ORIGINAL ARTICLE

Adenoma detection rate as a quality indicator for colonoscopy.

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ABSTRACT… Objective: To determine the quality of colonoscopy in terms of adenoma detection rate in the existing local settings. **Study Design:** Cross-sectional study. **Setting:** Department of Gastroenterology, Liaquat National Hospital, Karachi, Pakistan. **Period:** February 2022 to August 2022. **Methods:** We analyzed patients having age 18 years or older, of any gender, and who had colonoscopy indications and were required to have a screening colonoscopy for diagnostic purposes. The number of procedures with at least one polyp or adenoma was classified as the polyp detection rate (PDR) and adenoma detection rate (ADR). **Result:** Total 210 patients were enrolled into the study with median age of 41.5 (29.8-56.3) years and majority were males (n=46, 69.5%). The most frequent indication for colonoscopy was constipation (n=72, 34.3%) followed by bleeding (n=78, 37.1%), chronic diarrhea (n=36, 17.1%), both constipation and diarrhea (n=21, 10%) and altered bowel habits (n=3, 1.4%). PDR and ADR were 16.2% (n=34) and 10% (n=21) respectively. Age was significantly higher among patients who were found to have polyp (p<0.001) and adenomas (p<0.001). Frequency of polyps (p=0.010) and adenomas (p=0.007) were significantly higher in male patients. **Conclusion:** The current research discovered a low rate of adenoma detection in people receiving colorectal cancer screening, and it did not meet the quality benchmarks that have been associated with higher rates of early diagnosis and cancer prevention.

Key words: Adenoma, Colorectal Cancer, Carcinoma, Colonoscopy, Polyp.

INTRODUCTION

Colonoscopy is an important modality used in the contemporary medicine. It is a crucial process for saving lives because of its adaptability and utility, both in the immediate and long-term contexts.[1] A colonoscopy is a diagnostic and curative procedure that assesses the colon, rectum, anus, and the distal portion of the small intestine (terminal ileum). "American College of Gastroenterology colorectal cancer (CRC) Screening Guidelines" advocate colonoscopy as the CRC test of choice because it has been proven to be the gold standard for CRC screening.[2,3]

A screening colonoscopy is performed to look for pre-malignant neoplasms that run the risk of developing into CRC, identify them, and remove them. According to the available research, colonoscopy screening is linked to a 52% decrease in CRC incidence and a 62% decrease in CRC mortality.[4] These figures motivated gastroenterology groups to specify what constitutes high-quality endoscopy, along with the public's demand for an objective way to assess endoscopy quality in light of frightening stories of medical blunders. The first set of quality indicators for colonoscopies were published in 2006 by a task force established in 2005 by the "American Society for Gastrointestinal Endoscopy" and "American College of Gastroenterology". Since then, these indicators have been updated, with the most recent revision appearing in 201.[5,6] The appropriate bowel preparation, cecal intubation, average withdrawal time for negative tests, complications, and adenoma detection rate are among the various quality measures.[7] Adenomas and other possible precancerous lesions must be found and completely removed for colonoscopy-based CRC screening to be successful.[3] To view a screening colonoscopy as safe, thereby reducing

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the interval colon cancer, a high adenoma detection rate is required. The adenoma detection rate (ADR), which is the proportion of individuals at average risk for CRC who had at least one adenoma or adenocarcinoma discovered during a screening colonoscopy, is the most popular quality measure. There is strong evidence to indicate an inverse relationship between interval CRC (cancer discovered after a screening colonoscopy) and ADR, which will reduce CRC-related mortality in the future. Because of this, ADR is increasingly used to evaluate the effectiveness of colonoscopies.[8]

It is essential to ensure high-quality colonoscopy in order to maximize the procedure's ability to reduce CRC incidence and death. It is well recognized that the quality of colonoscopy, including its capacity to identify lesions, varies in actual practice and is strongly impacted by the endoscopists who carry out the procedure. There is a severe lack of local literature on this subject, and the findings that are accessible report a range in the detection rate of 9.9% to 24.2%.[9,10] Furthermore, there is no established screening programme in place for CRC, similar to other common malignancies in Pakistan like breast cancer or oral cancer. As a result, it becomes extremely important to assess the standard of colonoscopy in terms of adenoma detection rate in the current conditions in order to establish and implement a standard colon cancer screening program. The objective of this research was to determine the quality of colonoscopy in terms of ADR in the existing local settings.

METHODS

This cross-sectional study was conducted at the department of gastroenterology, Liaquat National Hospital, Karachi Pakistan, during February 2022 to August 2022. When the hospital ethics committee evaluated and approved the study's execution (App#0724-2022-LNH-ERC), the study got underway. With written informed consent, patients were enrolled for this study. Inclusion criteria were 18 years of age or older, of any gender, and who had colonoscopy indications and were required to have a screening colonoscopy for diagnostic purposes. Patients undergoing colonoscopy procedure for any purpose other than diagnostic and with poor intestinal preparation were excluded from this study. Sample size of 199 was calculated by taking 24.7% adenoma detection from a previous study[11], setting confidence level at 95% and putting a precision of 6%. The approach of non-probability consecutive sampling was utilized to enlist study participants.

At Liaquat National Hospital's endoscopy suite, all colonoscopies were carried out in compliance with the acceptable standards. Colonoscopies were carried out by six different gastroenterologists with a minimum 5 years of relevant experience. For bowel preparation, a 45 ml solution of sodium phosphate made in our hospital pharmacy was given orally six hours prior to the procedure. The Boston Bowel Preparation Scale was used to measure bowel readiness. Conscious sedation was used during the colonoscopy procedure. Injection midazolam of dose 2-3 mg and nalbuphine of 2-5 mg were given through intravenous route for sedating patients. All colonoscopies were performed using the OLYMPUS manufactured EVIS EXERA III video colonoscopes [CF-H190 L/I (Olympus Corp., Europe) and CF-HQ190 L/I (Olympus Corp., United States)]. Patients depicting abnormal findings were further examined through biopsy. During the colonoscopy, polyps that were found were removed, and the pathology section received the specimens in separate formalin-containing jars. All colorectal lesions had their histopathology recorded in accordance with WHO standards. Adenoma was classified as a polyp with a tubular, tubular-villous, or villous characteristic. The number of procedures with at least one polyp or adenoma was classified as the polyp detection rate (PDR) and adenoma detection rate (ADR).

Data entry was done into IBM-SPSS Statistics version 21 to perform data analysis. Frequencies and percentages were computed summarize categorical variables. Numerical variables were assessed for assumption of normality, on finding the non-normal distribution, they were expressed as median with inter-quartile range (IQR). Chi-

square or Fisher-exact test was applied for comparing categorical variables among patients with and without adenoma and polyp. Mann-Whitney U test was applied for comparing age between two groups. Statistical significance was defined based on the two tailed p-value less than or equal to 0.05.

RESULTS

Total 210 patients were enrolled into the study with age ranging between 18-85 years. Median age was 41.5 (IQR=29.8-56.3) years and majority were males (n=46, 69.5%). Patients presented with disease duration of <1 month (n=1, 0.5%), 1-3 months (n=81, 38.6%) and >3 months (n=128, 61%). The most frequent indication for colonoscopy was constipation (n=72, 34.3%) followed by bleeding (n=78, 37.1%), chronic diarrhea (n=36, 17.1%), both constipation and diarrhea (n=21, 10%) and altered bowel habits (n=3, 1.4%). Colonoscopic findings were normal among 64 (30.5%) patients. Frequency of hemorrhoids, polyps, ulcer, colitis and abnormal growth was 76 (36.2%), 34(16.2%), 19 (9%), 15 (7.1%) and 2 (1%) respectively. Figure-1 shows the frequency of histological findings.

Age was significantly higher among those who had adenoma and polyps (p<0.001). Frequency of male gender was significantly higher among patients with adenoma (p=0.007) and polyp (p=0.010). Disease duration and indications were not significantly different among patients with and without adenoma and polyp. Table-I shows

the comparison of patients' features with polyp adenoma detection rate.
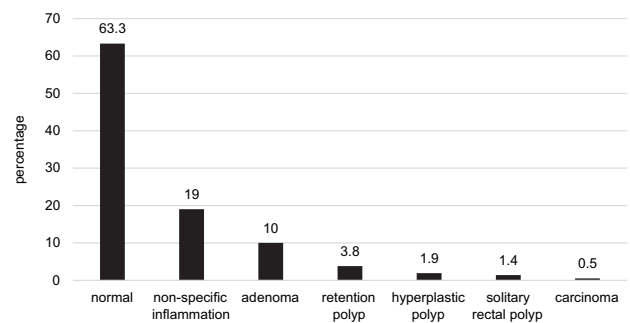

Figure-1. Frequency of histological findings

DISCUSSION

Both the incidence and mortality rates of CRC have steadily decreased, by about 1.7% and 3.2%, respectively, annually. It is thought that it is driven by improvements in surgery and therapeutic methods, early cancer detection by CRC screening, and removal of precancerous polyps with colonoscopy.[12] The goal of CRC screening is to identify early-stage CRC and remove adenomas and sessile serrated lesions. The ACG still strongly suggests CRC screening for people between the 50 to 75 years, and it tentatively suggests starting screening at 45 years.[13] The present study involved total six gastroenterologist performing the colonoscopic evaluation. The median age of patients undergoing colonoscopic screening in the present study was 41.5% years which is lower than the ACG recommended screening age.[4]

Study Variables	Presence of Adenoma		P-Value	Presence of Polyp		P-Value
	Yes	No		Yes	No	
Age	56 (53 - 72)	40 (29 - 55)	<0.001	55 (46.5 - 66.3)	37.5 (28 - 55)	<0.001
Gender						
Male	20(13.7)	126(86.3)	0.007	30(20.5)	116(79.5)	0.010
Female	1(1.6)	63(98.4)		4(6.2)	60(93.8)	
Duration of disease						
<1 month	-	1(100)	0.167	-	1(100)	0.708
1-3 months	5(6.2)	76(93.8)		12(14.8)	69(85.2)	
>3 months	16(12.5)	112(87.5)		22(17.2)	106(82.8)	
Indications						
Constipation	10(10.8)	83(89.2)	0.746	16(17.2)	77(82.8)	0.722
Bleeding	13(13.1)	86(86.9)	0.153	20(20.2)	79(79.8)	0.136
Chronic diarrhea	1(2.8)	35(97.2)	0.136	3(8.3)	33(91.7)	0.160
Bowel habit	-	3(100)	1.000	-	3(100)	1.000

This finding also reveals that in our local settings physicians are cautiously monitoring the patients and putting their efforts to properly follow the ACG guideline. However, there is variation in mean age of patients for undergoing CRC evaluation in different parts of the world. The mean age of 63.5±13.3 was reported in a Japanese study.[14] A median age of 50 years was observed in a study from Argentina.[11] The mean age as 54.36±15.05 years was reported from a Turkish study aiming to analyze characteristics of patients undergoing colonoscopy.[15] Changes in lifestyle and nutritional habits as well as genetic variances may contribute to variations in mean age at the time of screening.

PDR has been suggested as a viable substitute for ADR as an endoscopic performance metric. The ADR can be precisely calculated by using a conversion factor to the PDR. In line with the idea of utilizing PDR to predict ADR, the presence of a polyp during the colonoscopy was employed in our investigation to calculate the PDR rather than the histology report. PDR in our study was 16.2% which was consistent with other Pakistani study reporting PDR of 17.9%.[9] A PDR rate of 7.91% was also reported in another Pakistani study.[16] However, a higher PDR rate of 36.3% was observed by Delavari et al among Iranian population.[17] One of the possible reason of this higher rate could be inclusion of older patients of age 50 years and above. A study conducted in the United States analyzed total 296 colonoscopies and 131 of these patients underwent removal of one or polyps, yielding a very high rate of overall PDR (44%).[18] Variation in population features such as their life style and difference in healthcare settings and methods to interpret may cause variations in findings from region to region. Moreover, in this study we had enrolled patients screened for diagnostic purpose and have good bowel preparation which may also cause different findings.

It is advised that ADR be used as a gauge of the calibre of colonoscopic examinations because these are connected to lower rates of interval CRC. The present study demonstrated 10% ADR which was lower than the benchmark of overall ADR rates of 25%. Another Pakistani study reporting 9.9% ADR.[9] However, another Pakistani author studying the spectrum of preneoplastic and neoplastic lesions of small and large intestine biopsies reported adenoma detection in nearly quarter of the patients (24.2%). The reason of higher ADR in this study was inclusion of lesion only.[10] Higher ADR was reported from an Iranian study (33%) and US based study (33.2%).[17,19] The lower ADR rate in Pakistani studies denotes that the gap that locally there is no screening program for CRC detection.

The present study also analyzed that patients found to have adenoma and polyp were significantly older than those who were not detected to have polyps and adenomas which is agreement with other studies reporting that older age is a significant predictor of adenoma and polyp.[17,20] In this study, PDR and ADR rate was significantly higher among males than females, which is consistently report in available literature.[17,20] However, ADR rate among males and females was lower than the minimum benchmark of ADR among males (50%) and females (30%).[21] The reason of lower rate is inclusion of younger age patients. On the other hand, studies conducted in Western world were meeting this benchmark as they have implemented proper screening program in their settings.[18,20]

The study presented experience of a single center institute in Karachi. Moreover, we only enrolled limited number of patients undergoing CRC screening for diagnostic purpose and had good bowel preparations. These aspects limit the generalizability of our findings. We suggest to conduct multi-center studies with larger sample size addressing the existing gap to verify the findings of the current study.

CONCLUSION
The current research discovered a low rate of adenoma detection in people receiving colorectal cancer screening, and it did not meet the quality benchmarks that have been associated with higher rates of early diagnosis and cancer prevention.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Naik Muhammad	Conceptualized the study, Designed study protocol, Initial manuscript writing.	
2	Mansoor-Ul-Haq	Designed the study protocol, Critically revised the initial manuscript draft.	
3	Tauqeer Shaikh	Designed the study protocol, critical review.	
4	Atif Ali Hashmi	Performed data analysis and involved in result writing.	