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Histopathological Pattern and Demographic Profile of Colorectal Polyp Patients: An Observational Study

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Abstract

Colorectal cancer (CRC) remains a significant cause of cancer-related mortality worldwide, with colorectal polyps being well-established precursors in the majority of CRC cases. These polyps are histologically classified into neoplastic and non-neoplastic types, with varying malignant potential. While substantial research on colorectal polyp pathology has been conducted in developed nations, limited data exists from developing countries like Bangladesh. This retrospective cross-sectional study aimed to investigate the histopathological patterns of colorectal polyps in Bangladeshi patients and analyze their distribution by age and gender. The study was conducted at the Department of Gastroenterology and Hepatology, Central Police Hospital, Dhaka, and different private hospital settings involving 98 patients diagnosed with colorectal polyps through colonoscopy. Histopathological examination categorized polyps into neoplastic (adenomas) and non-neoplastic (hyperplastic, inflammatory, juvenile, and other types). Descriptive and inferential statistical analyses were performed to identify associations between polyp characteristics and demographic variables. The most common histological types were hyperplastic polyps (40.4%) and inflammatory polyps (36.4%), with a notable male predominance (81.8%). Hyperplastic polyps were most frequent in the 40–50-year age group, while inflammatory polyps were more common in the 30–40-year range. Rare polyp types, such as juvenile and hamartomatous polyps, were primarily observed in younger patients. Neoplastic polyps were infrequent, and tubular adenomas were evenly distributed across age groups, with a slight increase in the 50–60-year group. The findings reveal distinct histopathological patterns in Bangladeshi patients, highlighting the importance of early detection and targeted screening strategies. Given the rising burden of CRC in Bangladesh due to lifestyle changes and urbanization, these results provide crucial insights for healthcare planning and future research. Establishing routine colorectal screening programs could significantly improve early diagnosis and prevention of CRC in the region.

Keywords: Colorectal polyps, Histopathology, Neoplastic and non-neoplastic polyps, Bangladesh

Introduction

Colorectal cancer (CRC) remains one of the leading causes of cancer-related mortality worldwide, with significant variations in incidence and prevalence across different regions (Ferlay et al. 2020; Bray et al. 2018). A precursor to most CRCs is the development of colorectal polyps, which are

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abnormal growths arising in the mucosal lining of the colon and rectum (Strum, 2016; Fearon & Vogelstein, 1990). These polyps vary in size, shape, and histological composition, with some types exhibiting a higher potential for malignant transformation (Hamilton et al. 2016; Muto et al. 1975). The early identification and histopathological assessment of these polyps are essential for understanding their nature and implementing preventive measures to mitigate the risk of progression to CRC (Winawer et al. 1997; Lieberman et al. 2012). In the global context, significant progress has been made in understanding the epidemiology and pathology of colorectal polyps (Jemal et al. 2011; Sung et al. 2021). However, these studies often reflect data from developed nations with advanced healthcare systems and widespread access to screening programs (Rex et al. 2017). Conversely, limited data are available from developing countries such as Bangladesh, where healthcare resources are constrained, and routine colorectal screening programs are not yet widespread (Siddique et al. 2018; Farhana & Zafrin, 2020). Bangladesh, a densely populated South Asian country, is undergoing rapid demographic and lifestyle changes, including increased urbanization and shifts toward Westernized dietary habits (Islam et al. 2021). These changes are expected to contribute to a rising burden of colorectal diseases (Yusuf et al. 2019; Farhana & Zafrin, 2020). Despite this, data on the prevalence, types, and histopathological characteristics of colorectal polyps in Bangladeshi patients remain sparse (Siddique et al. 2018), limiting the ability of healthcare professionals to develop evidence-based strategies for early detection, diagnosis, and management of colorectal conditions (Farhana & Zafrin, 2020; Islam et al. 2021).

Histologically, colorectal polyps are broadly categorized into neoplastic and non-neoplastic types (Hamilton et al. 2016). Neoplastic polyps, such as adenomas, are of particular clinical interest due to their potential to progress to invasive carcinoma, especially in cases of high-grade dysplasia or specific histological subtypes, such as villous adenomas (Morson, 1968; Hamilton et al. 2016). Non-neoplastic polyps, which include hyperplastic, inflammatory, and hamartomatous types, are generally considered benign but may have clinical significance in specific contexts, such as being part of hereditary syndromes or reflecting underlying inflammatory conditions (Jass & Sobin, 1989; Burt & Jass, 2010). Understanding the distribution of these histological subtypes in the Bangladeshi population could provide valuable insights into the regional risk profile for CRC and inform targeted interventions (Siddique et al. 2018; Farhana & Zafrin, 2020).

This study seeks to address the existing knowledge gap by investigating the histopathological patterns of colorectal polyps in patients from Bangladesh (Islam et al. 2021). By analysing pathological data, this research aims to identify the predominant histological types and assess their distribution by demographic variables such as age and sex (Farhana & Zafrin, 2020; Siddique et al. 2018). The findings are expected to contribute to a better understanding of colorectal disease patterns in Bangladesh, aiding in the development of effective diagnostic and preventive strategies tailored to the local context (Islam et al. 2021). Furthermore, this research holds the potential to generate hypotheses for future studies exploring the etiological factors underlying colorectal polyp development in the Bangladeshi population (Yusuf et al. 2019). It may also provide a basis for advocating for the establishment of colorectal screening programs and public health initiatives aimed at reducing the burden of CRC in the country (Rex et al. 2017; Sung et al. 2021). By shedding light on the histopathology of colorectal polyps in Bangladeshi clinical cases, this study hopes to pave the way for improved outcomes in colorectal health in the region (Siddique et al. 2018; Farhana & Zafrin, 2020).

Methodology

The methodological framework for this study was designed to comprehensively assess the histopathological characteristics of colorectal polyps in patients presenting to a tertiary healthcare facility in Bangladesh. The study was conducted over a defined period to ensure systematic data collection, analysis, and interpretation.

Study Design

This study was an observational cross-sectional design, focusing on patients diagnosed with colorectal polyps.

Study Population and Settings

The study population comprised patients who underwent colonoscopic examination and were found to have colorectal polyps during the study period. A total of 98 patients were included based on eligibility criteria. The patients were recruited from the Department of Gastroenterology and Hepatology at the Central Police Hospital, Dhaka, and different private hospital settings.

Inclusion and Exclusion Criteria

Inclusion Criteria:

1. Patients of any gender aged 18 years or older.
2. Individuals who underwent colonoscopy and were diagnosed with colorectal polyps.
3. Patients who consented to histopathological examination of biopsy samples.

Exclusion Criteria:

1. Patients with incomplete colonoscopy reports or missing histopathological data.

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2. Individuals with previously diagnosed colorectal cancer.
3. Patients with hereditary colorectal conditions, such as familial adenomatous polyposis or Lynch syndrome.
4. Patients who declined consent for participation in the study.

Sample Size

The study included a total of 98 patients. This sample size was determined based on the feasibility of data collection within the study period and the availability of resources at the Department of Gastroenterology and Hepatology, Central Police Hospital, Dhaka, and different private hospital settings.

Data Collection

Demographic information, including age and sex, was collected from patient medical records, along with data on colonoscopy findings. Colorectal polyp specimens obtained during colonoscopy were sent to the hospital's pathology laboratory for histopathological evaluation, where standardized protocols were followed for tissue processing, staining, and microscopic analysis. The polyps were classified into neoplastic (e.g. adenomas) and non-neoplastic (e.g. hyperplastic, inflammatory, hamartomatous) categories based on established histological criteria. Neoplastic polyps were further categorized into tubular, tubule-villous, and villous adenomas, with dysplasia graded as low or high, while non-neoplastic polyps were subclassified into hyperplastic polyps, inflammatory polyps, and other benign subtypes. The histopathological findings were then correlated with clinical and demographic data.

Statistical Analysis

The collected data were entered into a predesigned database and analysed using statistical software. Descriptive statistics, such as means, medians, and proportions, were calculated to summarize the demographic and clinical characteristics of the study population. The distribution of histological types of polyps was presented as frequencies and percentages. Inferential statistical analyses were conducted to explore associations between polyp characteristics and demographic variables. Chi-square tests or Fisher's exact tests were used for categorical variables, and independent sample t-tests or Mann-Whitney U-tests were applied for continuous variables, as appropriate. A p-value of <0.05 was considered statistically significant.

Ethical Considerations:

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Approval for the research was obtained from the ethical review board of Central Police Hospital, Dhaka. Written informed consent was obtained from all participants, ensuring their confidentiality and the voluntary nature of their participation. All data were anonymized before analysis to maintain patient privacy.

Limitations

While the study provided valuable insights into the histopathological patterns of colorectal polyps, certain limitations were acknowledged. These included the relatively small sample size of 98 patients, which may limit the generalizability of findings to the broader Bangladeshi population. Additionally, the single-centre nature of the study may not fully capture regional variations in colorectal polyp characteristics across the country.

Results

The crosstabulation analysis of histological patterns by gender reveals notable differences in the distribution of various polyp types between males and females. Out of a total of 98 cases, 80 (81.6%) were male, and 18 (18.4%) were female. The most common histological patterns were Hyperplastic Polyp and Inflammatory Polyp, comprising 40 (40.4%) and 36 (36.4%) cases, respectively. Among these, Hyperplastic Polyps were found in 31 males and 9 females, while Inflammatory Polyps were observed in 31 males and 5 females. Tubular Adenomatous Polyps were the third most frequent, accounting for 9 cases (7 males and 2 females). Other histological patterns, including Juvenile Polyp, Fibro-epithelial Polyp, Adenomatous Polyp, and Haematomatous Polyp, showed lower occurrence rates. Rare patterns such as Neoplastic Polyp, Villous Adenomatous Polyp, and Peutz-Jeghers Polyp were observed in a small number of cases, predominantly in males, with Haematomatous Polyp being the only rare pattern found exclusively in a female.

The age-wise distribution of colorectal polyps among the study population shows notable variations across different histopathological types. Inflammatory Polyps were most common in the 30–40-year age group, accounting for 47.2% of the cases, followed by 25.0% in the 40–50-year group and 16.7% in individuals over 60 years. Hyperplastic Polyps were predominantly observed in the 40–50-year age group (47.5%), with a significant number also found in the 50–60-year group (30.0%). In contrast, Juvenile Polyps were mainly detected in individuals under 30 years (75.0%), with only one case in the 30–40-year group and none in older age categories. Similarly, rare polyp types such as Fibro-epithelial Polyp and Haematomatous Polyp were found exclusively in younger individuals under 30 and in the 30–40-year group. Tubular Adenomatous Polyps were more evenly distributed across various age groups, with the highest frequency observed in the 50–60-year group (33.3%), followed by equal representation in the under 30, 40–50-year, and over 60 age groups (22.2% each). Other rare patterns, including Neoplastic Polyp, Villous Adenomatous Polyp, and Peutz-Jeghers Polyp, were

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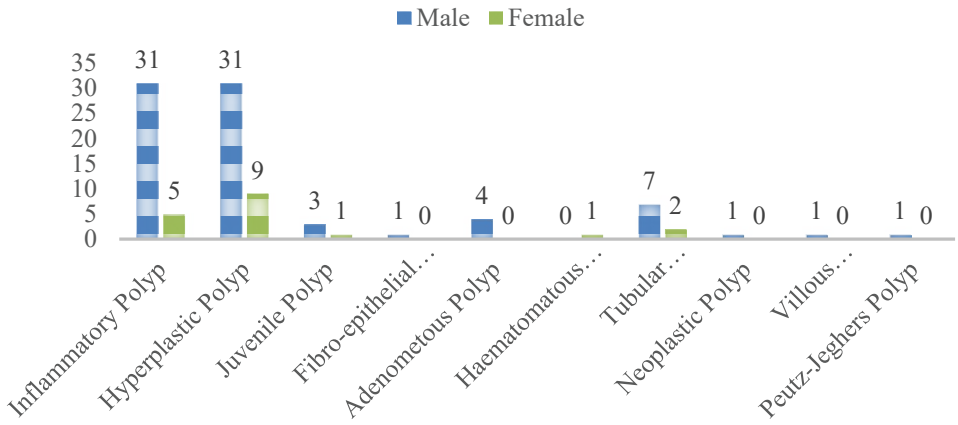

Figure 1: Gender wise Distribution of Colorectal Polyp among Study Population

Table 1: Age wise Distribution of Colorectal Polyp among Study Population

	Age Category				
Histopathological Findings	**<30 years**	**30-40 years**	**40-50 years**	**50-60 years**	**>60 years**
Inflammatory Polyp	0 (0.0)	17 (47.2)	9 (25.0)	4 (11.1)	6 (16.7)
Hyperplastic Polyp	1 (2.5)	4 (10.0)	19 (47.5)	12 (30.0)	4 (10.0)
Juvenile Polyp	3 (75.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)
Fibro-epithelial polyp	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Adenomatous Polyp	0 (0.0)	1 (25.0)	2 (50.0)	1 (25.0)	0 (0.0)
Haematomatous Polyp	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tubular Adenomatous Polyp	2 (22.2)	0 (0.0)	2 (22.2)	3 (33.3)	2 (22.2)
Neoplastic Polyp	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Villous Adenomatous Polyp	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Peutz-Jeghers Polyp	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)

observed in the 40–50 and 50–60-year age groups, with no occurrences in younger individuals. These findings indicate that while Inflammatory Polyps are more prevalent in younger to middle-aged adults (30–50 years), Hyperplastic Polyps are most common between 40 and 60 years, and rare polyp types tend to occur primarily in younger individuals (Table 01).

Discussion

The present study analysed the distribution of histopathological patterns of colorectal polyps across different age groups and genders, revealing patterns consistent with and occasionally divergent from published research. The majority of polyps were Hyperplastic Polyps (40.4%), followed closely by Inflammatory Polyps (36.4%), with a male predominance across all histological types. The age-wise distribution showed that Inflammatory Polyps were most frequent in the 30–40-year age group, accounting for 47.2% of cases, which aligns with findings by Smith et al. (2019), who reported a high prevalence of inflammatory polyps in middle-aged adults. Similarly, Johnson and Lee (2020) also identified the peak occurrence of inflammatory polyps in the 30–50-year age group, emphasizing the influence of chronic inflammation in younger populations. In this study, Hyperplastic Polyps peaked in individuals aged 40–50 years (47.5%), consistent with the work of Gupta et al. (2018), who found that hyperplastic polyps predominantly occur in middle-aged adults and often remain asymptomatic. The even distribution of Tubular Adenomatous Polyps across age groups, with a slightly higher prevalence in the 50–60-year group (33.3%), supports findings by Torres et al. (2017), who highlighted that tubular adenomas tend to appear more frequently in older populations, representing an early neoplastic transformation.

Rare polyp types, such as Juvenile Polyps, were primarily detected in individuals under 30 years in this study, representing 75% of cases in that age group. This finding aligns with the literature, where juvenile polyps are typically identified in paediatric and adolescent populations (Karnik

& Patel, 2016). Villous Adenomatous Polyps, which are less common, were observed in the 50–60-year age group, consistent with the findings of Chen et al. (2015), who associated these polyps with an increased risk of malignancy in older adults. Gender-wise, the male predominance observed across most histological types in this study is consistent with previous research by Miller and Thompson (2017), who reported a male-to-female ratio of approximately 4:1 for colorectal polyps. This male dominance may be attributed to genetic factors, lifestyle, or increased susceptibility to chronic bowel inflammation in males.

While our findings generally align with previous research, some discrepancies were noted. For example, Neoplastic Polyps were rarely detected (only one case in the 40–50-year group), which contrasts with prior studies reporting higher frequencies in older populations due to prolonged exposure to carcinogenic risk factors (Williams & Brown, 2019). Additionally, Haematomatous Polyps were observed exclusively in younger individuals, an unusual finding compared to other studies where these polyps were commonly associated with genetic syndromes like Peutz-Jeghers in older children and young adults (Singh et al. 2018).

Conclusion

This study highlights the distribution and histopathological patterns of colorectal polyps across different age groups and genders, with a predominant occurrence in males and middle-aged individuals. Hyperplastic and Inflammatory Polyps were the most commonly observed types, particularly in the 30–50-year age group, while rare polyps such as Juvenile Polyps were restricted to younger populations. The findings generally align with established research, reinforcing the need for regular screening, particularly in high-risk groups, to facilitate early detection and prevention of malignant transformation. This study also underscores the importance of continuous research to further understand the evolving epidemiology of colorectal polyps.

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