

# Colonoscopy Findings among Patients a Sub-Saharan Hospital: A 6-year Descriptive Cross-sectional Study

Iman Hakim Din, Francis Basimbe\* and Ignatius Kakande

Department of Surgery, Mother Kevin Postgraduate Medical School, Uganda Martyrs University, Uganda

## Abstract

**Background:** Whereas Colorectal Diseases (CRD) is common throughout the world, their incidence and prevalence vary with different geographic locations worldwide. This study was aimed at determining the indications and findings at colonoscopy performed at St. Francis Hospital Nsambya Endoscopy Unit from January 2013 to December 2018.

**Methods:** This was a 6-year descriptive cross-sectional study based on registry of patients screened for colorectal diseases. The study population included all patients referred for colonoscopy at the Endoscopy Unit of St Francis Hospital Nsambya for suspected colorectal diseases. Continuous variables were presented as mean and standard deviation (SD) while categorical variables presented as proportions. Independent sample t-tests were employed for comparisons of continuous, normally distributed variables. Two-sided tests with a 0.05 significance level were used. Statistical analyses were performed using STATA 14 (Stata Corp LP, Texas).

**Results:** A total of 806 patients underwent colonoscopy at the endoscopy unit between January 2013 and December 2018. Their average age was  $53.37 \pm 18.44$  years. Males accounted for 62.5% of the cases. The most common indications for colonoscopy in descending order were Rectal Bleeding (60.6%), abdominal pain (49.1%), constipation (30.4%) anemia-unknown etiology (28.9%) and weight loss of unknown etiology (15.4%). The commonest endoscopic findings were internal haemorrhoids (35.2%), followed by colitis (27.2%), tumors (18.20%), diverticulosis (17%) and polyps (11.3%). Non-specific colitis and internal haemorrhoids increased significantly from 5% to 34% during the study period. The colonoscopy findings were normal in 18.9%.

**Conclusion:** Our study findings indicate that there is a high prevalence of colorectal diseases in our population. The most common indication for colonoscopy was Rectal bleeding while the most common endoscopic finding was internal hemorrhoids, colitis and colonic tumors.

**Keywords:** Colorectal Diseases • Colonoscopy • Endoscopy

## Introduction

Whereas Colorectal Disease (CRD) is common throughout the world, its incidence and prevalence vary with geographic location worldwide. The highest incidence and prevalence rates of colorectal disease have been reported in North America and Europe ranging from 19.5 to 20 cases per 100,000 [1]. In Low and Middle Income Countries, relatively low incidence and mortality rates have been reported (Kanavos, 2006). However, this is attributed to the general lack of CRD screening programs and poor access to standard treatment [2]. With the westernization of lifestyle, there is growing CRD rates in numerous African countries which were traditionally recognized as low risk coupled with a unique pattern of early age of onset.

Colorectal diseases (CRD) such as ileitis, colitis, angiodysplasia, diverticulosis, inflammatory bowel disease (IBD), pneumatosis coli, familial adenomatous polyposis (FAP), amoebiasis, various types of polyps, cancer, fissures, fistula, hemorrhoids and rectal varices can be investigated by colonoscopy [3]. These variances may be attributed to geographic differences or ethnic diversity. CRD incidence and prevalence rates have also varied

markedly due to differences in risk factors such as age, race, sedentary lifestyle, diet, smoking, obesity, alcohol, family history and radiation therapy [4]. In the African population, the most common indications for CRDs were reported to be frank lower gastrointestinal bleeding, chronic diarrhea, chronic constipation, occult gastrointestinal bleeding, lower abdominal and anal pain, queried anorectal cancer and entero-cutaneous fistula [5].

In developing countries, the CRDs have been observed to affect mostly the young people aged under 40 years with incidence of 22% observed in Ghana, 25% in Egypt and 35.4% in Sudan [6-10]. As such, colorectal disease in Africa seems to be more among the young than the older population who present with diagnostic and therapeutic problems of which the prognosis is less favorable. Whereas the burden of colorectal cancer (CRC) across various nations is known, there is scanty information and limited knowledge about patterns and trends of CRD in our setting. This study was aimed at determining colonoscopy findings among the patients referred to the endoscopy unit at St Francis Hospital Nsambya in last six years

## Methods

This was a descriptive cross-sectional study based on registry of patients who underwent Colonoscopy at the Endoscopy unit of St Francis Hospital Nsambya. Colonoscopies were performed by a team of two surgeons and a physician with over ten years experience in performing these procedures. A colonoscopy was considered complete when the caecum was intubated with visualization of the appendicular orifice, all lesions visualized like tumors, polyps, ulcerations, hyperemic areas were biopsied and samples taken for histological confirmation. The study recruited patients who underwent colonoscopy for colorectal diseases at endoscopy unit of St Francis Hospital Nsambya from January 2013 to December 2018. St Francis Hospital Nsambya is a tertiary teaching hospital located in the capital city, Kampala (Uganda)

\*Address for Correspondence: Francis Basimbe, Department of Surgery, Mother Kevin Postgraduate Medical School, Uganda Martyrs University, Uganda; E-mail: basimbef@yahoo.co.uk/driman84@gmail.com

**Copyright:** © 2022 Din IH, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Received:** 02 May, 2022; Manuscript No. JGPR-22-58940; **Editor Assigned:** 03 May, 2022, PreQC No. P-58940, **Reviewed:** 16 May, 2022; QC No. Q-58940, **Revised:** 21 May, 2022, Manuscript No. R-58940; **Published:** 30 May, 2022, DOI: 10.37421/2329-9126.22.10.454

with a bed capacity of 360. The hospital offers specialist services in surgery, internal medicine, pediatrics, obstetrics and gynecology. In addition, there are specialized services in urology, eye care, orthopedics, endocrinology, endoscopy, laparoscopy, mammography, HIV/AIDS, accident and emergency.

The study was carried out in the endoscopy unit department of surgery at St Francis Hospital Nsambya. The Endoscopy unit is located in the department of surgery and is open for five days a week. It attends to an average of 200 colonoscopy patients in a year from within and referrals from out of the hospital. The hospital receives patients from Kampala and surrounding districts as well as referrals specifically to the endoscopy unit from all over the country.

Permission was obtained from the hospital administration to obtain demographics, presenting complaints and colonoscopy findings of all the patients who underwent colonoscopy from January 2013 to January 2018. The information obtained was entered into a data collection tool. The demographic data like age, sex, address was used to analyze the demographic distribution of the colorectal disease seen. The colonoscopy procedures to be analyzed were performed using three Endoscopy towers, namely a Karl-Storz tower, fuginon fuginon tower and an Aohua tower [11-14].

## Results

During the study period, a total of 861 patients had colonoscopies performed at the endoscopy unit of St. Francis Hospital between 2013 and 2018. Their records were retrieved, transcribed onto a data abstraction form, entered into E17 and analyzed. Of the 861 reports retrieved, 806 (93.6%) were reports of complete colonoscopy records and 55 (6.4%) had incomplete records. Hence in the final analysis, 806 reports were included in the analysis (Figure 1).

### Demographic characteristics

This analysis showed that 302 (37.5%) were female and 504 (62.5%) were male giving a ratio of 1:1.7. The mean (standard deviation) age for the study population was 53.37 ± 18.44 years with a median (IQR) of 55(40-68) years (Figure 2 and Table 1).

### Test for age difference between genders

An independent t-test was run on a sample of 806 participants to determine if there was a difference in age based on gender, with males as the control group and females as the treatment group. The results showed that there were 504 males and 302 females randomly assigned participants with no age difference between the male 53 ± 18 years with 55 (IQR: 38.5-67) year and female (53 ± 19 year) with 55.5 (IQR: 41-68) years at the time of colonoscopy,  $t(804) = -0.4973, p = 0.310$  (Table 2).

### Test for age difference between normal and abnormal colonoscopy

Similarly, there was no difference in age between those who had normal and abnormal colonoscopy as observed from t-test results below. Those with normal colonoscopy (i.e. yes) had an average age of 52.3 ± 17 years compared to those with abnormal colonoscopy of 53.5 ± 18 years with  $t(804)=0.631$  at  $p$ -value of 0.2642 (Table 3).

### Indications for Colonoscopy

The most common indications as reported by patients was presence of Rectal bleeding with 60.55% followed by abdominal pain (49.13%), constipation (30.4%), anemia of unknown etiology (28.91%) and weight loss of unknown etiology (15.38%) (Table 4). Other indications included anal pain/disorders 2.7%, Positive Occult Blood 1.5%, Melena 1.4%, Iliac Fossa Pain 1.2% and others with 6.2% (Figure 3).

### Colonoscopy findings

In total, 654 (81.14%) abnormal colonoscopies were observed between January 2013 and December 2018. Colitis and haemorrhoids increased significantly from approximately 5% to 34% (Figure 4). Of these, the most

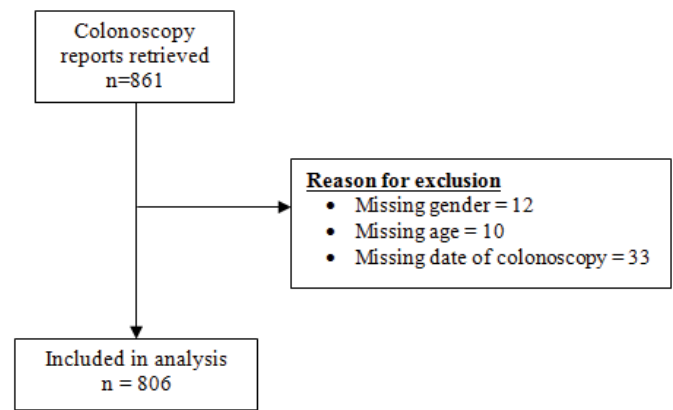


Figure 1. Information flow chart.

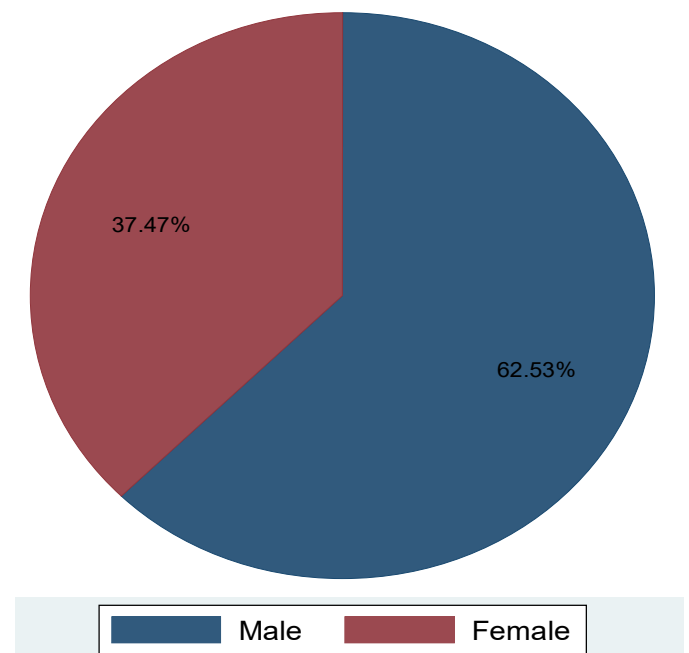


Figure 2. Gender distribution.

Table 1. Participant's information: age group by gender.

Age Groups	Male n=504(%)	Female n=302(%)
<=15	10 (1.98)	10 (3.31)
16-29	38 (7.54)	25 (8.28)
30-44	121 (24.01)	56 (18.54)
45-60	143 (28.37)	94 (31.13)
>60	192 (38.10)	117 (38.74)

commonly diagnosed condition was Haemorrhoids with 35.17%, followed by colitis 27.22%, tumors (18.20%), diverticulosis (16.97%) and polyps (11.31%). In total, 815 conditions were identified from 806 patients ((Table 5).

### Tumors

A total of 119/806 (14.76%) malignant tumors were detected between Jan-2013 to Dec 2018 with no significant difference between males and females (Table 5). Analyzing information from fig 5 above, it is visible that among patients 15 years and below, 30% of diagnosed conditions were malignant tumors. However, 75% of the diagnosed malignant tumors were detected among patients 45 years and above, with patients above 60 years accounting for 49.6% while those 45 to 60 years accounting for 31.2%. Clinical presentations observed included weight loss-unknown etiology with 50.6%, colonic tumors with 50%, anemia-unknown etiology with 26.8% and presence of hematochezia with 17.1%. Running a non-parametric test for trend, it was

**Table 2.** Stata table results for t-test for age difference in gender.

Two-sample t Test with Equal Variances						
Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Male	504	53.12698	.8022851	18.01126	51.55074	54.70323
Female	302	53.7947	1.102656	19.16212	51.62481	55.96459
Combined	806	53.37717	.6495881	18.4419	52.10208	54.65226
Diff	-	-.6677179	1.342633	-	-3.303199	1.967763
Diff = mean (Male) - mean (Female)						t = -0.4973
Ho: diff = 0			Degrees of freedom = 804			
Ha: diff < 0		Ha: diff! = 0		Ha: diff > 0		
Pr(T < t) = 0.3095		Pr( T  >  t ) = 0.6191		Pr(T > t) = 0.6905		

**Table 3.** Stata table results for t-test for age difference in terms of normal or abnormal colonoscopy.

Two-sample t Test with Equal Variances						
Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Abnormal	694	53.54179	.7073439	18.63418	52.15299	54.93058
Normal	112	52.35714	1.629633	17.24642	49.12792	55.58637
Combined	806	53.37717	.6495881	18.4419	52.10208	54.65226
Diff	-	1.184644	1.878654	-	-2.503002	4.87229
Diff = mean(No)- mean (Yes)						t 0.6306
Ho: diff = 0			Degrees of freedom = 804			
Ha: diff < 0		Ha: diff! = 0		Ha: diff > 0		
Pr (T < t) = 0.7358		Pr( T  >  t ) = 0.5285		Pr(T > t) = 0.2642		

**Table 4.** Clinical indications of patients who underwent colonoscopy between 2013 and 2018.

Indications	Count (%)	Gender	
		Male	Female
Rectal bleeding	488 (60.55)	310 (63.52)	178 (36.48)
Abdominal pain	396 (49.13)	246 (62.12)	150 (37.88)
Colonic tumor	6 (0.74)	3 (50.00)	3 (50.00)
Chronic Diarrhea	82 (10.17)	39 (47.56)	43 (52.44)
Altered bowel habits	76 (9.43)	43 (56.58)	33 (43.42)
Weight loss-unknown etiology	124 (15.38)	76 (61.29)	48 (38.71)
Anemia-unknown etiology	233 (28.91)	150 (64.38)	83 (35.62)
Other indications	362 (44.91)	230 (63.54)	132 (36.46)

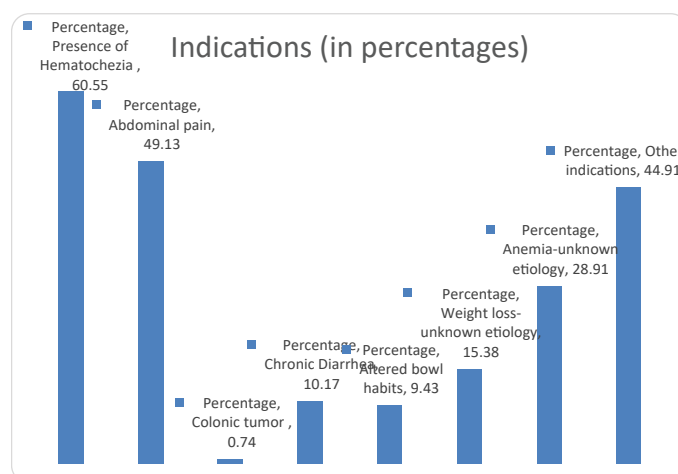
evident that diagnosis of a patient with tumor significantly increased with advancing age,  $P = 0.00117$  (Figure 5).

### Polyps

Polyps were diagnosed in 74/564 (11.31%) of the patients who presented with abnormal colonoscopy findings. Polyps were more prevalent among patients above 30 years. The overall trend using non parametric test across the age groups noted, indicated that polyps increased with increasing age  $P = 0.047$  (Figures 5 and 6). The number of polyp related colonoscopies were 199 accounting for approximately 8% of all colonoscopies done during the study period.

### Colitis

In this study colitis includes all diagnoses referred to conditions such as hyperemia, ulcerations, loss of vascular pattern, loss of colonic contour and granularity that were confirmed on histology of biopsies taken. Colitis accounted for 22% of all colonoscopy findings and was more pronounced among patients less than 45 years of age with those less than 16 years and 30 to 44 years of age taking the lion share i.e. 35% of all colitis followed by patients 16 to 29 years. Most common presentation among these patients included chronic diarrhea with 64.0%, altered bowel habits with 51.5%, abdominal pain with 27.4%, weight loss-unknown etiology with 24.0%, colonic tumor with 16.7% and Rectal Bleeding with 14.0%. Running a non-parametric test for trend, it was observed that colitis decreased with advancing age,  $P = 0.023$  [15-20].



**Figure 3.** Clinical indication/main complaints.

### Diverticular disease

Overall, 189/806 (23.45%) of the patients who underwent colonoscopy had diverticulosis while 88/806 (10.9%) had diverticulitis. Among those with diverticulosis, 58.8% presented with hematochezia, 21.7% with anemia of unknown etiology and 15.9% with abdominal pain. Among patients diagnosed with diverticulitis 17.1% presented with abdominal pain, 16.1% with anemia

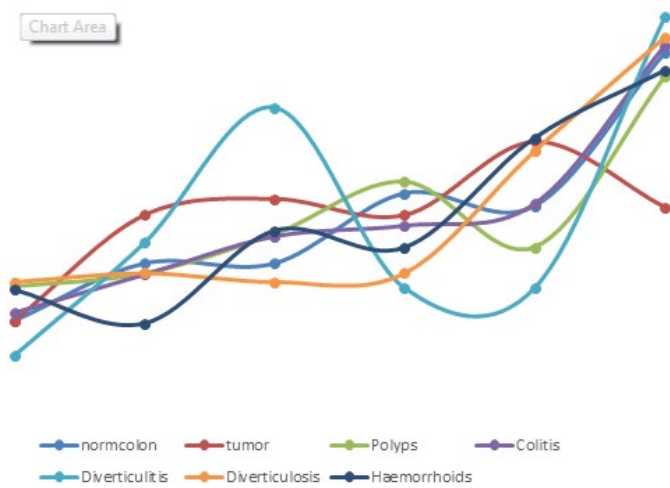


Figure 4. Trend of diagnosis by year.

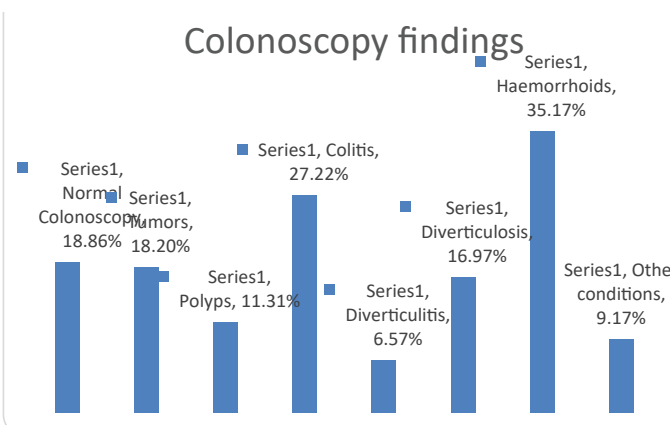


Figure 5. Frequencies of various colonoscopy diagnoses.

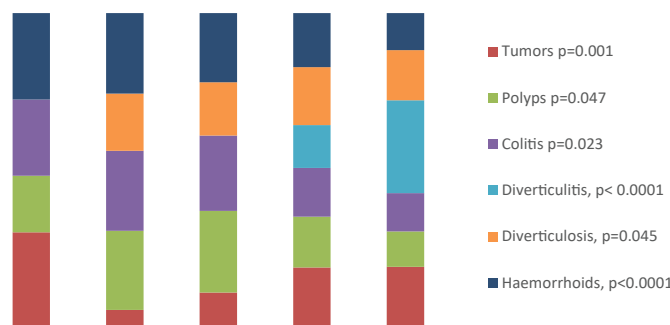


Figure 6. Diagnostic trend for commonly observed conditions by age groups.

of unknown etiology and 15.5% with hematochezia (Table 2). Of those with diverticulosis 29/189 had inflammation i.e. diverticulitis. The average age of patients with diverticulitis was  $68 \pm 11.49$  years with the youngest being 46 years and the diagnosis increased significantly with advancing age  $P < 0.0001$ . The median (IQR) for those with diverticulitis was 70 (61.5-77) vs. 52 (38-65) in those without the disease.

### Haemorrhoids

Haemorrhoids were more common among patients above the age of 30 years. Most common clinical presentations among those with haemorrhoids were presence of Rectal Bleeding with 32.9%, with 33.3% had presented with chronic anemia of unknown etiology 20.2% and 13.5% with abdominal pains. Test for trend indicates that Haemorrhoids significantly increased with advancing age,  $P = 0.000$ .

## Discussion

### Demographic characteristics

According to study findings the average (standard deviation) age for the study population was  $53.37 \pm 18.44$  years. This is similar to the Nigerian study with  $57.0 \pm 15.3$  years. However, results from the diagnostic cohort carried out in Virginia showed that the average (SD) of the study population was  $40.4 \pm 8.0$  years and these differed from results observed in our study. Further observation in terms of gender by age revealed that our study population was similar to that of a Zambian study in terms of age. The median and interquartile ranges for our male population was 55 (IQR: 38.5-67) years as compared to 45 (34-62) years of the Zambian study. Similarly females recorded 55.5 (IQR: 41-68) years compared to 49 (37-61) years of the Zambian study [21-26].

Analysis of the patient gender distribution showed that more males (62.5%) than females (37.5%) underwent colonoscopy at St. Francis Hospital Nsambya. Similar trends have been reported in other studies in Africa. Results from the colorectal disease study carried out in Zambia show that the proportion of females of 37% is similar to that recorded in our study, however, there was a difference in proportion of males 55% compared with our results. Our results are similar to results obtained in Nigeria in which gender distribution was 61.6% males and 38.4% [27-30].

### Colonoscopy findings among patients who attended the endoscopy unit

Overall, haemorrhoids were the most common findings closely followed by colitis. The detection of colitis, diverticulosis and haemorrhoids increased over this time period while diverticulitis increased sharply between 2013 and 2015 and dropped in 2016 and again increased between 2017 and 2018. Whereas our study shared similar findings for haemorrhoids with the Zambian study, there are differences in the second most prevalent condition. In our study the second most prevalent condition was colitis compared to tumors in the Zambian study.

Although its etiology and pathogenesis are not clearly defined, colitis is a systemic disease associated with a number of troublesome events and was believed to affect whites in the past. Our study findings detected 27.2% of colitis (21.0% being male vs 23.8% female) which is similar to findings from 21.2% extensive colitis observed in this study carried out in Korea. However, our findings lie within the estimated ranges of colitis i.e. from 11.0% to over 37% observed in western countries. Compared using gender to other findings elsewhere, our findings are similar to those observed in a Northern France study where prevalence of IBD has an equal distribution between the genders but different in results observed from Brazil and Portuguese in which there were more female patients [31-35].

There is paucity of information on colonic polyps in St. Francis Hospital Nsambya. In this study, polyp detection rate of 11.31% with the mean age being  $57 \pm 22$  years. These polyp detection rate results are different from those observed in the African population in Zambia (8%), Zimbabwe (5%), and Kenya (6.5%) [36-39]. These results also differ from those reported in population as observed in a meta-analysis from the United States in which the overall prevalence of polyps was 30%. Differences were also observed in polyp population mean age are different from results observed in an African-American population in the District of Columbia-US in which the average (SD) age of polyps was  $63 \pm 12$  years. Our results also differ from the overall polyp detection rate of 17.3% observed in a study at University of Ilorin Teaching Hospital, Ilorin, Nigeria which was 16.1% and a mean age of 57 years. However, similar results were reported in two Nigerian studies in which the PDR was 10.3%. Contrary to anatomical part findings in US study where more polyps were found on the left side compared to right side of the colon, in our study, polyps were evenly distributed across the left and right sides (i.e. ascending colon 14.88%, descending colon 14.16%) [40-44].

Once thought to be rare, Diverticular disease of the colon has been observed in African populations. However, the disease is among the most prevalent conditions in western society and is among the leading reasons

**Table 5.** Clinical indications by colonoscopic findings (conditions).

Colonoscopic Findings	Presence of Hematochezia	Abdominal pain	Colonic tumor	Chronic Diarrhea	Altered bowel habits	Weight loss-unknown etiology	Anemia-unknown etiology	Other indications	Total
Normal colonoscopy	12	39	0	3	8	12	18	83	175
Tumor	105	71	3	5	9	78	85	91	447
Polyps	50	24	0	4	7	7	40	23	155
Colitis	86	130	1	64	53	37	31	45	447
Diverticulitis	38	34	0	3	3	3	23	24	128
Diverticulosis	95	81	0	3	6	3	51	47	286
Haemorrhoids	202	64	2	12	11	10	64	88	453
Other conditions	26	31	0	6	6	4	5	65	143
<b>Total</b>	<b>614</b>	<b>474</b>	<b>6</b>	<b>100</b>	<b>103</b>	<b>154</b>	<b>317</b>	<b>466</b>	<b>2234</b>

for outpatient visits and causes of hospitalization. In our study, Diverticulosis detection was 13.77% with an average age of  $67 \pm 12$  years, more males than females (15.67 vs 10.60). Similar findings were observed in a Nigerian study with 10.6% and South African study that reported 13.5% prevalence of diverticulosis (Vally et al., 2017, Oluyemi and Odeghe, 2016). In this study abdominal pain 81/286 (28.3%) was the second most common clinical indication after hematochezia 95/286 (33.2%) associated with diverticulosis and 41.67% of diverticulosis was observed on the left side of colon compared to 34.5% on the right side of the colon. This finding benefits from Delvaux's observation in which he suggested that Left-sided diverticulosis was largely age dependent and is uncommon in those under 40 years but increasing up to 65% in those aged 65 years or above (Delvaux, 2003). As implied, the detection of Diverticulosis was observed to increase with increasing age groups with none being observed in those below the age 30 years, 1.8% for below 45 years, 27% for 45-60 years and 71.2% among those above 60 years. Similar trends were observed in studies carried out in the European continent in which detection of diverticulosis increased with increasing age. These results also affirm the notion that episodes of mild non-specific abdominal pain are attributed to diverticular disease (Stollman and Raskin, 2004). However, in a Zambian Study, majority of diverticular disease was observed to be on right-side of the colon, in contrast to the European, North American distribution and our study finding [45-47].

Although difficult to ascertain, haemorrhoids are swollen blood vessels in the lower rectum that present in many patients as minor lesions who do not seek medical advice. In our review, haemorrhoids were the most common diagnosis with a prevalence of 37.8% with a mean age of  $46 \pm 18$  years. Whereas these results were different from those observed in the Zambian study i.e. 26% similar and Nigerian study with 21%, they are similar to results presented in a study carried in Austria which reported a prevalence of 39%. However, another Nigerian study reported the prevalence to be as high as 43% and 50.6%. Rectal bleeding is a common presentation in patients with haemorrhoids. In terms of population age, our study revealed a young population with haemorrhoids when compared to results reported in an Austrian study in which an older population of patients acquired haemorrhoids of 61.68 years. The most common indication reported in our study and observed in those with haemorrhoids was presence of hematochezia with 44.6%, abdominal pain and anemia-unknown etiology with 14.1% [48-50].

### Clinical Indications among patients who attended the endoscopy unit

In our study, Indications for colonoscopy were presence of PR Bleeding 88 (60.6%), Abdominal pain 396 (49.1%), constipation (30.4%), Colonic tumor 6 (0.74%), Chronic Diarrhea 82 (10.2%), Altered bowel habits 76 (9.4%), Weight loss-unknown etiology 124 (15.4%), Anemia-unknown etiology 233 (28.9%); other indications 362 (44.9%). Among the other indications was constipation with 30.4%, anal pain/disorders 2.7%, Positive Occult Blood 1.5%, Melena 1.4%, Iliac Fossa Pain 1.2% and others with 6.2%.

In a Nigerian study, commonly reported indication for colonoscopy included rectal bleeding 42.9%; suspected colorectal cancer 23.2%; abdominal pain 7.6%; chronic diarrhea 6.2%; surveillance colonoscopy 4.2%; constipation

3.8%; change in bowel habits 3.1%; occult bleeding 2.1%; others 20 (6.9%). Endoscopic findings were normal findings 30.8%; hemorrhoids 30.4%; colonic polyps 17.3%; diverticulosis 11.8%; rectal cancer 10.0%; colon cancer 8.3%; colitis 6.6%; others 4.5%. The findings were not mutually exclusive [51-56].

### Study limitation

The study results are also biased towards those patients who can afford colonoscopy at a privately funded facility which affects generalizability of findings. The absence of weight and height measurements affected our ability to assess influence of Body Mass Index (BMI) to the development of haemorrhoid Incomplete or missing data contributed to reduction in sample number due to exclusion of colonoscopy reported at St. Francis Hospital Nsambya. Since we do not intend to study exposures and risk factors, we are not in a position to evaluate the causes of disease prevalence which may limit planning by the healthcare system for exposure reduction and screening program for the population groups at risk [57-60].

### Conclusion

The most prevalent colorectal diseases in our population were haemorrhoids, colitis, tumors diverticulosis and polyps. hematochezia, abdominal pain, constipation and Anemia of unknown etiology were the most prevalent indications among the population.

### Conflict of Interest

The authors declare no conflict of interest.

### References

1. Abdalla, Ahmed, M.T. Musa, A.R. Randa Zaki and M. Khair. "Presentation of colorectal cancer in Khartoum teaching hospital." *Sudan J Med Sci* 2 (2007): 263-265.
2. Agyemang-Yeboah, Francis, Joseph Yorke and Christian Obirikorang, et al. "Patterns and presentations of colorectal cancer at Komfo-Anokye teaching hospital Kumasi, Ghana." *Pan African Med J* 28 (2017): 142-142.
3. Al-Shamali, Mohammed A., Maher Kalaoui and Fuad Hasan, et al. "Colonoscopy: Evaluating indications and diagnostic yield." *Ann Saudi Med* 21 (2001): 304-307.
4. Alatise, O.I, A.O. Arigbabu, A. E. Agbakwuru and O.O. Lawal, et al. "Polyp prevalence at colonoscopy among Nigerians: A prospective observational study." *Nigerian J Clin Prac* 17 (2014): 756-762.
5. Alatise, O.I, A.O. Arigbabu, E.A. Agbakwuru and O.O. Lawal, et al. "Spectrum of colonoscopy findings in Ile-Ife Nigeria." *Nigerian Postgraduate Med J* 19 (2012): 219-224.
6. Bafandeh, Yousef, and Fereshteh Yazdanpanah. "Distribution pattern of colorectal diseases based on 2300 total colonoscopies." *Gastroenterol Hepatol* 10 (2017): 90.
7. Barreiro-de Acosta, Manuel, Fernando Magro and Daniel Carpio. "Ulcerative

- colitis in Northern Portugal and Galicia in Spain." *Inflammatory Bowel Dis* 16 (2010): 1227-1238.
8. Blachut, Katarzyna, Leszek Paradowski and Jerzy Garcarek. "Prevalence and distribution of the colonic diverticulosis. Review of 417 cases from Lower Silesia in Poland." *Rom J Gastroenterol* 13 (2004): 281-285.
  9. Bojuwoye, Matthew O., Abdulfatai B. Olokoba and James A. Ogunmodede, et al. "A clinicopathological review of colonic polyps in a tertiary hospital in north Central Nigeria." *Sudan J Med Sci* 13 (2018): 277-288.
  10. Calton, Brook A., James V. Lacey Jr and Arthur Schatzkin, et al. "Physical activity and the risk of colon cancer among women: A prospective cohort study (United States)." *Int J Cancer* 119 (2006): 385-391.
  11. Cappell, Mitchell S. "Pathophysiology, clinical presentation, and management of colon cancer." *Gastroenterol Clin North Am* 37 (2008): 1-24.
  12. Cha, Jae-Myung, Richard A. Kozarek and Danielle La Selva, et al. "Findings of diagnostic colonoscopy in young adults vs. findings of screening colonoscopy in patients aged 50 to 54 years: A comparative study stratified by symptom category." *Gastrointest Endoscopy* 82 (2015): 138-145.
  13. Cho, Eunyoung, Stephanie A. Smith-Warner and John Ritz, et al. "Alcohol intake and colorectal cancer: A pooled analysis of 8 cohort studies." *Ann Int Med* 140 (2004): 603-613.
  14. Da Silva, Bruno César, Andre Castro Lyra and Carlos Maurício Cardeal Mendes, et al. "The demographic and clinical characteristics of ulcerative colitis in a Northeast Brazilian population." *BioMed Res Int* 20 (2015): 1-4.
  15. Delvaux, M. "Diverticular disease of the colon in Europe: epidemiology, impact on citizen health and prevention." *Alimentary Pharmacol Therap* 18 (2003): 71-74.
  16. Desai, H.G. and P.A. Gupte. "Increasing incidence of Crohn's disease in India: Is it related to improved sanitation." (2005).
  17. Najar, F.A., M. Faisal, A. Khesal, and T. A. Ansari. "Prevalence of hemorrhoid among the patients visiting surgery OPD at Nium hospital." *Eur J Biomed* 5 (2018): 435-437.
  18. Ferlay, Jacques, Isabelle Soerjomataram and Rajesh Dikshit, et al. "Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012." *Int J Cancer* 136 (2015): E359-E386.
  19. Gado, Ahmed, Basel Ebeid and Anthony Axon, et al. "Colorectal cancer in Egypt is commoner in young people: Is this cause for alarm?." *Alexandria J Med* 50 (2014): 197-201.
  20. García, A.Z. Gimeno, Y. Gonzalez and E. Quintero, et al. "Clinical validation of the European Panel on the Appropriateness of Gastrointestinal Endoscopy (EPAGE) II criteria in an open-access unit: A prospective study." *Endoscopy* 44 (2012): 32-37.
  21. Gimeno-García, Antonio Z and Enrique Quintero. "Colonoscopy appropriateness: Really needed or a waste of time?." *World J Gastroint Endoscopy* 7 (2015): 94.
  22. Heitman, Steven J., Paul E. Ronskley and Robert J. Hilsden, et al. "Prevalence of adenomas and colorectal cancer in average risk individuals: A systematic review and meta-analysis." *Clin Gastroenterol Hepatol* 7 (2009): 1272-1278.
  23. Holmes, Ashley C., Anders H. Riis and Rune Erichsen, et al. "Descriptive characteristics of colon and rectal cancer recurrence in a Danish population-based study." *Acta Oncologica* 56 (2017): 1111-1119.
  24. Hou, Jason K., Jennifer R. Kramer and Peter Richardson, et al. "The incidence and prevalence of inflammatory bowel disease among US veterans: a national cohort study." *Inflammatory Bowel Dis* 19, (2013): 1059-1064.
  25. Ries, L.A.G. D. Melbert, M. Krapcho and D.G. Stinchcomb, et al. "SEER cancer statistics review, 1975-2005." *Bethesda, National Cancer Institute* 2999 (2008).
  26. Ismaila, B. O. and Michael A. Misauno. "Colonoscopy in a tertiary hospital in Nigeria." *J Med Tropics* 13 (2011): 72-74.
  27. Juillerat, Pascal, Isabelle Peytremann-Bridevaux and J.P. Vader, et al. "Appropriateness of colonoscopy in Europe (EPAGE II)-presentation of methodology, general results, and analysis of complications." *Endoscopy* 41 (2009): 240-246.
  28. Kanavos, Panos. "The rising burden of cancer in the developing world." *Ann Oncol* 17 (2006): viii15-viii23.
  29. Katsidzira, Leolin, Innocent Tichaona Gangaidzo, Munyaradzi Paul Mapingure and Jonathan Arthur Matenga. "Retrospective study of colorectal cancer in Zimbabwe: Colonoscopic and clinical correlates." *World J Gastroenterol* 21 (2015): 2374.
  30. Kayamba, Violet, Kate Nicholls, Catrin Morgan and Paul Kelly. "A seven-year retrospective review of colonoscopy records from a single centre in Zambia." *Malawi Med J* 30 (2018): 17-21.
  31. Keding, G.B, J.M. Msuya, B.L. Maass and M.B. Krawinkel. "Dietary patterns and nutritional health of women: The nutrition transition in rural Tanzania". *Food Nutr Bull* 32 (2011): 218-226.
  32. Laiyemo, Adeyinka O., Otis Brawley and David Irabor. "Towards colorectal cancer control in Africa." *Int J Cancer* 138 (2016): 1033.
  33. Maletnlema, T.N. "A Tanzanian perspective on the nutrition transition and its implications for health." *Public Health Nutrition* 5 (2002): 163-168.
  34. Mbengue, M., D. Dia, M.L. Diouf and M.L. Bassène, et al. "Contribution of colonoscopy to diagnosis of rectal bleeding in Dakar (Senegal)." *Medecine Tropicale: Revue du Corps de Sante Coloniale* 69 (2009): 286-288.
  35. McMichael, A.J. "Food, nutrition, physical activity and cancer prevention. Authoritative report from World Cancer Research Fund provides global update." *Public Health Nutri* 11 (2008): 762-763.
  36. Molinie, F., C. Gower-Rousseau, T. Zyet and V. Merle, et al. "Opposite evolution in incidence of Crohn's disease and ulcerative colitis in Northern France (1988-1999)." *Gut* 53 (2004): 843-848.
  37. Molodecky, Natalie A., Shian Soon and Doreen M. Rabi, et al. "Increasing incidence and prevalence of the inflammatory bowel diseases with time, based on systematic review." *Gastroenterol* 142 (2012): 46-54.
  38. Moore, Steven C., Preetha Rajaraman and Robert Dubrow. "Height, body mass index, and physical activity in relation to glioma risk." *Cancer Res* 69 (2009): 8349-8355.
  39. Nouriae, Mehdi, Fatemeh Hosseinkhah and Hassan Brim. "Clinicopathological features of colon polyps from African-Americans." *Digestive Dis Sci* 55 (2010): 1442-1449.
  40. Obonna, G.C, A.O. Arowolo and A. Agbakwuru. "Experience with colonoscopy in the riverine southwestern Nigeria." *J West African Coll Surgeons* 2 (2012): 63.
  41. Ogutu, E.O, F.A. Okoth and G.N. Lule. "Colonoscopic findings in Kenyan African patients." *East African Med J* 75 (1998): 540-543.
  42. Oluyemi, Aderemi and Emuobor Odeghe. "Diverticular disease at colonoscopy in Lagos State, Nigeria." *Nigerian Med J* 57 (2016): 110.
  43. Onyekwere, C.A, J.N. Odiagah, O.O. Ogunleye and C. Chibututu, et al. "Colonoscopy practice in Lagos, Nigeria: A report of an audit." *Diag Therap Endoscopy* 20 (2013): 1-4.
  44. Oostindjer, Marije, Jan Alexander and Gro V. Amdam. "The role of red and processed meat in colorectal cancer development: A perspective." *Meat Sci* 97 (2014): 583-596.
  45. Park, Seon Mee, Dong Soo Han, Suk-Kyun Yang and Weon-Seon Hong, et al. "Clinical features of ulcerative colitis in Korea." *Korean J Int Med* 11 (1996): 9.
  46. Patel, Keyur and Neville E. Hoffman. "The anatomical distribution of colorectal polyps at colonoscopy." *J Clin Gastroenterol* 33 (2001): 222-225.
  47. Riss, Stefan, Friedrich Anton Weiser, Katrin Schwameis and Thomas Riss, et al. "The prevalence of hemorrhoids in adults." *Int J Colorectal Dis* 27 (2012): 215-220.
  48. Shayo, Grace A and Ferdinand M. Mugusi. "Prevalence of obesity and associated risk factors among adults in Kinondoni municipal district, Dar es Salaam Tanzania." *BMC Public Health* 11 (2011): 1-7.
  49. Iqbal Siddique, Krishna Mohan, Fuad Hasan and Anjum Memon, et al. "Appropriateness of indication and diagnostic yield of colonoscopy: First report based on the 2000 guidelines of the American Society for Gastrointestinal Endoscopy." *World J Gastroenterol* 11 (2005): 7007.
  50. Siegel, Rebecca, Carol DeSantis, and Ahmedin Jemal. "Colorectal cancer statistics, 2014." *Cancer J Clin* 64 (2014): 104-117.
  51. Stollman, Neil and Jeffrey B. Raskin. "Diverticular disease of the colon." *Lancet* 363 (2004): 631-639.
  52. Sule, A.Z and B.M. Mandong. "Malignant colorectal tumours in patients 30 years and below: A review of 35 cases." *Central African J Med* 45 (1999): 209-212.

53. Tanner, Marcel and Z. Lukmanji. "Food consumption patterns in a rural Tanzanian community (Kikawila village, Kilombero District, Morogoro Region) during lean and post-harvest season." *Acta Tropica* 44 (1987): 229-244.
54. Govender, M., M. Vally, and M.Z. Koto. "An investigation of diverticular disease among black patients undergoing colonoscopy at Dr George Mukhari Academic Hospital, Pretoria, South Africa." *South African Med J* 107 (2017): 137-139.
55. Van Blarigan, Erin L and Jeffrey A. Meyerhardt. "Role of physical activity and diet after colorectal cancer diagnosis." *J Clin Oncol* 33 (2015): 1825.
56. Zhang, Xiaoxiao, Edward L. Giovannucci and Kunling Wun, et al. "Magnesium intake, plasma C-peptide, and colorectal cancer incidence in US women: A 28-year follow-up study." *British J Cancer* 106 (2012): 1335-1341.
57. Wolin, Kathleen Y, Alpa V. Patel and Peter T. Campbell. "Change in physical activity and colon cancer incidence and mortality." *Cancer Epidemiol Prevention Biomark* 19 (2010): 3000-3004.
58. Zavoral, Miroslav, Stepan Suchanek and Filip Zavada. "Colorectal cancer screening in Europe." *World J Gastroenterol* 15 (2009): 5907.
59. Zheng, Jia Ju, Xia Shuang Zhu and Zhao Huangfu. "Crohn's disease in mainland China: A systematic analysis of 50 years of research." *Chinese J Digestive Dis* 6 (2005): 175-181.
60. Zheng, Wei and Sang-Ah Lee. "Well-done meat intake, heterocyclic amine exposure, and cancer risk." *Nutr Cancer* 61 (2009): 437-446.

**How to cite this article:** Din, Iman Hakim, Francis Basimbe and Ignatius Kakande. "Colonoscopy Findings among Patients a Sub-Saharan Hospital: A 6-year Descriptive Cross-sectional Study." *J Gen Prac* 10 (2022): 454.