015 to August 2017. The study was approved by the institutional ethics committee, and informed consent was obtained from all patients included in the analysis. Patients diagnosed with gastrointestinal malignancies during the study period were included in the analysis.

Inclusion criteria comprised of patients with biopsy-proven gastrointestinal malignancies and admitted to the Department of General Surgery at IGM. Exclusion criteria were, patients with metastatic deposits from non-gastrointestinal primary malignancies. Patients who were reviewed on an outpatient basis without admission. Data was collected from the hospital records, including demographic information (age, sex, and residence), clinical characteristics (type of malignancy, stage at diagnosis), treatment modalities, and clinical outcomes. The following gastrointestinal malignancies were analysed; Oesophageal cancer, Gastric cancer, Colorectal cancer, Small intestinal cancer and Hepatobiliary cancer (including gallbladder, pancreatic, cholangiocarcinoma,

and periampullary cancer)

Statistical analysis was performed using Epi Info and SPSS software. Descriptive statistics were calculated for demographic characteristics and cancer incidence rates.

Results

Table 1: Patient Demographics

Characteristic	Value
Total Patients	410
Mean Age (years)	56.29 ± 12.501
Male Patients	248 (60.5%)
Female Patients	162 (39.5%)

Table 2: Incidence of Gastrointestinal Malignancies

Malignancy Type	Frequency	Percentage
Colorectal Cancer	162	39.5%
Gastric Cancer	148	36.1%
Hepatobiliary Cancer	48	11.7%
Esophageal Cancer	44	10.7%
Small Intestinal Cancer	4	1.0%

Table 3: Age Distribution by Cancer Type

Malignancy Type	Mean Age (years)	Standard Deviation
Colorectal Cancer	54.84	13.790
Gastric Cancer	58.09	11.860
Hepatobiliary Cancer	54.96	9.702
Esophageal Cancer	55.91	12.425
Small Intestinal Cancer	61.00	15.556

Table 4: Sex Distribution of Malignancies

Malignancy Type	Male Count	Female Count	Total Count
Colorectal Cancer	82	80	162
Gastric Cancer	102	46	148
Hepatobiliary Cancer	22	26	48
Esophageal Cancer	36	8	44
Small Intestinal Cancer	4	0	4

Table 5: Treatment Modalities

Malignancy Type	Curative Surgery	Palliative Procedure
Colorectal Cancer	126	36
Gastric Cancer	106	42
Hepatobiliary Cancer	24	24
Esophageal Cancer	21	23
Small Intestinal Cancer	3	1

Table 6: Clinical Staging of Malignancies

Malignancy Type	Stage I	Stage II	Stage III	Stage IV
Esophageal Cancer	1	18	2	23
Gastric Cancer	2	16	88	42
Colorectal Cancer	-	20	106	36
Hepatobiliary Cancer	1	19	4	24
Small Intestinal Cancer	-	2	1	1

Discussion

The findings of this study indicate a higher incidence of colorectal and gastric cancers in the Himalayan population compared to national averages.⁴ The predominance of colorectal cancer aligns with global trends, where it is recognized as one of the most common gastrointestinal malignancies.⁵ The male predominance observed in this study (60.5%) is consistent with findings from other regions, where males are generally at higher risk for developing gastrointestinal cancers due to lifestyle factors such as tobacco and alcohol use.⁶ The mean age of patients diagnosed with gastrointestinal malignancies was 56.29 years, with significant findings related to the late-stage presentation of malignancies. Most patients presented at advanced stages (III and IV), highlighting the need for improved awareness and screening programs in the Himalayan region.⁷ The late presentation of patients may be attributed to various factors, including limited access to healthcare, lack of awareness about cancer symptoms, and cultural

barriers to seeking medical attention.⁸

The treatment modalities used in this study reflect the management practices for gastrointestinal cancers in our institute. A significant number of patients underwent curative surgeries, particularly for colorectal and gastric cancers. However, a notable proportion of patients underwent palliative procedures, reflecting the advanced stage at which many patients presented.⁹ This underscores the importance of early detection and intervention to improve treatment outcomes and quality of life for patients with gastrointestinal malignancies. An important aspect of gastrointestinal malignancies is the role of dietary micronutrients in cancer risk, particularly gastric cancer. Epidemiological studies have consistently demonstrated significant relationships between the intake of dietary micronutrients and gastric cancer risk.¹⁰ Micronutrients such as vitamins A, C, and E, along with minerals like selenium and zinc, have been shown to possess antioxidant properties that may protect against cancer development. However, the relationship is complex, as excessive intake of certain micronutrients can also promote carcinogenesis.¹¹ Recent research has highlighted the interaction between micronutrients and *Helicobacter pylori*, the strongest identified risk factor for gastric carcinogenesis.¹² Noto and Peek (2015) propose that essential micronutrients can affect gene expression within *H. pylori*, influencing its virulence and the host-pathogen interaction. This can facilitate the development of premalignant and malignant lesions in the stomach.¹³ For instance, a deficiency in certain micronutrients may enhance the pathogenicity of *H. pylori*, leading to increased inflammation and subsequent carcinogenic processes. Furthermore, research is ongoing to understand the role of the gastrointestinal microbiome in cancer development. Studies in humans and

animal models have linked specific microbial species to increased risk for malignancy in the stomach, colon, and potentially the esophagus. The way we eat can affect the bacteria in our gut, and these bacteria can affect our risk of cancer. Understanding how these things work together can help us find ways to eat to reduce our cancer risk.

Conclusion

This study provides critical insights into the epidemiology of gastrointestinal malignancies in the Himalayan population, highlighting the need for targeted cancer prevention and management strategies. The unique demographic and environmental factors influencing cancer incidence in this region warrant further research to understand the underlying causes and develop effective public health interventions.

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