A seven-year retrospective review of colonoscopy records from a single centre in Zambia

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Abstract

Introduction

Colorectal disease is common throughout the world, but the spectrum of diagnoses across Africa remains largely unexplored. There is anecdotal evidence of changing colorectal disease but this has not been systematically investigated. The aim of this study was to enhance our insight into the spectrum of colonoscopic diagnoses in Zambia.

Methods

We retrieved written colonoscopy reports from January 2008 to December 2015. Collected data were coded by experienced endoscopists and analysed by age, sex, referral source, indication and diagnosis.

Results

Included in this analysis were 573 colonoscopy reports. The most common diagnosis was haemorrhoids (n=151, 26%), followed by polyps (n=265, 46%). Over this time period, the proportion of normal colonoscopies decreased by 32% (P<0.001), presumably due to introduction of screening of all requests, while the rate of polyp detection increased from 5% to 10% (P=0.006). The detection of polyps was highest in patients less than 16 years (OR 8.4; 95% CI 2.4-26.2, P<0.001). Of those with colorectal tumours, 33/96 (35%) were less than 45 years although the occurrence was higher with advancing age (P=0.02). Diverticular disease was more common in older age groups (median (IQR) age 70 (60-75) years, versus 47 (34-62) years for those without the disease; P=0.0001).

Conclusion

This audit has shown that more than a third of colorectal tumours seen during colonoscopy are in patients below the age of 45 years, with the occurrence of polyps being highest in those below 16 years. Diverticular disease is most common in older age groups.

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was coded by VK. The University of Zambia Biomedical Research Ethics Committee granted exemption from ethics review for this retrospective analysis on 22nd January 2015.

**Coding of indications and diagnoses**

Free text entries were coded as follows:

1. Indication: these were summarized as either, “diarrhoea”, “per rectal bleeding or blood in stools”, “recurrent constipation”, “abnormal imaging”, “rectal mass or rectal lesion”, “surveillance”, “screening” or “follow-up”, “abdominal pain”, “anaemia”, “melaena”, “abdominal mass” and “mucoid discharge”.

2. Diagnosis: “Normal”, “diverticula”, “colitis”, “proctitis”, “haemorrhoids”, “poor bowel preparation”, “anal fissure”, “telangiectasia”, “polyp, non-specific”, “erythematous mucosa”, “fissure”, “tumour”, “non-specific ulceration”, “fistula”, “blue-rubber-bleb”, “distended bowel”, “stricture”, “radiation damage”, “megacolon”, “venous malformation”.

**Data analysis**

Data were analysed using STATA 13 (StataCorp, College Station TX). Age was summarized using medians with interquartile ranges. Diagnostic categories were dichotomized and analysed by frequency; and two-way analyses were carried out using Fisher’s exact to look for various associations. Trend tests were also used to assess the odds ratios in various categories. Odds ratios with 95% confidence intervals were derived and P values less than 0.05 were considered statistically significant.

**Results**

A single endoscopist, PK, performed 77% of all colonoscopies done between 2013 and 2015. Of the 687 reports retrieved, 483 (70%) were reports of full colonoscopies and 204 (30%) were either flexible sigmoidoscopies or incomplete colonoscopies. From these reports, 79 (12%) had no definitive diagnosis due to poor bowel preparation and 35 (5%) had either illegible or unclear diagnosis leaving 573 reports with complete and clear diagnoses. Therefore in the final analysis, 573 reports were included of which 127 (22%) were flexible sigmoidoscopies. This analysis showed that 211(37%) were female, 315 (55%) were males and sex was not specified in 47(8%). There was no significant age difference between the two sexes (Table 1). Reports with the referral source indicated showed that 345/428 (80%) were from within the UTH. The most common diagnosis during this time period was haemorrhoids in 151/573 (26%) followed by tumours in 96/573 (17%), (Figure 1).

| Table 1: Colonoscopic diagnoses in females and males |
|--------------------------------------------------|
| Age, median (IQR) | Females, n=211 (%) | Males, n=315 (%) | P |
|-------------------|-------------------|----------------|---|
| Haemorrhoids      | 46(22)            | 93(30)         | 0.06 |
| Diverticula       | 4(2)              | 10(3)          | 0.42 |
| Tumour            | 38(18)            | 50(16)         | 0.55 |
| Polyps            | 16(8)             | 24(8)          | 1.00 |
| Colitis           | 15(7)             | 12(4)          | 0.11 |

*Interquartile range (IQR)*

**Figure 1: Frequencies of various colonoscopic diagnoses. Included in other diagnoses are anal fissures, fistula, non-specific erythematous mucosa, megacolon, stricture, blue-rubber-bleb and venous malformation**

**Table 2: Table showing the odds of diagnosing normal colonoscopy and finding poorly prepared bowels by year.**

| Year | Normal colonoscopies n (%) | Odds; 95% CI | Poor bowel preparation n (%) | Odds; 95% CI |
|------|---------------------------|-------------|-----------------------------|-------------|
| 2009 | 15 (48)                   | 0.9; 0.4-1.9 | 5 (14)                      | 0.2; 0.1-0.4 |
| 2010 | 28 (41)                   | 0.7; 0.4-1.1 | 16 (19)                     | 0.2; 0.1-0.4 |
| 2011 | 27 (34)                   | 0.5; 0.3-0.8 | 21(21)                      | 0.3; 0.2-0.4 |
| 2012 | 29 (41)                   | 0.7; 0.4-1.1 | 12 (15)                     | 0.2; 0.1-0.3 |
| 2013 | 35 (33)                   | 0.5; 0.3-0.7 | 4 (4)                       | 0.03; 0.0-0.1 |
| 2014 | 15 (16)                   | 0.2; 0.1-0.3 | 5 (5)                       | 0.05; 0.02-0.1 |
| 2015 | 20 (16)                   | 0.2; 0.1-0.3 | 15 (11)                     | 0.1; 0.07-0.2 |

*Trend of odds P=0.0001* P=0.001

*Using the score test for trend of odds, the reduction in odds was statistically significant in both cases, P= 0.0001 and P=0.001 respectively.

**Table 3: Detection of tumours during colonoscopy in relation to indication**

| Indication | Tumour seen n=96 (%) | No tumour seen n=477 (%) | OR; 95% CI | P |
|------------|----------------------|--------------------------|------------|---|
| Rectal lesion | 11 (12)             | 15 (3)                  | 4.0 (1.6-9.7) | 0.001 |
| Melaena | 0 (0) | 6 (1) | - | 0.596 |
| Anemia | 6 (6) | 33 (7) | 0.9 (0.3-2.2) | 1.000 |
| Positive fecal occult blood | 0 (0) | 5 (1) | - | 0.596 |
| Rectal bleeding | 45 (47) | 255 (54) | 0.8 (0.5-1.2) | 0.263 |
| Diarrhoea | 4 (4) | 32 (7) | 0.6 (0.2-1.8) | 0.489 |
| Constipation | 3 (3) | 12 (3) | 1.3 (0.2-4.8) | 0.725 |
| Abdominal mass | 7 (8) | 4 (1) | 9.4 (2.3-44.2) | <0.001 |
| Abdominal pain | 2 (2) | 24 (5) | 0.4 (0.04-1.7) | 0.285 |
Polyps were detected in 44/573 (8%) of the patients. Two
detected rectal lesions or abdominal masses but not melaena
(Figure 3). Tumour diagnosis was associated with clinically
tumours significantly increased with advancing age, P=0.02,
years. Using Cuzick’s non-parametric test for trend, colonic
these, five were aged below 20 years, the youngest being 15
33/96 (35%) of those with
time period, with no significant difference between
The endoscopists saw a total of 96 colonic tumours during
preparation was not associated with age, P=0.8.
Inadequate bowel preparation
The odds of incomplete procedures due to poor bowel
preparation reduced during the seven years, P=0.001. Of
incomplete procedures due to poor bowel preparation was
inconsistent during this time period. The proportion of
Bowel preparation for colonoscopy in this unit was
lowest during the years a commercially obtained osmotic
laxative was available in this unit (i.e. 2013 – 2014). For
many patients are unable to afford the prescribed bowel
preparation medications were readily available in our unit.
Diverticular disease
Overall, 14/573 (2%) of the patients had diverticular disease
and of these, 11 (79%) presented with rectal bleeding. The
youngest patient with diverticular disease was 42 years old
and the diagnosis increased significantly with advancing age.
The median (IQR) for those with diverticular disease was 70(60-75) versus 47(34-62) in those without the disease
P=0.0001; Figure 3.
Haemorrhoids
Haemorrhoids were more common among patients below
the age of 45 years (OR 1.7; 95% CI 1.1-2.5, P=0.007) but
did not differ significantly by sex (Table 1). The presence of
haemorrhoids was associated with rectal bleeding and this
was statistically significantly, OR 3.9; 95% CI 2.5-6.0,
P<0.001.
Discussion
In this small seven-year colonoscopy audit, we report the
profile of diagnoses made. Overall, haemorrhoids were the
most common findings closely followed by tumours. We
found that the detection of polyps increased over this time
period and was very common in patients less than 16 years.
More than a third of patients with tumours diagnosed during
colonoscopy were below the age of 45 years but, in contrast,
diverticular disease was only present in older patients.
Bowel preparation for colonoscopy in this unit was
inconsistent during this time period. The proportion of
incomplete procedures due to poor bowel preparation was
lowest during the years a commercially obtained osmotic
laxative was available in this unit (i.e. 2013 – 2014). For
most years, patients had to either buy the bowel preparation
using out of pocket funds or rely on left over samples from
research studies. Due to economic hardships in Zambia,
many patients are unable to afford the prescribed bowel
preparation. Over the seven years, 12% of the procedures
could not be completed due to poor bowel preparation. Our
findings are similar to a study carried out in Tunisia, in which
they reported 18% of colonoscopies not completed due to
inadequate colonic preparation8. In contrast, statistics
from the UK show a proportion less than 2%17 a figure
not very different from those for the two years when bowel
preparation medications were readily available in our unit.
It is generally thought that older age is associated with less
satisfactory bowel preparation8. Our data however showed
no influence of age on the occurrence of poor bowel
preparation.
This audit showed a decrease of normal colonoscopies
over the course of seven years. When the unit first opened,
almost 50% of the procedures showed normal findings, but
by 2015 the proportion had reduced to 16%. One factor
influencing this reduction could have been the introduction of
a new policy requiring all request forms to be reviewed by
a gastroenterologist. This strategy was put in place in order
of these patients were from Peutz–Jeghers families and one
from a family with Familial Adenomatous Polyposis. The
detection of polyps was significantly higher among patients
less than 16 years old compared to adults, OR 8.4; 95% CI
2.4-26.2, P<0.001. However, there was no overall trend
across the age groups noted, P=0.6, (Figure 3). There was
no significant difference in polyp detection by endoscopist,
although the numbers of procedures done by some was too
few to enable meaningful comparisons, P=0.53.

**Diverticular disease**
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**Haemorrhoids**
Haemorrhoids were more common among patients below the age of 45 years ($OR = 1.7; 95\% CI 1.1-2.5, P=0.007$) but did not differ significantly by sex (Table 1). The presence of haemorrhoids was associated with rectal bleeding and this was statistically significantly, $OR = 3.9; 95\% CI 2.5-6.0, P<0.001$.

**Discussion**
In this small seven-year colonoscopy audit, we report the profile of diagnoses made. Overall, haemorrhoids were the most common findings closely followed by tumours. We found that the detection of polyps increased over this time period and was very common in patients less than 16 years. More than a third of patients with tumours diagnosed during colonoscopy were below the age of 45 years but, in contrast, diverticular disease was only present in older patients.

Bowel preparation for colonoscopy in this unit was inconsistent during this time period. The proportion of incomplete procedures due to poor bowel preparation was lowest during the years a commercially obtained osmotic laxative was available in this unit (i.e. 2013 – 2014). For most years, patients had to either buy the bowel preparation using out of pocket funds or rely on left over samples from research studies. Due to economic hardships in Zambia, many patients are unable to afford the prescribed bowel preparation. Over the seven years, 12% of the procedures could not be completed due to poor bowel preparation. Our findings are similar to a study carried out in Tunisia, in which they reported 18% of colonoscopies not completed due to inadequate colonic preparation8. In contrast, statistics from the UK show a proportion less than 2%17 a figure not very different from those for the two years when bowel preparation medications were readily available in our unit. It is generally thought that older age is associated with less satisfactory bowel preparation8. Our data however showed no influence of age on the occurrence of poor bowel preparation.

This audit showed a decrease of normal colonoscopies over the course of seven years. When the unit first opened, almost 50% of the procedures showed normal findings, but by 2015 the proportion had reduced to 16%. One factor influencing this reduction could have been the introduction of a new policy requiring all request forms to be reviewed by a gastroenterologist. This strategy was put in place in order
to assess the appropriateness of all referrals. An audit done in Zimbabwe found that 52% of the colonoscopies were normal, while in Nigeria it was 29%6,11.

The incidence of colorectal cancer in Zambia remains uncertain. There is evidence of racial disparities in the occurrence of colorectal cancer, even within the same geographical location. Graham et al reported that colorectal cancer was more common among whites and least among blacks in sub-Saharan Africa9. Similarly, in Zimbabwe, colorectal cancer was more common in Caucasians than other racial groups.6 In contrast, colorectal cancer in the United States is most common among black men20. This could be an actual racial and regional difference but it could also mean that colorectal cancer in black Africans is being under-reported. Furthermore, Katsidzira et al found that black colorectal cancer patients in Zimbabwe were significantly younger than their Caucasian counterparts. These findings are similar to those of a study in Nigeria which found that the mean age of colorectal cancer patients was lower than that of Western countries;3 suggesting that the findings reported in this study are part of a more general phenomenon. In Egypt it was reported that 22% of colorectal cancer patients were below the age of 40 years3, In the USA, only 5.7% of colorectal cancer patients were below the age of 45 years with a median age at diagnosis of 68 years2. We do not believe that these age discrepancies are merely due to the young population structures in Africa. If that were the case, all disease conditions would be equally affected. In this audit, for example, we found that over the seven years there was no patient below the age of 40 years with the diagnosis of diverticular disease, a profile similar to statistics from western countries such as the UK3. Unexplored in this population is the genetic predisposition to colorectal cancer, but in this study we know of only three patients who had a clear-cut genetic syndrome. This highlights a potential area where further research is warranted to obtain a more definitive conclusion.

There is paucity of information on colonic polyps in Zambia. The occurrence of colonic polyps is generally thought to be lower among Africans, and in this series the largest proportion of polyps were in younger patients. We found a prevalence of 8% in this audit, a figure similar to Zimbabwe in which they found that 5% of black patients had colonic polyps.6 Similarly, the figures for Nigeria and Kenya were 10.3% and 6.5% respectively11,12. A meta-analysis from the United States reported the overall prevalence of adenomatous polyps to be 30%24.

Diverticular disease was once thought to be rare in Africans. Alatise et al identified 40 patients over a five-year period and Segal et al detected 42 cases in 3 years among black South Africans6,25. However these figures are still much lower than in developed countries. Questions have been raised as to whether urbanization of rural parts of Africa and the introduction of a western diet with lower fibre content has been a cause of the increase in diverticular disease26,27. However, this link has been questioned in a cross-sectional study and during clinical observation in Thailand where diet was not associated with the prevalence of diverticular disease26,29. In our study, the majority of diverticular disease was right-sided, in contrast to the European or North American distribution. The exact incidence of haemorrhoids is difficult to ascertain, as many patients with minor lesions do not seek medical advice. In this audit, haemorrhoids were the most common diagnosis with a prevalence of 26% similar to Nigeria where they reported a proportion of 21%11. Interestingly, another study from Nigeria reported the prevalence as high as 43%12. The same pattern of disease diagnosis is seen in the developed world. Riss et al from Austria noted that 39% of their study participants suffered from haemorrhoids30. Rectal bleeding is a common presentation in patients with haemorrhoids. Nigeria reports an older population of patients acquiring haemorrhoids, the highest frequency being in the 61-70 age group; which correlates with Austria’s mean age of haemorrhoid diagnosis of 61.68 years14,30. Korea reports a slightly lower age group, 40-59 years14.

In this study, the mean age was 43 years. High body mass index (BMI) has been linked to the development of haemorrhoids30,32, but we did not have data on BMI in this audit. This was the first colonoscopy audit done in a Zambian population but had the limitation of incomplete entries. This reduced the number of reports included in the final analysis. The lack of histological confirmation of the tumours seen during endoscopy is another limitation of this retrospective audit.

In conclusion, the profile of disease detected during colonoscopy in Zambia is similar to other centers in Africa, with a much younger population of individuals with colorectal tumours.

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Author contributions
PK initiated the idea for the audit. VK, KN and CM collected the data. VK and PK did data analysis. All authors contributed to the intellectual content of the manuscript.

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