

ORIGINAL ARTICLE

Utilisation and diagnostic yield of large bowel endoscopy at Korle-Bu Teaching Hospital

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Large bowel endoscopy, the most accurate diagnostic investigation of the colon and rectum has been available at the Korle-Bu Teaching for close to two decades and has been used mostly for diagnosis. This retrospective study assessed patients who have undergone large bowel endoscopy, with the aim of defining the utilization of the diagnostic yield and the predominance of the varied methods. From January 1998 to December 2011, a total of 2,151 patients comprising 1,302(60.5%) males and 763(35.5%) females underwent large bowel endoscopy. Patient age ranged from 8 to 100 years with a median age of 53 years and an inter-quartile range of 25 - 72 years. The proportion of the varied methods was: colonoscopy (832; 39%), flexible sigmoidoscopy (704; 33%), rigid sigmoidoscopy (406; 19%) and proctoscopy (192; 9%). Bleeding per rectum (57.0%) was the commonest primary complaint with an overall diagnostic yield of 48.4%. In 888(41.6%) cases no pathology was found. Haemorrhoidal disease accounted for 690(32.3%) cases followed by tumours 191(9.0%). Sigmoidoscopy (both rigid and flexible) diagnosed 141(95.3%) of the tumours and colonoscopy diagnosed the remaining 7(4.7%) tumours Complete colonoscopy was achieved in 491(59%) cases scheduled for colonoscopy. In most symptomatic cases the diagnostic yield of endoscopy was high with tumours being the second commonest diagnosis after haemorrhoids. Many of the tumours were diagnosed with the sigmoidoscope. It is therefore recommended that flexible sigmoidoscopy be made available in all hospital in Ghana.

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INTRODUCTION

Lower gastrointestinal endoscopy: proctoscopy, sigmoidoscopy and colonoscopy, is a standard investigative procedure performed on the anus, rectum and colon. It offers direct visualization of the mucosa of the intestine and the choice of modality to perform is guided by the patients' risk level for large bowel cancer and availability of type of endoscopy and expertise (Pignone *et al.*, 2002; Rex *et al.*, 2009).

Proctoscopy examines the anal canal and rectum; rigid sigmoidoscopy examines the rectum and distal sigmoid colon while the flexible sigmoidoscope examines as far as the splenic flexure of the colon.

The introduction of the flexible sigmoidoscopy has witnessed a decline in the use of the rigid sigmoidoscope worldwide because of patient comfort associated with the former, higher diagnostic yield as well as the ease of carrying out a flexible sigmoidoscope (Corman, 2005). Indeed, the gold standard colonoscopy, which examines the entire large bowel, has revolutionized the management of colonic diseases due to its relatively safe and low incidence of serious complication (Nelson *et al.*, 2002).

While this invaluable service has been provided at the Korle-Bu Teaching Hospital for close to two decades, no study has been conducted to assess the utilization and diagnostic yield of the various techniques. This study was thus conducted to provide baseline data and reference for future studies in the area of lower gastro-intestinal endoscopy and better still form the basis for protocol development and

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policy formulation on endoscopy practice in hospitals in Ghana.

MATERIALS AND METHODS

A retrospective, single centre study was conducted on consecutive patients who had lower GIT endoscopy at the Korle-Bu Teaching Hospital from January 1998 to December 2011. Data source was the register at the Endoscopy unit.

For each patient, age, gender and date of endoscopy were recorded. The indications for the test were noted and in cases where more than one indication is given, these were recorded as secondary and tertiary complaints. The type of endoscopic procedure, the extent of examination achieved and the endoscopic diagnosis were also recorded.

For patients in whom a tumour was identified at sigmoidoscopy, complete bowel examination was achieved with colonoscopy and/or barium enema. In view of the fact that the primary examination the patients were billed to undergo was sigmoidoscopy, such cases are captured under sigmoidoscopy in this study.

All procedures were performed by general surgeons and gastroenterologists, who are the endoscopists, after they have thoroughly reviewed the case. The patients comprised of those referred from hospitals and clinics within the Greater Accra metropolis as well as those receiving care in Korle-Bu Teaching Hospital.

Statistical analysis

The data extracted was entered into excel spreadsheet and later transferred to IBM SPSS version 19, New York, for statistical analysis. Chi square test was done and p value < than 0.5 for considered significant.

RESULTS

A total of 2,151 patients comprising 1,302(60.5%) males and 763(35.5%) females, with ages ranging from 8 to 100 years and a median age of 53 years (IQ range: 25 - 72 years) underwent lower gastrointestinal endoscopy within the study period under

review. Varied proportions of data for the variables studied were available, as shown in Table 1. For all age groups and the various types of endoscopy males pre-dominated females (Figure 1 and 2).

Table 1: Proportions of data available on variables studied

Variable	No. of available data	Percentage available data
Age	1950	90.7%
Sex	2065	96.4%
Date of examination	2151	100.0%
Primary Complaint	1941	90.2%
Endoscopic Diagnosis	2137	99.3%
Type of endoscopic technique	2134	99.2%
Location of Lesion	2096	97.4%

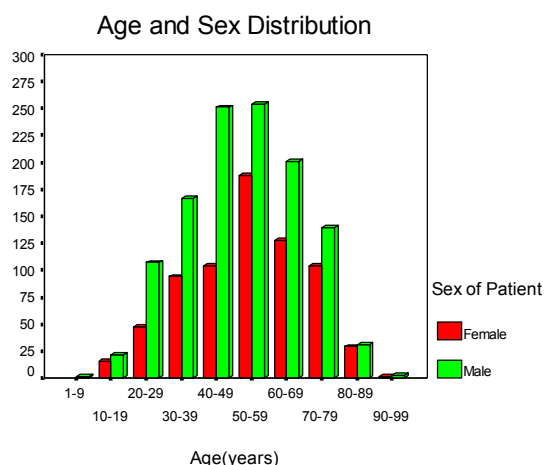


Figure 1: Age and sex distribution of the cases

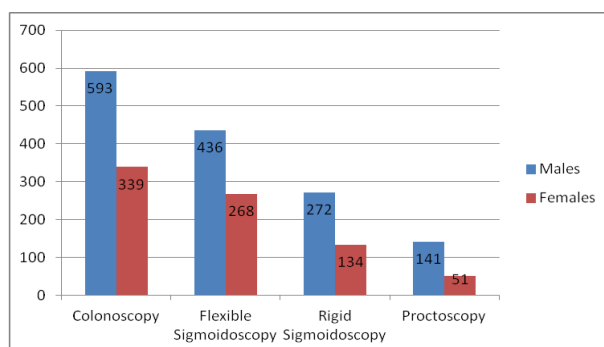


Figure 2: Distribution of the various endoscopic types by sex

There was a progressive increase in the utilization of endoscopic evaluation of the large bowel over the study period. It is worth noting that there was a drastic decline in 2007 (Table 2). The types of endoscopy performed were: colonoscopy 832(39%), flexible sigmoidoscopy 704(33%), rigid sigmoidoscopy 406(19%) and proctoscopy 192(9%) (Table 2). Before the age of 50 years usage of flexible sigmoidoscopy pre-dominate marginally followed by colonoscopy, rigid sigmoidoscopy and proctoscopy. However, after the age of 50 years usage of colonoscopy substantially pre-dominate followed by flexible sigmoidoscopy, rigid sigmoidoscopy and proctoscopy (Figure 3).

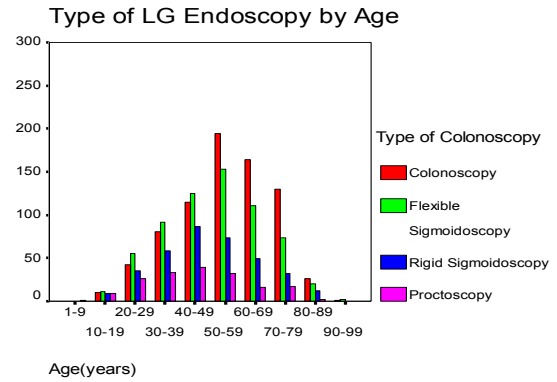


Figure 3: Types of Lower gastrointestinal endoscopy by age

Table 2: Annual frequencies of the various type of lower gastrointestinal Endoscopy

Years	Lower GI Endoscopy	Colonoscopy	Flexible Sigmoidoscopy	Rigid Sigmoidoscopy	Proctoscopy
<i>n</i>	2151	832	704	406	192
1998	39(1.8%)	15(1.8%)	7(1.0%)	16(3.9%)	0(0.0%)
1999	46(2.1%)	29(3.5%)	8(1.1%)	9(2.2%)	1(0.5%)
2000	46(2.1%)	23(2.8%)	17(2.4%)	3(0.7%)	1(0.5%)
2001	65(3.0%)	33(4.0%)	31(4.4%)	0(0.0%)	1(0.5%)
2002	95(4.4%)	40(4.8%)	48(6.8%)	3(0.7%)	6(3.1%)
2003	116(5.4%)	42(5.0%)	49(7.0%)	21(5.2%)	5(2.6%)
2004	120(5.6%)	52(6.3%)	26(3.7%)	33(8.1%)	6(3.1%)
2005	165(7.7%)	66(7.9%)	25(3.6%)	38(9.4%)	23(12.0%)
2006	190(8.8%)	99(11.9%)	43(6.1%)	39(9.6%)	9(4.7%)
2007	89(4.1%)	20(2.4%)	13(1.8%)	37(9.1%)	17(8.9%)
2008	404(18.8%)	215(25.8%)	166(23.6%)	5(1.2%)	15(7.8%)
2009	247(11.5%)	23(2.8%)	111(15.8%)	155(38.2%)	56(29.2%)
2010	246(11.4%)	106(12.7%)	109(15.5%)	19(4.7%)	9(4.7%)
2011	283(13.2%)	69(8.3%)	151(21.4%)	28(6.9%)	43(22.4%)

Bleeding per rectum (57.0%) was the commonest primary complaint. Other primary indications for lower GI endoscopy are as shown in the Table 3. When the studied population was stratified based on gender, significantly higher proportion of the males presented with bleeding per rectum (61.3%), haemorrhoids (1.8%) and anal discharge (1.2%) as compared to their female counterparts (49.3%, $p < 0.0001$; 0.7%, $p = 0.0454$ and 0.3%, $p = 0.0375$ for bleeding per rectum, haemorrhoids and anal discharge respectively). However, abdominal pain, follow-up post-surgery, abdominal mass as well as follow-up for IBD were more significantly associated

with the female as compared to the male (Table 3). Multiple complaints were noted in 263(12.2%) patients who had two complaints and 6(0.3%) patients who had 3 complaints.

No pathology was found in a large number of patients 888(41.6%). Haemorrhoidal disease was the commonest pathology identified, 690(32.3%), followed by tumours 191(9.0%). More than one pathology was identified in 97(4.5%) patients. Other diseases found are detailed in Table 4. Sigmoidoscopy (both rigid and flexible) diagnosed 141 (95.3%) of the tumours and 44(57.9%) of the

Table 3: Frequencies of the primary complaints stratified by gender

Primary Complaint	Total	Female	Male	P value
<i>n</i>	1941	696	1245	
Bleeding per rectum	1106(57.0%)	343(49.3%)	763(61.3%)	< 0.0001
Abdominal Pain	136(7.0%)	69(9.9%)	67(5.4%)	0.0002
Diarrhoea	137(7.1%)	54(7.8%)	83(6.7%)	0.3677
Follow-up post-surgery	67(3.5%)	45(6.5%)	22(1.8%)	< 0.0001
Constipation	69(3.6%)	27(3.9%)	42(3.4%)	0.5638
Anorectal Pain	58(3.0%)	23(3.3%)	35(2.8%)	0.5404
Anaemia	51(2.6%)	18(2.6%)	33(2.7%)	0.9322
Change in bowel habit	64(3.3%)	23(3.3%)	41(3.3%)	0.9892
Rectal Mass	48(2.5%)	22(3.2%)	26(2.1%)	0.1445
Abdominal Mass	38(2.0%)	21(3.0%)	17(1.4%)	0.0118
Haemorrhoids	28(1.4%)	5(0.7%)	23(1.8%)	0.0454
Follow-up for IBD	23(1.2%)	14(2.0%)	9(0.7%)	0.0119
Screening	20(1.0%)	7(1.0%)	13(1.0%)	0.9359
Fistula-in-ano	16(0.8%)	3(0.4%)	13(1.0%)	0.1519
Anal Discharge	17(0.9%)	2(0.3%)	15(1.2%)	0.0375
Weight loss	19(1.0%)	9(1.3%)	10(0.8%)	0.2931
Abnormal Barium Enema	11(0.6%)	4(0.6%)	7(0.6%)	0.9720
Follow-up after polypectomy	13(0.7%)	2(0.3%)	11(0.9%)	0.1225
Flatulent dyspepsia	4(0.2%)	0(0.0%)	4(0.3%)	0.1344
Perianal Ulcer	3(0.2%)	0(0.0%)	3(0.2%)	0.1950
Pruritus Ani	3(0.2%)	1(0.1%)	2(0.2%)	0.9273
Others	10(0.5%)	4(0.6%)	6(0.5%)	0.7842

P values were generated from chi-square analysis comparing the male and female

Table 4: Endoscopic Diagnosis of the studied population (*n* = 2134)

Primary Findings	Prevalence
Normal Findings	888(41.6%)
Haemorrhoids	690(32.3%)
Tumours	191(9.0%)
Proctocolitis	90(4.2%)
Polyp	76(3.6%)
Diverticular Disease	65(3.0%)
Anal Fissure	30(1.4%)
Fistula-in-ano	18(0.8%)
Stenosis in the colon	16(0.7%)
Upper Gastrointestinal Bleed	12(0.6%)
Pus	9(0.4%)
Pale Mucosa	8(0.4%)
Ulcerative Colitis	10(0.5%)
Others	31(1.5%)

polyps while the rest of these lesions were diagnosed with the colonoscope 7(4.7%) of the tumours and 32(42.1%) of the polyps. Caecal intubation (complete colonoscopy) was achieved in 491 (59.0%) cases that were planned to have colonoscopy.

DISCUSSION

Endoscopy has revolutionized the management of diseases of the large bowel not only because it has become the diagnostic method of choice but also a major therapeutic modality for some pathologies of the bowel (Wolff and Shinya, 1971). Consistent diagnostic endoscopic service has been available at the Korle-Bu Teaching hospital since 1995, however, trends of its utilization and diagnostic yield for large bowel symptoms has not been studied, hence, the need for this study. This study reviewed cases from 1998 because data from 1995 to 1997 were unavailable.

Being a retrospective study the inherent problem of completeness of data was encountered. Data was hand-recorded and in some cases were not legible. Despite these, the completeness of the available data of interest ranged between 90 and 100 percent which is adequate for a meaningful analysis.

There was a high utilization of Colonoscopy and flexible sigmoidoscopy in this study. This is the result of both recognition of these procedures as gold standard for evaluating and treating lesions in the colon and rectum (Cappell and Friedel, 2002) and the availability of skilled personnel carrying out these procedures in the hospital. These personnel are, however, not dedicated endoscopists contributing to the low rate of complete colonoscopy (59%). Ten general surgeons and four gastroenterologists acting as the endoscopists take turns each in the course of the week to perform the procedure. The time allotment is small for each person who performs both gastroscopies and the lower gastrointestinal endoscopies at the same sitting.

Increase use of flexible sigmoidoscopy was witnessed with a decreasing utilization of rigid sigmoidoscopy over the studied period. In 2008, the later was the least performed endoscopic procedure. This follows the worldwide trend because of the superiority of the flexible sigmoidoscope in detecting lesions and the ease of performing procedures such as biopsy and polypectomy with it (Traul *et al.*, 1983). In a retrospective study by Rao *et al.*, 33.9% of patients who were declared normal by rigid sigmoidoscopy had lesions on flexible sigmoidoscopy (Rao *et al.*, 2005).

Selection of a type of endoscopic procedure that was performed was informed by the patients' presenting symptoms and the likelihood of identifying a neoplasm which explains the predominance of flexible sigmoidoscopy over colonoscopy in patients who were aged less than 50 years, and colonoscopy exceeding flexible sigmoidoscopy in cases who were 50 years and older. The overall diagnostic yield in this study was 48.4%.

Detection of tumours in the large bowel is the single

most important reason for endoscopy either in symptomatic patients or for screening purposes (Doubeni *et al.*, 2013). In a large study involving 16,433 symptomatic cases who underwent flexible sigmoidoscopy over a 16 year period in a single colorectal unit in south of England, it was shown that the chance of missing a proximal lesion with this procedure is about 2.5% (Thompson *et al.*, 2008). In West Africa about 50% of colorectal cancers are located in the rectum of which 78% are within reach of the examining finger, with another 20% in the sigmoid, descending and splenic flexure of the colon (Dakubo *et al.*, 2010; Irabor and Adedeji, 2009; Naaeder and Archampong, 1994).

This large proportion of tumours are recognisable with the flexible sigmoidoscope hence together with its short learning curve and ease of performance, it is appropriate to recommend its wide availability in all district hospitals (where it is currently unavailable) in the country and the resident doctors taught to use it. This has the potential of increasing the detection rate of early cancers since many cases of colorectal cancer that present late to the tertiary centres will be identified early at the peripheral hospitals and then referred. About 95% of the tumours and 58% of the polyps in this study were diagnosed with the sigmoidoscope (both rigid and flexible) while about 5% of the tumours and 42% of the polyps were diagnosed with the colonoscope from this study. Right colon cancers account for about 30% of colorectal cancer (Dakubo *et al.*, 2010). The observed low rate of right colon tumours noted in this study could be as a result of the stage and presentation of these tumours. They are mostly operated upon without endoscopy because they present as large obstructing lesions in emergent states.

In this study, proctoscopy has been included as an endoscopic procedure for completeness of the data because it is routinely performed at the endoscopy unit. Its usage is limited to evaluation of the anal canal and lower rectum and permits biopsy of lesions as well as aiding in sclerotherapy of haemorrhoids. In young patients presenting with bright red bleeding and anal symptoms suggestive of haemor-

rhoids (feeling of warmth in the anus, pruritus ani, anal discharge and protruding anal mass at defaecation) this was the only test done since the likelihood that a proximal tumour will be missed is very low (Vening *et al.*, 2010). Additionally, although during sigmoidoscopy the anal canal can be visualized, it is not an effective substitute for proctoscopy.

Bleeding PR, abdominal pain, diarrhoea and constipation were the most frequent reasons for which patients underwent large bowel endoscopic procedure. These indications agree fairly well with those of the Clinical Category of European Panel on The Appropriateness of Gastrointestinal Endoscopy II (EPAGE II) (Juillerat *et al.*, 2009). This study also found that other relatively frequent indications as defined in the EPAGE II Clinical categorization guideline were pertinent and included iron deficiency anaemia, follow-up post colectomy, follow-up for IBD and screening for CRC. However, appropriateness analysis based on EPAGE II was not part of the scope of this study.

In more than one third of the patients, the colorectal mucosa and anal epithelium were deemed normal. However, it is important to note that colonoscopy was intended in only 39% of the cases. Even in this group completeness was achieved in only 59%. These may contribute to a low diagnosis rate even though patients in whom colonoscopy was incomplete had their large bowel evaluated by double contrast barium enema, the data of which was not available for this study. Haemorrhoidal disease is not uncommon in the tropics as was thought in the past. It was the commonest disease reported in 32,3% of the patients signifying that other predisposing factors to the development of haemorrhoidal disease beyond diet are at play. Other common diseases noted were tumours (9.0%), proctocolitis (4.2%), polyps (3.6%) and diverticular disease (3.0%) cases. This compares disproportionately with a European series of lower Gastrointestinal endoscopy done over an 11 year period involving 11,550 cases in which cancers accounted for 4-6%, Inflammation, 9-15%, polyps 9-16% and diverticular disease 21-37% (Loffeld and van der Putten, 2005). Diverticular disease was found in 3% of patients which is un-

derstandably lower than the 4.5% reported from this hospital in patients who presented with haematochezia (Dakubo *et al.*, 2008). Bleeding is the commonest form in which diverticular disease presents in Tropical Africa and thus explaining the earlier higher frequency of this disease (Archampong *et al.*, 1978; Baako, 2001). Notably a very rare condition in blacks in the Tropics 10 cases of ulcerative colitis were diagnosed.

In patients that colonoscopy was planned, caecal intubation was achieved in 59%. This is higher than the 30.4% complete colonoscopy reported earlier when a smaller proportion (181 patients) of this population was studied (Dakubo *et al.*, 2008). Reasons for the low complete colonoscopy rate could be due to redundancy of the colon: sigmoid and transverse colon, difficulty in achieving adequate bowel preparation due to the bulky nature of stools, and the time available for each endoscopist who performs both upper and lower gastrointestinal endoscopies at the same sitting (Kim *et al.*, 2000). This low complete colonoscopy rate falls far short of the 92% reported from other centre where the procedures are performed by dedicated endoscopists (Selehi *et al.*, 2008). It is worrying when viewed against the background that 16.2% and 7.2% of tumours are located in the caecum and ascending colon respectively in our experience (Juillerat *et al.*, 2009).

CONCLUSION

Lower gastrointestinal endoscopy is an invaluable investigative procedure and in symptomatic patients has a high diagnostic yield. Most of the tumours were diagnosed with the flexible sigmoidoscope. It is recommended that flexible sigmoidoscopy be made widely available in all health institutions in Ghana.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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Endoscopy practice in Ghana

Dakubo et al.,

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