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Identification and Predictive Analysis of Colorectal Polyps Using Flexible Sigmoidoscopy: A Retrospective Cohort Study

Hamza Nawaz Cheema[1], Mohsin Asghar[1], Fatima Rehman[1], Muhammad Ali Muzaffar[1], Ibrahim Warraich[1], Musab Abdul Rehman[1]

1. Lahore Medical & Dental College (LMDC), Lahore, Pakistan.

***Corresponding Author**: Muhammad Nasir Shahbaz, **Email:** Shahbaznasir985@gmail.com, **Cell:** +923336479181

ABSTRACT

Background: Colorectal polyps are mucosal growths in the colon and rectum that may progress to cancer if not removed early. Flexible sigmoidoscopy is a common diagnostic tool for detecting these polyps, particularly in symptomatic patients, though predictive factors in younger populations remain unclear.

Objective: This study aims to analyze the characteristics of colorectal polyps diagnosed via flexible sigmoidoscopy and identify predictive factors for their presence.

Materials and Methods: We conducted a retrospective study on 1004 patients who underwent sigmoidoscopy from August 2023 to February 2024 at Ghurki Trust & Teaching Hospital, Lahore, Pakistan. The study included data from 84 patients diagnosed with colorectal polyps. Analyzed variables were age, gender, polyp count, type (pedunculated or sessile), distribution, and indications for sigmoidoscopy (bleeding vs. other). Statistical analysis using SPSS version 15 included chi-square tests and odds ratios to identify significant associations.

Results: Colorectal polyps were detected in 8.4% of patients, with a gender distribution of 7.9% in males and 8.4% in females. Sessile polyps predominated at 64.3%, and the majority of polyps were solitary (75%). Polyps primarily affected the rectum (53.6%) and were less frequently found in the sigmoid colon (21.4%), rectosigmoid junction (17.9%), and descending colon (7.1%). Significant predictors of polyp detection included age (45% in children vs. 6.5% in adults, $p < 0.001$) and indication for sigmoidoscopy (14% in cases of rectal bleeding vs. 3.3% for other reasons, $p < 0.001$). Gender was not a significant factor ($p=0.467$).

Conclusion: Sigmoidoscopy effectively detects colorectal polyps, particularly in symptomatic children and those with rectal bleeding. This highlights the need for targeted screening to improve early detection and management. Further research is required to validate these findings and refine screening guidelines.

Keywords: Colorectal polyps, Sigmoidoscopy, Predictive factors, Retrospective study, Screening strategies.

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INTRODUCTION

Colorectal polyps are mucosal projections in the colon and rectum that differ from each other in the degree to which they can be developed into colorectal cancer[1]. These polyps are divided into the neoplastic ones which include the adenomatous and serrated polyps, and the non-neoplastic ones which are the hyperplastic, juvenile and inflammatory ones, the first ones being more dangerous and the second ones being less dangerous but still needing attention because of the symptoms and complications [2, 3].The detection and removal of the polyps by the flexible sigmoidoscopy, a diagnostic tool that is quite minimally invasive, is especially useful for the lower part of the colon

to be examined by patients who have symptoms like rectal bleeding and as part of routine screening in the older adults[4]. In contrast to colonoscopy, sigmoidoscopy is a speedy, less expensive procedure and carries fewer risks, thus it is a crucial tool in the early detection of colorectal abnormalities[5]. Yet, the predictive factors for the occurrence of colorectal polyps during sigmoidoscopy, especially in various populations, have not been sufficiently defined[6]. Present-day research states that some demographic and clinical factors, for instance, age, gender, and some symptoms, are positively correlated with the possibility of polyp detection[7]. Nevertheless, there is a demand for more detailed analyses to uncover these relationships thoroughly, especially in various populations[8]. Through the identification of these predictors, the screening guidelines can be made more accurate, personalized doctors can be provided, and the earlier detection of colorectal abnormalities can be made possible[9].Early detection is emphasized as a major component of the CRC prevention process because flexible sigmoidoscopy is able to identify precancerous polyps efficiently. This is a useful method that is relatively easily performed and provides little or no discomfort to the patient and therefore will be useful in clinical diagnostic settings especially in determining risk and the appropriate prevention strategies in symptomatic individuals[10]. Addressing the detailed aspects of polyp detection that play out in the context of specific populations and clinical situations will also help to improve the accuracy and effectiveness of CRC screening, and perhaps guide adjustments to population-based programs for CRC control[11].The main objective of this research is to examine the characteristics of colorectal polyps found by sigmoidoscopy and to discover the factors that can be predictive of them. The study improves our knowledge of these relationships and thus, the advances made by it are helpful in bettering the screening protocols and preventive care which ultimately, may reduce the incidence and burden of colorectal cancer[10].

MATERIAL AND METHODS

This study was a retrospective cohort study that was carried out at a Ghurki Trust & Teaching Hospital Lahore in Lahore, Pakistan. It was aimed at determining patients who had sigmoidoscopy from august 2023 till February 2024. The objective was to delve into the features of colorectal polyps and to determine the extent to which they can be predicted by demographic and clinical indicators. Patients were included in the study if they had undergone sigmoidoscopy within the study period, resulting in a total cohort of 1004 patients. We specifically analyzed data from 82 patients who were diagnosed with colorectal polyps during the procedure. Exclusion criteria encompassed patients without complete medical records or those who had undergone other types of colorectal examinations (e.g., full colonoscopy) prior to the study period, to maintain the focus on sigmoidoscopy-based findings. Quantitative and qualitative data were collected for each patient, including: Quantitative Variables Age of the patient, count of the polyps, and the distance from the anal verge of detected polyps. Qualitative Variables Gender, age group (children <19 years, adults ≥19 years), indication for sigmoidoscopy (bleeding per rectum PR vs. other reasons), presence of a polyp stalk, and anatomical distribution of the polyps. Data analysis was performed using SPSS version 20. Descriptive statistics, including means and standard deviations, were calculated for quantitative variables, while frequencies and percentages were used for qualitative variables. The study further applied bivariate analysis to explore the relationship between polyp presence and various predictive factors. A chi-square test of independence was utilized to evaluate the associations between polyp detection and categorical variables such as gender, age groups, and reasons for undergoing sigmoidoscopy. Odds ratios (OR) with 95% confidence intervals (CI) were also computed to quantify the strength of these associations. Statistical significance was set at a p-value of less than 0.05.The study was conducted following the ethical standards of the institutional review board at the hosting medical facility. All patient data were anonymized and confidentiality maintained in accordance with HIPAA guidelines. Ethical approval certificate ERC/2024/22C was taken from Ethical Review Board of Lahore University of Biological & Applied Sciences (UBAS) , Lahore Medical & Dental College, Lahore, Pakistan

RESULTS

The study analyzed 1004 patients who underwent sigmoidoscopy, identifying colorectal polyps in 84 patients, representing an 8.4% detection rate. Of these patients, 59 were male (7.9% of the male cohort) and 23 were female (8.4% of the female cohort), indicating a slight difference in polyp detection by gender, although this was not statistically significant (p=0.467). In terms of polyp characteristics, 35.7% of the polyps were pedunculated (30 out of 84), and 64.3% were sessile (54 out of 84). A breakdown of polyp counts showed that 75% of patients had solitary polyps, 11.9% had two polyps, 3.6% had four polyps, and 9.5% had numerous polyps. Among those with numerous polyps (n=8), 62.5% were inflammatory polyps and 37.5% were diagnosed with Familial Adenomatous Polyposis. The anatomical distribution of the polyps revealed that 53.6% were located in the rectum, 17.9% at the rectosigmoid junction, 21.4% in the sigmoid colon, and 7.1% in the descending colon.A significant finding from the study was the association between the detection of polyps and the patients' age groups. Polyps were found in 45% of children (18 out of 40) compared to just 6.5% of adults (64 out of 942), with these differences yielding a p-value of less than 0.001. The primary factor for selecting to have a sigmoidoscopy was

also the strongest determinant of the polyp detection. Patients for bleeding PR checked up showed a 14% rate of polyps, considerably higher than the 3. 3% of the patients doing the procedure for something else were detected, and a p-value of less than 0. was obtained. 001. The findings from this retrospective study give us the needed information about the features and the factors of polyp prediction in the clinical environment which is why the link between the age and the reasons for sigmoidoscopy are testedThe Table-1, in short, contains the summary statistics of the patient age, polyp count, and the distance from the anal verge, showing the basic clinical and demographic data of the patient.

The Table-2 shows the features of discovered polyps including stalk presence, polyp counter, types of multiple polyps, and their anatomical distribution, which gives the readers the knowledge on the type and location of the polyps in the study population.

The Table-3 analyzes the correlation of polyp presence with gender, age, and indication for sigmoidoscopy, emphasizing significant predictive factors for polyp detection.

Table-1: Descriptive Statistics of Quantitative Variables

Quantitative Variables	Minimum	Maximum	Mean ± SD
Age (Years)	8	79	36.45 ± 19.12
Count of polyps, other than polyposis	1	3	1.50 ± 0.48
Distance from anal verge of the polyps, other than polyposis (centimetre)	7	55	21.30 ± 11.05

Table-2: Polyp Characteristics

Characteristics	Frequency (Percent)
Presence of stalk (n=84)	
Yes (Pedunculated)	30 (35.7%)
No (Sessile)	54 (64.3%)
Count of Polyps (n=84)	
Solitary	63 (75%)
Two	10 (11.9%)
Four	3 (3.6%)
Numerous	8 (9.5%)
Diagnoses of numerous polyps (n=8)	
Inflammatory polyps	5 (62.5%)
Familial Adenomatous Polyposis	3 (37.5%)
Anatomical distribution of countable polyps (n=84)	
Rectum	45 (53.6%)
Rectosigmoid junction	15 (17.9%)
Sigmoid colon	18 (21.4%)
Descending colon	6 (7.1%)

Table-3: Association of Colorectal Polyp Detection with Various Parameters

Parameter Categories	Polyps Detected	Total Cases	p-value	Odds Ratio (95% CI)
Gender				
Male	59 (7.9%)	708	0.467	1.22 (0.72-2.06)
Female	23 (8.4%)	274		
Age Group				
Children	18 (45%)	40	<0.001	0.11 (0.06-0.21)
Adults	64 (6.5%)	942		
Reason for Sigmoidoscopy				
Bleeding PR	64 (14%)	457	<0.001	0.25 (0.15-0.42)
Other Reasons	18 (3.3%)	525		

DISCUSSION

The findings of this retrospective cohort study reveal several key insights into the characteristics and predictability of colorectal polyps via sigmoidoscopy[12]. A key observation is the slightly higher prevalence of polyps among female patients compared to males, although the difference was not statistically significant[13]. This contrasts with some previous studies that suggested a higher prevalence in males, possibly indicating demographic or lifestyle differences in the population studied[14]. A significant result from the study is the markedly higher detection rate of polyps in children (45%) compared to adults (6.5%), which is strikingly significant ($p < 0.001$). This could suggest a genetic predisposition or an early onset of conditions that lead to polyp development in the Pakistani population studied[11, 15]. The reason for sigmoidoscopy, particularly bleeding per rectum, strongly predicted the presence of polyps, with a 14% detection rate in such cases. This aligns with existing literature indicating that symptomatic presentation, especially rectal bleeding in younger age groups, is a strong predictor of significant colorectal findings[16, 17, 18].The anatomical distribution of polyps, with a higher concentration in the rectum and sigmoid

colon, aligns with the common understanding of polyp development due to the physiological and fecal stasis factors predominant in these areas[19]. The high incidence of sessile polyps which is 64.3% in this study that was observed makes the fact that the need for curling examinations during sigmoidoscopy is even stronger because they are flatter and hence the detection and removal is really difficult compared with the pedunculated.[20].

CONCLUSION

The study showed that the sigmoidoscopy is a useful method for diagnosing the CRC in children with signs or specific symptoms such as bleeding rents. The data gained also points out that age factor has a great influence on prevalence of polyps; as the authors state, polyps have a high incidence with the increase of age. The patterns of symptoms and anatomical location also contribute much to the polyp identification. The research illustrates the fact that the predisposing factors of colorectal diseases ought to be known to the general pubic who should further be encouraged to participate in the relevant screening and surveillance for young and at risk groups for enhanced symptom detection and subsequent …Further follow-ups can be made to validate these outcomes in other populations and, subsequently, the screening criteria can be adjusted.

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