

# Presentation, distribution pattern, and management of diverticular disease in a Nigerian tertiary hospital

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## Abstract

**Background:** Colonic diverticular disease is one of the most common and costly gastrointestinal disorders among industrialized societies, which have recently been described among Africans. Presentations and distribution pattern of the disease among Africans appeared to be different from that described among the Western population. We embark on this study aimed at evaluating the presentation, distribution pattern, and the management of diverticulosis in our tertiary health facility.

**Materials and Methods:** A prospective descriptive study of the cases of diverticular disease seen between January 2007 and December 2011 at Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Osun State, Nigeria.

**Results:** During the 5-year study period, 40 cases were seen. The patients were aged 41–85 years with a median age of 64 years. There were 29 (72.5%) male and 11 (27.5%) female with an average male to female ratio of 3:1. The most common presentation was bleeding per rectum in 28 (70%) patients, which mostly needed transfusion. Ten (25%) patients presented with recurring abdominal pain, whereas one (2.5%) patient presented with abdominal mass and features of intestinal obstruction. Thirty patients were diagnosed on colonoscopy, eight on barium enema, and two on computerized tomography scan. Thirty-four (85%) patients had a pancolonic disease. All the patients were placed on high fiber diet and antibiotics namely ciprofloxacin and metronidazole. Five patients had recurrence within 6 months of follow up, of which one had emergency colectomy.

**Conclusion:** Diverticular disease is no longer a rare disease in Nigeria. It is a common cause of lower gastrointestinal bleeding in elderly patients. High index of suspicion for diverticular disease of the colon and its complications should increase in the country.

**Key words:** Distribution pattern, diverticular disease, management, Nigeria, presentation

**Date of Acceptance:** 27-May-2012

## Introduction

Colonic diverticular disease, one of the most common and costly gastrointestinal disorders among industrialized societies, is characterized by the formation of sac-like outpouchings or pockets within the colon that form when colonic mucosa and submucosa herniate through weakened areas in the muscle layer (pseudo-diverticula).<sup>[1-3]</sup> It occurs at the point of entry of the small arteries that supply the colon, the vasa recta, penetrate the circular muscle layer of the colonic wall.<sup>[4,5]</sup> These entry points of the vasa recta are

areas of relative weakness through which the mucosa and sub mucosa can herniate when under increased intraluminal pressure.<sup>[5-7]</sup>

One of the unique aspects of diverticular disease is its considerable geographic variation.<sup>[7-9]</sup> The prevalence, anatomical location, and presentation of diverticular disease have different characteristics depending on the regional,

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racial, and dietary factors.<sup>[10]</sup> The disorder is extraordinarily rare in rural Africa and Asia; conversely, the highest incidence rates are seen in the United States, Europe, and Australia.<sup>[11]</sup> A Nigerian review of 603 adult barium enema examinations demonstrated only 11 cases of diverticular disease, which account for less than 2% of cases.<sup>[12]</sup> A report from southern Islamic Republic of Iran noted a 1.2% incidence in more than 500 barium enema studies.<sup>[13]</sup> These data contrast sharply with the incidence of 42-54% in the Western populations.<sup>[10]</sup> The marked difference in the disease prevalence was speculated to be due to some genetic factors, dietary or other unseen environmental factors, which may play a role in protecting native Africans.<sup>[9,10]</sup>

The anatomical location of diverticular in the Asian populations tends to be right-sided, in contrast to American, European, and Australian series, which show a left-sided predominance.<sup>[14]</sup> Few African studies from Durban in South Africa, Ghana, and Uganda also suggested preponderance of right-sided diverticula among African population.<sup>[8,9,15,16]</sup> In view of the rarity of the disease and that there have been no characterization of the location of diverticular disease in Nigeria, we embark on this study aimed at evaluating the presentation, distribution pattern, and the management of diverticulosis in our tertiary health facility.

## Materials and Methods

### Study setting

The study was carried out at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Osun State. The hospital provides tertiary level services being mostly accessed by patients from Osun, Ondo, Ekiti, and some parts of Kwara, Kogi, Oyo, and Edo States with an estimated population of about 10 million according to 2006 National population census.

The people Ife/Ijesa zone of Osun State where the institution is located are predominantly Yorubas, who along with other Nigerian tribes and other ethnic groups, however, also reside permanently in this area. Peasant farming is the major occupation of the people. A sizeable number are engaged in commercial and small-scale industrial enterprises, whereas the cream of the educated ones are the civil servants.

### Study design

This is a prospective study of all cases of colonic diverticular disease diagnosed on barium enema, contrast enhanced computerized tomography (CT) scan, and/or colonoscopy between January 2007 and December 2011. Information obtained from each patient included sociodemographic data such as sex, age, occupation, and socioeconomic status. Other information obtained included co-morbidity, presenting symptoms, presence of pyrexia on admission, method of diagnosis, clinical investigations, distribution

pattern of the diverticular disease within the colon, management and management outcome, duration of follow-up, and recurrent episodes.

### Definition of terms

Because symptoms, colonoscopy, and radiographic findings do not always distinguish between diverticulosis and diverticulitis, the more general term, diverticular disease of the colon, is used.

The terms 'diverticulosis' and 'diverticular disease' are used to describe the presence of uninflamed diverticula. Diverticulitis is an inflammatory complication of the disease, which is commonly accompanied by gross or microscopical perforation, ranging in severity from a single, mild, acute attack of diverticulitis to more severe attacks characterized by perforation and abscess formation, occasionally resulting in chronic complications such as obstruction and fistula formation.<sup>[17]</sup>

### Data analysis

All data were entered into the personal computer and analyses were performed using SPSS version 16.0. Descriptive and inferential statistics were used in the analysis of the data.

## Results

During the 5-year study period, 40 patients were diagnosed to have diverticular disease at OAUTHC, Ile-Ife, Osun state, Nigeria. The patients were aged 41-85 years with a median age of 64 years. The peak age is in the eight decade [Figure 1]. Only five (12.5%) of the patients were aged  $\leq 50$  years. There were 29 (72.5%) male and 11 (27.5%) female with an average male to female ratio of 3:1.

All the patients had various levels of education. Three (7.5%) patients had educational level only up to primary school, whereas eight (20%) patients had educational level up to secondary school level, and others (72%) had higher education in tertiary level institutions. The types of occupation the patients were engaged is varied. Among the male patients, 8 (27.6%) were 'businessmen' or traders, 7 (24.1%) patients were farmers, 5 (17.2%) were retirees, 5 (17.2%) artisans, 2 (6.9%) professors of social sciences, 1 (3.5%) surgeon, and 1 (3.5%) engineer. Among the female patients, 6 (54.6%) were retirees or grandmothers who were just 'staying at home', 3 (27.3%) had their own businesses mainly selling goods at a market or roadside, and 1 (9%) was a principal of a private school. Only 5 of 40 patients gave history of intake of westernized diet as they reside in developed countries for significant number of years. Essentially, majority of the patients eat traditional mixed diet.

The most common presentation was bleeding per rectum in 28 (70%) patients. The bleeding was severe necessitating hospital admission and blood transfusion in 20 of the 28 patients. The number of blood transfused ranged from 2 to 8 with a median of 4. Ten (25%) patients presented with recurring abdominal pain, whereas one (2.5%) patient presented with abdominal mass and features of intestinal obstruction. Similarly, 8 of 10 patients with abdominal pain had fever at presentation. Thirty-two (80%) patients were admitted into the hospital for treatment of the disease.

The body mass index (BMI) of the patients ranged from 22.5 to 40.8 kg/m<sup>2</sup>. The median BMI was 32.6 kg/m<sup>2</sup>. Whereas majority (25 of 28) of the patients who presented with bleeding per rectum had their BMI greater than 25 kg/m<sup>2</sup>, all the patients who presented with abdominal pain had their BMI less than 25 kg/m<sup>2</sup>. Of the 40 patients, 8 patients had associated hypertension and are on combination of antihypertensive and aspirin. All these patients presented with bleeding per rectum.

Colonoscopy was performed on 30 patients [Figure 2], whereas 8 patients had barium enema [Figure 3], and 2 had the diagnosis made on CT scan. Other findings on colonoscopy included internal hemorrhoids in 8 patients and polyps in 3 patients. In 34 of the 40 patients, the diverticulosis was found in every part of the colon. It was found on the right side of the colon and the transverse colon in 4 of the 40 patients whereas only 2 of the 40 patients had the diverticulosis restricted to the left colon.

All the patients were placed on high fiber diet and antibiotics namely ciprofloxacin 500 mg twice daily and metronidazole 400 mg thrice daily for at least 10 days. All of them responded to conservative managements. Those on hospital admission were discharged. Five patients had recurrence of the symptoms within 6 months of treatment—bleeding per rectum in four patients and abdominal pain in one patient. Among those that had re-bleeding per rectum, the bleeding was torrential necessitating emergency colectomy in one patient. Others declined surgery.

All the patients that had re-bleeding were aged above 65 years with poor compliant to the drug treatment. Three of these patients had associated elevated blood pressures that are also on low dose aspirin. The other two patients were obese. No other colonic lesion seen in these patients that may be responsible for the re-bleeding. The re-bleeding occurred at a variable period of 2 and 6 months after completing the treatment.

### Discussion

In the past century, diverticular disease was unknown among African descend.<sup>[4]</sup> Recently, however, it has been

reported that diverticular disease of the colon is on the rise in the African population.<sup>[8,12,15,16]</sup> Madiba reported 26 cases in a period of 5 years in South African Blacks.<sup>[8]</sup>

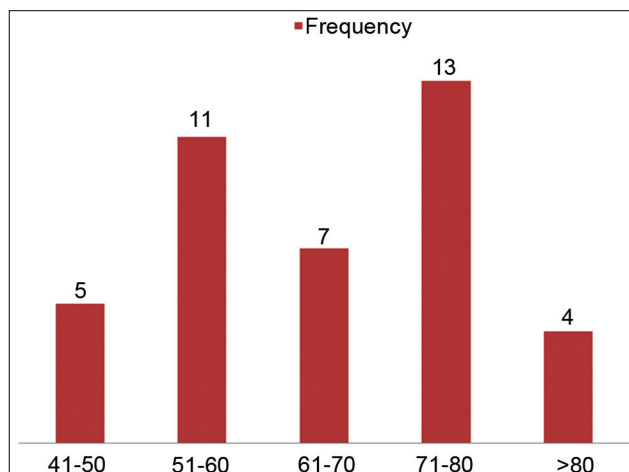


Figure 1: Age of patients at presentation

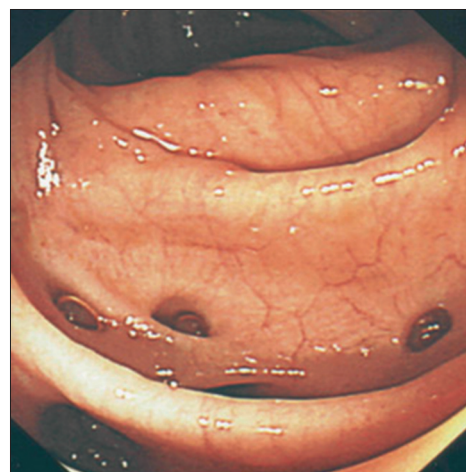


Figure 2: Colonoscopic finding of a 65-year-old man with diverticular disease



Figure 3: The barium enema of a 68-year-old woman with diverticular disease

Kiguli-Malwadde and Kasozi reported 31 cases in 5 years among the Ugandians.<sup>[15]</sup> Baako reported 37 cases over 3 years in Ghana.<sup>[16]</sup> In Nigeria, few cases of diverticular disease had been presented. Ogunbiyi in Ibadan presented 11 cases from 603 barium enema performed at University College Hospital.<sup>[12]</sup> Similarly, Ihekwa also reported 15 cases of colonic diverticular disease managed in the same hospital and about the same period.<sup>[18]</sup> We present 40 cases of diverticular disease managed over a short time of 5 years. This supports the fact that more cases of diverticular disease are being seen in the African population.

The reason for the apparent surge in the occurrence of diverticulosis is not known. Diverticular disease is a disease of the aging population<sup>[19-21]</sup> and in contrast to a report by Ihekwa<sup>[18]</sup> in Ibadan who found that more than 70% of their patients were aged below 50 years; more than 75% of our patients were aged above 50 years. The median age of our patients was similar to those reported from the Western population.<sup>[21]</sup> It is possible that the previous rarity of diverticular disease in Nigeria may be due to the reduced life expectancy in the country. With gradual improvement in the life expectancy and the health care in most African countries, more cases of diverticular disease will be diagnosed.

Up to now, there is no clear predisposition to diverticular disease on the basis of sex.<sup>[10]</sup> In this study, we found that males were affected three times more than women. Madiba reported female predilection among South African Blacks,<sup>[9]</sup> Kiguli-Malwadde and Kasozi showed no sex predilection among Ugandan cohort.<sup>[15]</sup> A study from Singapore showed that diverticula were seen more frequently in men than women (20.1% vs. 17.2%).<sup>[19]</sup> Eide and Stalsburg in Norway reported 280 unselected autopsies in patients aged above 20 years and found an incidence of 25% in males and 43% in females.<sup>[20]</sup> The true sex distribution is difficult to determine because most patients with the condition are asymptomatic.<sup>[21]</sup> Symptomatic diverticular disease, however, is more easily studied, and more data are available in these groups. Patients aged above 50 years and hospitalized for diverticular disease in a large Canadian study were more frequently female, and this preponderance increased with increase in age. However, men aged below 50 years were hospitalized more frequently than women, suggesting both age and sex effects on the development of symptomatic disease.<sup>[22]</sup>

The evaluation of our patient's socioeconomic status showed that all social strata were affected by the disease and only few patients gave history of intake of refined food. Essentially majority of our patients consume more of local high fiber diet. It was previously suggested that the current emergence of diverticular disease in our environment may be due to change in diet.<sup>[12,18]</sup> No doubt, there is a recent increase in 'fast food joints' in Nigeria; most of this refine

food may be beyond the reach of majority of our patients. Other factors other than diet may be responsible for the increase occurrence of diverticular disease in Africans. Omojola *et al.*, in Port-Harcourt, reported a cases series of three siblings, all having diverticular disease.<sup>[23]</sup> Similarly, Schlotthauer reported seven cases of diverticular disease in a family of nine siblings presenting between 49 and 70 years of age.<sup>[24]</sup> These reports underscore the fact that some genetic factors may play a role in the occurrence of diverticular disease among the African population. In general, genetic predisposition to diverticular disease involves conditions that alter colonic wall integrity, conditions that cause visceral neurological dysfunction, and those that result in change of stool consistency.<sup>[10]</sup> These three different mechanisms, which all cause the same phenotype, support the concept that the pathophysiology of diverticular formation is multifactorial.<sup>[10]</sup>

It worth noting that majority of our patients was either overweight or obese. Whether obesity is a result of the dietary features in this at-risk population or a risk factor in itself is difficult to know. Nonetheless, previous reports had shown that there is significant association between obesity and complications of diverticular disease, particularly in younger patients.<sup>[10,25,26]</sup> We found that there is significant association between obesity and the presentation of diverticular disease. The obese patients presented with bleeding per rectum whereas those with normal BMI presented with pain. A greater incidence of diverticulitis and bleeding was seen in patients with greater waist-to-hip ratios as well—an association that persisted with adjustment for BMI.<sup>[27]</sup> A large Swedish study also found a greater incidence of hospitalization for diverticular disease in overweight and obese patients.<sup>[28]</sup> It has been suggested that because obesity has been linked to inflammation and differences in the intestinal flora, these mechanisms should be considered for the increased risk of diverticulitis.<sup>[10]</sup>

The most common presentation in African patient with diverticular disease is rectal bleeding, as also shown in this study.<sup>[9,15,16]</sup> In developed countries, however, the most common presentation is sepsis.<sup>[7,29]</sup> Differences in diet had been used to explain the disparity in presentation in African and Western countries. High fiber diet may tend to prevent sepsis by ensuring regular fecal flow thereby reducing blockage at the neck of the diverticular disease and prevent stasis, bacterial proliferation, and sepsis.<sup>[16]</sup> It may also be possible that the frequent use of over the counter antibiotic for suspected infective gastrointestinal conditions; reduce the frequent occurrence of diverticulitis.

The most widely available and accurate examination of patients with diverticular disease in developed countries is the abdominal CT.<sup>[3,30,31]</sup> This investigation modality is more relevant in patient with associated sepsis. Advantages of CT scanning include the ability to make an accurate diagnosis



and stage the severity of disease, and the therapeutic ability to drain an abscess with CT guidance. Disadvantages of CT scan in developing countries include radiation exposure and the cost of the examinations. Since most of our patients present with bleeding per rectum; hence colonoscopy can be regarded as the investigation modality of choice in African patients having diverticular disease. This procedure should, however, be performed by skilled individual to prevent complication. Performing colonoscopy in these patients also serve as an opportunity to screen them for colorectal cancer especially in our environment where national wide screening for the disease is not available. In our series, some of the patients had coexisting colonic polyps and hemorrhoids. We found no case of coexisting colorectal cancer in our patients. Though inconclusively, it has been suggested that the incidence of colorectal cancer increases in patients with diverticular disease.<sup>[32]</sup> This is because both disease conditions have common risk factor. Similarly, the elevated risk of colorectal cancer in diverticular disease can be associated to chronic inflammation, which often occurs in it.<sup>[10]</sup>

Majority of our patients had the disease involving the entire colon, whereas only few had the disease restricted to the right. Although most African studies showed the preponderance of the disease on the right colon as common among the Asian descent,<sup>[9,15,16]</sup> some showed the occurrence of the disease on the left colon with the site of predilection being the descending colon.<sup>[33]</sup> Hence, diverticular disease affects predominantly the right colon in Japanese, Thais, Chinese in Hawaii, and Chinese, Malays, and Indians in Singapore, whereas the most common site of diverticula in Western populations is the sigmoid colon, which is involved in 95% of patients.<sup>[10]</sup> The reason for this variation in anatomic discrepancy is unknown, although it may not be unconnected to the diet.

Most of the patients responded to conservative management, which comprises of increase intake of high fiber diet and antibiotics. Recently, poorly absorbed antibiotics such as Rifaximin and Mesalazine are now been used to treat diverticular disease in most industrialized countries.<sup>[34]</sup> These drugs are not available in Nigeria. The rationale for the use of antibiotics is that bacterial overgrowths from intraluminal stasis in diverticula give rise to chronic low-grade mucosal inflammation. This sensitizes intrinsic primary efferent neurons in the submucosal and myenteric plexus, inducing visceral hypersensitivity and changes in colonic motor function.<sup>[35,36]</sup> The alterations in neurochemical transmitters also explain the changes in colonic motility and development of abdominal symptoms.<sup>[35]</sup>

Until recently, most patients were offered elective resection after two documented attacks of uncomplicated diverticulitis. This recommendation is based on the early works of Parks.<sup>[29]</sup> Recently, this recommendation have been

challenged. Salem and Flum suggested that waiting until the fourth attack of uncomplicated diverticular disease would be associated with fewer deaths and fewer intestinal stomas.<sup>[37]</sup> Another decision analysis concluded that elective resection after the third attack would be more cost-effective.<sup>[38]</sup> Furthermore, a number of large reviews have suggested that the common practice of operating after the second episode of diverticulitis should be reconsidered.<sup>[39,40]</sup> However, the American Society of Colon and Rectal Surgeons currently states that the “number of attacks of uncomplicated diverticulitis is not necessarily an overriding factor in defining the appropriateness of surgery. Patients selection for surgery should be on case by case basis”.<sup>[41]</sup> In our setting, adequate information should be given to patients following recurrence and patients should be given opportunity to choose. Fear of surgery by an average Nigerian will limit the use of surgery.

One other finding of this study is the important of concurrent drug use in the occurrence of bleeding and re-bleeding. Nonsteroidal antiinflammatory drug notably aspirin has been shown to increase complication resulting from diverticular disease.<sup>[42]</sup> Although the reason for the association is not known yet. The plausible biological explanation for this may be related to the reduction in prostaglandin synthesis and alterations in large intestine mucus secretion and large intestine permeability.<sup>[42,43]</sup> All this factors decrease colonic wall integrity and hence increase in complication associated with diverticular disease.

## Conclusion

Colonic diverticular disease is not uncommon among Nigerians. Lower gastrointestinal bleeding is a common mode of presentation. It tends to involve all part of the colon. Majority respond to conservative management. High index of suspicion for diverticular disease of the colon and its complications should increase in the country

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**How to cite this article:** ???

**Source of Support:** Nil, **Conflict of Interest:** None declared.