

# Colonoscopy in Central Jamaica: Results and Implications

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## ABSTRACT

*The aim of this report was to determine the outcome of all patients subjected to colonoscopy at an outpatient medical facility in central Jamaica. A copy of the colonoscopy report of each consecutive patient during the period March 2007 to April 2011 was entered into a database and analysed. One thousand two hundred and fifty patients were identified with a mean age of 60 years and 56.5% were female. The most common indication for colonoscopy was bleeding (28%) but constipation (15%) and screening (11%) were also important. Caecal intubation was achieved in 96% of the group. While 30% of the group had normal findings, 32% had diverticulosis and 23% had haemorrhoids; importantly 10% had carcinomas and 11% had adenomas. Adenomas were detected in 13% of the screened patients. The most important predictor of an abnormal colonoscopy was a history of bleeding. The perforation rate was 0.24% with no perforations occurring in the latter 650 cases.*

**Keywords:** Colonoscopy, colorectal cancer, lower gastrointestinal bleeding

## La Colonoscopia en Jamaica Central: Resultados e Implicaciones

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## RESUMEN

*El objetivo de este reporte fue determinar la evolución clínica de todos los pacientes sometidos a colonoscopia en una clínica de consulta externa en Jamaica central. Una copia del reporte de la colonoscopia de cada paciente consecutivo durante el periodo de marzo de 2007 a abril de 2011 fue introducida en la base de datos, y luego analizada. Se identificaron un total de mil doscientos cincuenta pacientes con edad promedio de 60 años, de los cuales 56.5% eran hembras. La indicación más común para la colonoscopia fue el sangramiento (28%) pero el estreñimiento (15%) y el tamizaje (11%) fueron también importantes. La intubación cecal se logró en el 96% del grupo. Mientras que el 30% del grupo tuvo resultados normales, el 32% presentó diverticulosis y el 23% tenía hemorroides. Aún más importante: 10% tenían carcinomas y 11% tenían adenomas. Se detectaron adenomas en 13% de los pacientes tamizados. El predictor más importante de una colonoscopia anormal fue una historia de sangramiento. La tasa de perforación fue 0.24% sin que se presentaran perforaciones en los últimos 650 casos.*

**Palabras claves:** Colonoscopia, cáncer colorectal, sangramiento gastrointestinal bajo

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## INTRODUCTION

Colonoscopy is considered the gold standard for investigation of diseases affecting the large intestines. It is the

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screening investigation of choice for colorectal neoplasms and is a necessary investigation for all patients with a positive alternative investigation. Colorectal cancer (CRC) is the third most common cancer affecting both genders in Jamaica (1), and is the second leading cause of cancer-related deaths (2). Colonoscopy (screening and therapeutic) is one of the leading reasons for the recent reduction in deaths from CRC as noted in the United States of America [USA] (3).

The first successful report of total colonoscopy was in 1966 by Overholt and Pollard (4), and just over three decades later, there was a report of its use in the Jamaican population

(5). Over a 12-year period, Lee *et al* examined 335 patients with a caecal intubation rate of 33%. In keeping with the published literature, they reported the procedure to be safe and more specific than barium enema, with a range of therapeutic options. This was confirmed in the Jamaican setting with another report by Lee and Hanchard on its use in reducing the need for surgery in patients with colonic polyps (6).

Colonoscopy is not an innocuous procedure, with perforation and bleeding the main complications. Cost is another important consideration. However, given the prevalence of CRC and its importance in cancer-related mortality, plus the central role of screening colonoscopy in reducing this incidence, it is not surprising that this procedure is now in widespread use in the at-risk population. As a result, the various governing bodies have published standards to which performing physicians and their institutions are expected to adhere in the best interest of the population (7, 8). They are also encouraged to publish their results and to take advantage of opportunities to improve quality of the service offered. We hereby report the results of colonoscopy in central Jamaica, an area where this service was not regularly available. In addition, we looked at the results of a surgeon-performed outcome, which was not previously reported in the region.

## SUBJECTS AND METHODS

From March 2007 to April 2011, all colonoscopies performed by a single surgeon at an outpatient medical centre were entered in a prospective database and this report evaluates all such cases. Demographics (age, gender and parish of origin), indications for colonoscopy, caecal intubation rate, endoscopic findings and complications were analysed.

All patients were provided with a patient information document at the making of their appointment and this included bowel preparation instructions. The majority of patients were prepared with sodium phosphate solution, unless contraindicated. Prior to the performance of the procedure informed consent was obtained. Patients were routinely offered sedation with the use of titrated intravenous midazolam (dose range 2–12 mg) and each patient was provided with supplemental oxygen and monitored with pulse oximetry. Flumazenil was used selectively for reversal of sedation at the end of the procedure. Patients were provided with a report immediately after the procedure and where applicable, histology was available within two weeks. The Olympus video endoscopic system was used for all cases and colonoscopy was performed using standard techniques. The procedures were performed with the patients in the left-lateral position with the selective use of external sigmoid counter-pressure and position changes in order to achieve caecal intubation with identification of the appendiceal orifice. Cannulation of the terminal ileum was not routinely attempted. Biopsies and polypectomies were performed as indicated.

Values were expressed as counts, proportions, or means  $\pm$  standard deviations as appropriate. As there were multiple indications for some persons and multiple endoscopic findings per subject for some persons these multi-item variables were cross-classified into two-n way contingency tables. In these two-n way contingency tables, separate Pearson Chi-square statistics for each response category were performed to determine whether the probability of observing the response depended on the levels of the explanatory variable. Bonferroni method was used to adjust *p* values for multiple-tests. Multivariable logistic regression was used to examine the relationship between predictors and the odds of having normal endoscopic findings on colonoscopy. In these regression models, age was entered as a covariate. The Stata statistical software for Windows version 10 was used for the analysis.

## RESULTS

During the period, 1259 colonoscopies were performed on 1250 patients. Of these, nine were excluded from data analysis because of missing information. The sample had patients from 10 of the 14 parishes in Jamaica, but 80 per cent were from the parishes of Manchester, St Elizabeth and Clarendon. The mean age of the sample was 60.6 years (range 11–100 years) and 56.5% were females (Figure, Table

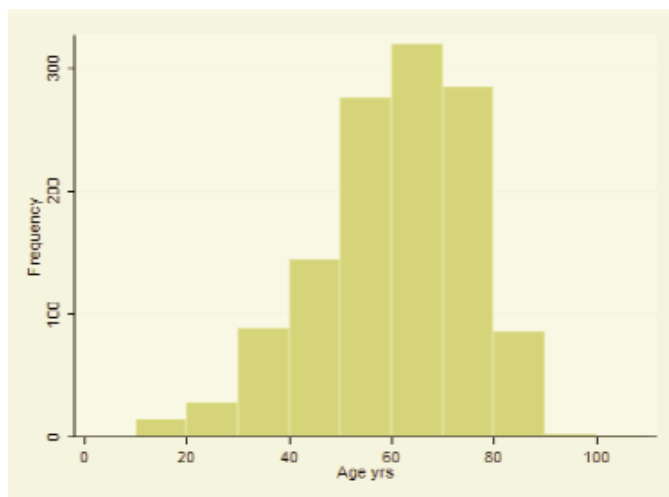


Figure: Age distribution of patients having colonoscopy.

1). There was no difference in mean age by gender (males, mean  $\pm$  SD, 61  $\pm$  15 vs females, mean  $\pm$  SD, 59  $\pm$  15 years) nor was there an association of abnormal endoscopy findings with gender. Indications for colonoscopy were clearly documented in 1250 cases and the main indications were bright red bleeding per rectum (20%), constipation (15%), lower gastrointestinal haemorrhage (8%) and screening [11%] (Table 1).

There was no significant difference in mean age of subjects whose indication for colonoscopy included screening

Table 1: Age and indications for colonoscopy

Age (years) Indication	Male n = 543 61 ± 15	Female n = 704 59 ± 15	Total 1247 60 ± 15	p-value 0.006
Screening	53	93	146	0.7 <sup>†</sup>
BRBPR	126	145	271	1.0 <sup>†</sup>
Constipation	93	104	197	1.0 <sup>†</sup>
History of polyp	10	23	33	1.0 <sup>†</sup>
History of cancer	43	49	92	1.0 <sup>†</sup>
Anaemia	18	33	51	1.0 <sup>†</sup>
Positive FOBT	22	42	64	1.0 <sup>†</sup>
Abnormal barium enema	37	40	77	1.0 <sup>†</sup>
LGIB	52	55	107	1.0 <sup>†</sup>
Change of bowel habit	31	42	73	1.0 <sup>†</sup>
Abdominal pain	26	59	85	0.2 <sup>†</sup>
Other	68	74	142	1.0 <sup>†</sup>
Total indications persons		579 543	759 704	1338 1247

<sup>†</sup>p-values – Bonferroni adjusted values

BRBPR – bright red blood per rectum; FOBT – faecal occult blood test;

LGIB – lower gastrointestinal bleed

Table 2: Age and endoscopic findings by screening indication

Age (years) Endoscopic findings	Diagnostic indications 60 ± 15	Screen indication 59 ± 9	Total 60 ± 15	p-value 0.39
Normal	299	72	371	0.001 <sup>†</sup>
Diverticulosis	371	47	418	1.0 <sup>†</sup>
UC	33	2	35	1.0 <sup>†</sup>
Polyps/adenomas	122	19	141	1.0 <sup>†</sup>
Invasive cancer	125	0	125	0.001 <sup>†</sup>
Haemorrhoids	269	22	291	0.1 <sup>†</sup>
Proctitis	13	0	13	1.0 <sup>†</sup>
Bowel obstruction	6	0	6	1.0 <sup>†</sup>
Other	27	2	29	1.0 <sup>†</sup>
Radiation proctitis	6	0	6	1.0 <sup>†</sup>
Total endoscopic case findings Persons	1271 1104	164 146	1435 1250	

<sup>†</sup>p-values – Bonferroni adjusted values

UC – ulcerative colitis

compared with those whose indications were not for screening. There were 146 subjects who had a screening colonoscopy and 1104 that had diagnostic endoscopy. As some patients had multiple endoscopic findings, there were 164 endoscopic case findings in the screened group and 1271 endoscopic case findings in the diagnostic group. A greater than expected proportion of normal endoscopic finding was reported in the group where the indication for endoscopy included screening. Conversely, a lower than expected proportion of cancer diagnosis was reported in the group where the indication for endoscopy included screening (Table 2). Of the 146 patients whose indication was screening, 32% had

diverticulosis, 13% had polyps including one patient who had an *in situ* cancer in a resected large adenoma. The 125 patients confirmed with invasive colorectal carcinomas had 64% distal to the splenic flexure while 25% were in the caecum or ascending colon.

A multivariable logistic regression was performed to determine the odds of normal endoscopic findings on colonoscopy (Table 3). Increasing age was associated with lower odds of normal endoscopic findings. Adjusting for age and gender, bleeding bright red blood from the rectum, abnormal barium enema, history of polyp and a lower gastrointestinal bleed were associated with 96%, 70%, 81% and 86% in-

Table 3: Odds for normal endoscopic findings

	Odds Ratio	p-value	Lower 95% CI	Upper 95% CI
Screening	1.43	0.28	0.75	2.75
Bright red blood per rectum	0.04	0.00	0.02	0.10
Constipation	1.23	0.50	0.68	2.22
History of polyp	0.23	0.02	0.07	0.75
History of cancer	1.45	0.30	0.72	2.93
Anemia	0.75	0.46	0.35	1.61
Faecal occult blood	1.49	0.28	0.73	3.04
Abnormal Barium enema	0.43	0.04	0.20	0.94
Lower GI bleed	0.16	0.00	0.07	0.38
Change of bowel habits	1.17	0.69	0.56	2.44
Abdominal pains	1.40	0.35	0.69	2.84
Other	0.63	0.15	0.33	1.18
Male	0.94	0.68	0.71	1.24
Age (years)	0.98	0.00	0.97	0.99

creased probability of abnormal endoscopic findings, respectively.

There was no bleeding or cardio-respiratory problem, however, three patients had perforations (0.24%). All perforations occurred at the rectosigmoid/distal sigmoid region in the first 600 cases (patients 416, 445 and 582). They were recognized during the procedures and were all treated with emergency laparotomy. One patient was treated with a colostomy (because of the extent of faecal contamination) while the others were treated with primary repair without complications. While there was no delay in treating the patient with colostomy, she developed cardio-respiratory problems and died in the intensive care unit six days after laparotomy.

## DISCUSSION

Colonoscopy is regarded as the 'gold standard' in the diagnosis of colonic diseases. It has the best sensitivity and specificity for the diagnosis of polyps and has been credited in part with the reduction in colorectal cancer in the USA. In the Caribbean, with its limited resources and intermediate incidence of colorectal cancer, it is suggested that all should have a screening colonoscopy at age 60 years of age (9). This is in keeping with the mean age of 60 years for our patients with no statistical difference in the age of patients being subjected to diagnostic colonoscopy and the asymptomatic patients. Nearly 90% of patients were symptomatic, therefore a positive finding was expected in the majority. In 30%, the indication was noticeable blood from the lower gastrointestinal tract while constipation was another important indication. Screening accounted for 11% of colonoscopies. This is an important group and even though it is held that screening colonoscopy may not be justified in developing countries (10), this group provides useful baseline information. Of significance, one patient was diagnosed with *in situ* cancer, and 13% of the screened group had adenomas resected. This may give some idea of the expected adenoma rate in the general at-risk population. It is in keeping with a

previous publication of incidental adenoma rate of 17% in a Jamaican population of mean age a decade older who had total abdominal colectomy for bleeding (11). This adenoma detection rate is thought to be a good indicator of the quality of colonoscopy (12), which in high prevalence countries, in patients over age 50 years, is about 25% in men and 15% in women (8). Given that Jamaica has CRC prevalence of about one third the number of cases seen in North America and other developed countries, we do not expect to have a similar adenoma detection rate as these countries, which accounts for the main source of the published literature. Overall, in the entire group, the adenoma detection rate was 11%. While there is great variability in adenoma detection between endoscopists (13), given the results of the screened subgroup, this finding is lower than expected and there are several possible reasons for this. These are:

Some were missed, especially in the setting of another positive finding. Using high quality computed tomography colonography, the rate of missed adenomas >1 cm ranges up to 17% (14).

The screened patients perhaps had a more careful examination, simply because they were asymptomatic.

It would have been useful to compare withdrawal times in the groups with detected polyps and those without, but this variable of quality (15) was not documented. It is generally recommended that this should average six minutes in normal examinations. Another indicator of quality is caecal intubation rate which was achieved in 96 per cent of the group. Generally, this rate is expected to be above 90 per cent and 95 per cent in the screened population (7, 15, 16). Still, our practice can be improved with the use of photographic documentation of the appendiceal orifice which is recommended (17).

When compared to the screening population and adjusting for age and gender, the significant indications predicting an abnormal finding were bleeding, and an abnormal

barium enema, while abdominal pain, constipation or a change in bowel habit and positive faecal occult blood were less likely to have an abnormal colonoscopy. This may have implications for rationalizing the colonoscopy service in the setting of limited resources. That 10% of the referred patients were diagnosed with cancer is important and in keeping with its role as a diagnostic tool. The cancer distribution was as expected with the majority being left-sided. We are still mindful that there could have been some missed cases, especially on the right side as colonoscopy may miss 4–5% of cancers (8, 18).

There is great variability in iatrogenic colonoscopy perforation with rates of 0.2 to 0.016% reported for diagnostic procedures, and up to 5% following some therapeutic interventions (19). While the often quoted acceptable perforation rates is less than or equal to 1 in 500 overall, and less than 1 in 1000 for screening (8, 20), more recent publications have had rates of 1 in 1400 overall (21). The perforation rate was 0.2% and there was one death in this study. Even though the group was composed of mostly symptomatic patients, the 1 in 420 occurring here is more frequent than is generally acceptable. It is encouraging that there was no perforation in the latter 600 cases suggesting greater expertise with time. There was no colonoscopy associated bleeding or re-admission in the group.

This report is the first large-scale report of video-colonoscopy results in the region. While it is limited by the single surgeon/single institution and retrospective analysis of the data, it provides some insight into the results and service being offered to diagnose and treat problems of the lower gastrointestinal tract. It does show that there are areas where there is room for improvement of this service.

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