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REVIEW

Diverticular disease in Africans: myth or fact?

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Diverticulosis coli is an acquired colon disease where small outpouchings of the colonic mucosa occur due to mucosal herniation of the colonic wall at sites of vascular perforation. The disease is common in developed countries, and its prevalence increases with age. Risk factors for its development include inadequate dietary fibre intake, abnormal colonic motility, and elevated pressures within the colon. Studies from the late 1900s showed that this disease was unknown in the African population, which is known for its high-fibre diet. With urbanisation, the prevalence of this disease has somewhat increased over the years in the African population. Just how common is this condition among African people? In this review, we discuss the literature regarding this condition in indigenous Africans.

Keywords: diverticular disease, Africans, fibre, diet, colon motility

Introduction

Diverticular disease was first described by the French surgeon Alexis Littre in the late 1700s. In 1815, Fleischman described the condition as "divertikel". Cruveilhier described the mucosal herniation in the colon found in diverticular disease in 1849. In 1869, Klebs was the first surgeon to link the "divertikel" to constipation. Graser, in 1899, described the first case of diverticulitis and emphasised that it resulted in perisigmoiditis and perforation.[1] In 1971, Painter et al.[1] published the first paper on diverticular disease among Africans in a Johannesburg hospital in South Africa. During their 20-year tenure at a tertiary hospital in Johannesburg, no cases of diverticular disease were found among the African population.

Since 1971, several reports from African countries have documented cases of diverticular disease among native Africans. This review explores the published data on diverticular disease in Africa. There has been a shift in African countries' socioeconomic climate, with growing numbers in the middle-income group. More native Africans have better jobs, and they are more urbanised. With urbanisation, more have adopted a Western diet.

The exact incidence of diverticular disease in Africans is unknown; however, the increase in the number of cases in Africa could be due to more awareness of the disease. The lack of resources in Africa is a partial limiting factor to investigating patients presenting with diverticular disease symptoms. Hence, it is probable that the numbers may be higher than reported.

Classification

Asymptomatic diverticulosis

Of the people with colonic diverticulosis, 80–85% are asymptomatic. Most of these patients are diagnosed as an incidental finding during colonoscopy or imaging, when they are examined for other indications.

Symptomatic diverticulosis

Of the symptomatic patients, 15–20% may present with symptomatic, uncomplicated diverticulitis or diverticulitis with complications (Figure 1). History-taking is crucial in differentiating these phenotypes and identifying risks associated with diverticular disease. Symptomatic, uncomplicated diverticular disease includes recurrent abdominal pain, bloating, and altered bowel habits. In addition, acute diverticulitis presents with low-grade fever, left lower quadrant tenderness (sigmoid colon), a possible palpable mass, and, rarely, haematochezia. An acute

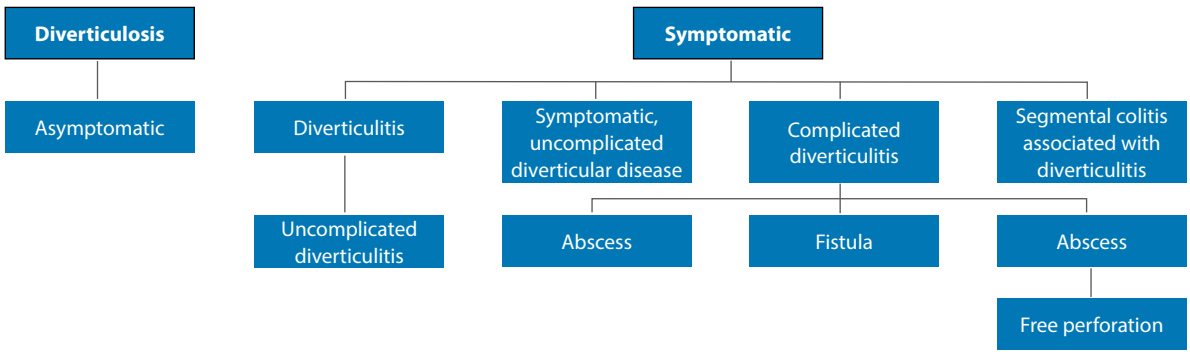

Figure 1: Diverticulosis classification

abdomen indicates possible complicated diverticulitis with perforation and peritonitis.

The clinical evaluation also includes identifying risk factors. Non-modifiable risk factors include age, sex, and genetics. The prevalence of diverticular disease is particularly high in individuals aged > 65 years, although the occurrence is currently increasing in people aged < 40 years. The increased life expectancy explains the increasing prevalence in non-Western countries, which were previously considered at low risk for diverticular disease. Modifiable risk factors include diet, lifestyle, and pharmacological factors. A low-fibre diet is regarded as a significant risk factor. It results in increased intraluminal pressure and the formation of diverticula. Countries with a high-fibre diet, such as those in Africa and Asia, have a lower incidence of diverticular disease than Western countries. Other risk factors should be considered, such as obesity, physical inactivity, alcohol consumption, and the prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs) and steroids.

Diverticular disease in Africa

Prevalence

There is a paucity of studies in Africa on diverticular disease, as it is an uncommon condition. Consequently, the exact incidence is unknown. Several studies have been conducted in South Africa, Nigeria, Kenya, and Uganda. These studies were mainly conducted in referral (tertiary) hospitals. They all seem to show an increase in the prevalence of this condition in Africa over the past 40 years. Painter et al.[1] published the first paper on diverticular disease in Africa, describing the close relationship between the incidence of diverticular disease and economic development. Secondly, they alluded to the fact that it would take about 40 years for diverticular disease to develop, even after the colon's environment has been changed. Hence, diverticular disease would not be expected to be seen until a community had departed from their traditional eating habits for approximately 40 years.

Archampong et al.[2] published a case study in 1978 in Ghana of 14 patients diagnosed with diverticular disease over three years. The patients were from an urban area in Ghana and presented with features of diverticulitis. The most common presenting symptom was rectal bleeding. However, the authors describe that despite their patients being upper-class, their diet had not changed. They still adhered to a traditional, high-fibre, low-calorie diet. Calder found 20 cases of diverticular disease over one year in Kenya in 1980.[3] He noted that, despite the Kenyan subjects consuming more refined maise and sugars, their diet was still high in fibre compared with their Western counterparts.

Segal et al.[4] found 42 cases of diverticular disease over three years in the Baragwanath Hospital in Johannesburg, South Africa. The patients were from an urban population. The main presenting symptoms were rectal bleeding, abdominal mass, or pain. The average age was 62 years, with 16 men and 26 women. The Africans' mean daily dietary fibre intake was 26.5 ± 8.5 g, compared with the 22.4 ± 6.0 g of local whites.

Madiba et al.[5] reported 26 cases of diverticular disease over five years in an urban hospital in Durban, South Africa. The most common presenting symptom was rectal bleeding, and 77% of the diverticula were left-sided. Notably, the study was published in 1994, the year all South Africans were allowed to vote and elected the first democratic government, marking a significant shift in the country's socioeconomic climate. Urbanisation increased greatly as more black people became more affluent than in the previous decade.

In Uganda, Kiguli-Malwadde et al.[6] published a retrospective and prospective study in 2002, conducted over five years. They found 31 cases of diverticular disease. All patients were aged > 40 years and consumed a mixed diet, including both high- and low-residue foods. The most common presenting symptoms were rectal bleeding, abdominal mass, or pain.

Alatise et al.[7] found 40 cases of diverticular disease over five years in Nigeria. The patients' median age was 64 years, with 72.5% male and 27.5% female. The most common symptoms were rectal bleeding, abdominal mass, or pain. All patients were placed on a high-fibre diet with antibiotics (ciprofloxacin and metronidazole). Five patients had a recurrence within six months of follow-up, and one required emergency colectomy. Also, in Nigeria, Oluyemi et al.[8] found 28 cases of diverticular disease over five years. This group similarly found a higher percentage of males with diverticular disease. The most common presentation was rectal bleeding.

Vally et al.[9] found 47 cases of diverticular disease during one year in South Africa in 2017. One can certainly appreciate the rising incidence in Africa since 1971, when no cases were found over 20 years, until 2017, when 47 cases were reported in only one year. Moreover, the studies by Painter and Vally were conducted in the same province in South Africa. More awareness of the disease may exist now than 50 years ago. A study by Golder et al.[11] showed that the risk of diverticular disease in black Africans was higher than in their indigenous counterparts, even if one accounts for an increase in the prevalence of diverticular disease following urbanisation in Africa.

Incidence of diverticular disease around the globe (personal collection using GunnMap)

Figure 2: World map showing the global incidence of diverticular disease

Table I: Complete exploration of the colon in African Caribbean and European patients

Complete exploration	Group AC with complete exploration *n* = 106	Group E with complete exploration *n* = 31	OR (95% CI)	*p*-value
Pancolonic DD	78 (73.6)	11 (35.5)	5.06 (2.15 to 11.88)	0.0002
Right-sided DD*	9 (8.5)	1 (3.2)	9 (1.03 to 78.17)	0.03
Left-sided DD*	10 (9.4)	18 (58.1)	0.06 (0.01 to 0.32)	0.0002
Bipolar left- and right-sided DD**	9 (8.5)	1 (3.2)	9 (1.03 to 78.17)	0.03

Qualitative values are expressed as *n* (%).
* Without diverticula in the contralateral side.
** Without diverticula in the transverse colon.
Group AC – African Caribbean patients, Group E – European patients, CI – confidence interval, DD – diverticular disease, OR – odds ratio

Figure 2 shows the global distribution of diverticular disease. One can appreciate that more cases are found in countries like the United States and Australia. There are fewer cases in Africa, found in fewer countries across the continent.

Location of diverticula in Africans

There seems to be a discrepancy regarding the location of diverticula in Africans. Some studies show a pancolonic distribution.[7] Ihekwaba and Golder et al.[11] found a predominance of right-sided diverticular disease.[13] Kiguli-Malwadde et al.[6] found the most diverticula located on the left colon. Table I is taken from the study by Gelu-Simeon et al.,[14] which compared the distribution of diverticular disease between African Caribbean individuals and Europeans.

Risk factors for diverticular disease

Diet

A dietary fibre deficiency is a risk factor for diverticular disease. Painter et al.[1] described diverticular disease as a deficiency disease of Western civilisation. Indeed, it is more common in Western countries, such as the United States, Australia, and Europe. Africans have been known to consume a high-fibre, low-calorie diet for centuries, which has been shown to have a "protective" effect against colonic diseases, such as diverticular disease and colorectal carcinoma. Due to the high fibre in the African diet, the disease has been uncommon in Africans. Data regarding the quantity of fibre in the African diet has largely been lacking. Urbanisation, especially for native Africans, has resulted in the "westernisation" of their diet. Kiguli-Malwadde et al.[6] found that their study subjects ate a mixed diet of both low- and high-residue food.

Studies in Africa have yielded conflicting data on whether diet is the primary protective factor against diverticular disease, with some studies, such as those by Kiguli-Malwadde et al.,[6] showing that despite their patients consuming a high-fibre diet, they still developed diverticular disease. Other studies show an increase in diverticular disease in patients who adopted a Western diet. This conflict in data may suggest that more factors contribute to diverticular disease (e.g. genetics). More data is needed in Africa. Golder et al.[11] conducted a prospective study of the dietary changes between rural and urban men and women over five years in South Africa. Their findings are discussed below.

Beneficial and detrimental changes in food intake

The analysis of changes in foods eaten clearly showed some beneficial effects over the five years (more vegetables and fruit, milk and milk products, fish, and animal-origin foods), all contributing to improved micronutrient intakes. Unfortunately, these small changes did not enable most participants to meet the recommended intake of vegetables, fruit, milk, and milk products. Furthermore, some detrimental changes were observed, especially an increase in added sugar intake, mainly from sugar-sweetened beverages. There were also increases in the consumption of beer by women and intakes of processed meat, savoury snacks, and hard margarine (i.e. a higher saturated fat intake), illustrating an emergence of processed foods in the diet, which is concerning. Increasingly, global dietary and food recommendations emphasise the importance of home-prepared meals made from fresh ingredients due to the high energy content of processed foods and their association with obesity.

There was no evidence of "new" foods being eaten in 2010, and the "top ten" consumed foods remained unchanged from 2005 to 2010. Examples include white-fleshed fruit eaten by 77.6% of rural women in 2005 and by 88.3% of them in 2010. Similarly, in 2010, more men consumed products such as milk, eggs, organ meats, processed meats, hard margarine, and cooked starchy vegetables, with added fat compared with 2005.

Dietary staples

The group observed a decreased intake of cooked maise porridge and bread, which was concerning given the mandatory fortification of maise meal and bread flour to provide micronutrients. However, the data show that porridges are replaced to a certain extent by micronutrient-rich foods such as vegetables, fruit, milk, and animal-origin foods.

Age

Diverticular disease is most prevalent in old age and the distal colon. Watters et al.[10] compared the colon's mechanical properties between African and European patients in vitro. They found that, with old age, the distal colon was weaker and less distensible. Furthermore, they found that the distal colon was narrower, weaker, and less expansile than the proximal colon. These factors, among others, indicate that the aged sigmoid colon is predisposed to developing diverticular disease due

to its aged features, static mechanical changes, and greater intraluminal pressures. Despite the differences in race and ethnicity, one can appreciate the increase in the prevalence of diverticular disease with increasing age. Taken from the study by Watters et al.,[10] Figure 3 demonstrates this trend.

Table II summarises the findings of a paper published by Vally et al.[9] in a Johannesburg hospital in South Africa. The sharp increase in the number of cases in the 60–80 age category is noteworthy. In this study, there was a slight female preponderance among the subjects. This contrasts with the studies by Oluyemi et al.,[8] which showed a higher percentage of males with the disease.

Table II: Summary of cases per decade[9]

Age (years)	*n*	Male	Female
40–49	1	0	1
50–59	6	3	3
60–69	16	6	10
70–79	15	7	8
80 +	4	2	2
Unknown	5	2	3
Total	47	20	27
Youngest	-	50	46
Oldest	-	83	86

Abnormal colonic motility and pressures

Watters et al.[10] also found that Africans had a wider and more distensible distal colon. The Edinburgh group had impaired stretch capacity, making them prone to developing diverticular disease. Furthermore, Africans have shorter stool transit times and greater stool weights than their European counterparts. According to Painter et al.,[1] the stool transit time is approximately 48 hours, and they produce a less viscous stool, which passes more easily than a Caucasian's stool. The colonic pressures in the Africans' guts are lower than in their European counterparts. Hence, the African colon would tend to be less "trabeculated" and form fewer diverticula. Caucasians may also tend to ignore the call of nature, leading to drying out of the stools, greater colonic pressure, and an increased tendency to form diverticula.

Discussion

The most common clinical presentation noted in the African studies is rectal bleeding, followed by abdominal pains. This appears to be in line with studies conducted elsewhere in the world. Moreover, there is little difference in the gender distribution of subjects. However, Vally et al.[9] found a higher male preponderance. They also found the incidence of diverticular disease in South Africa to be around 13%, similar in other parts of Africa.[7,8] One can appreciate that the incidence of diverticular disease in Africans is increasing. However, it is important to note that these studies were conducted in tertiary hospitals with probable bias.

Furthermore, the studies were conducted in urban areas, and due to urbanisation and the improved socioeconomic status of indigenous Africans, dietary change may be a sizable factor, accounting for the increased diverticular disease diagnoses. The authors of the studies did not analyse the amount of fibre consumed, which would be insightful since it is believed that the indigenous African diet, with its high fibre content, protects against diverticular disease.

Conclusion

Diverticular disease is common in developed countries, such as the United States and Australia. Its incidence increases

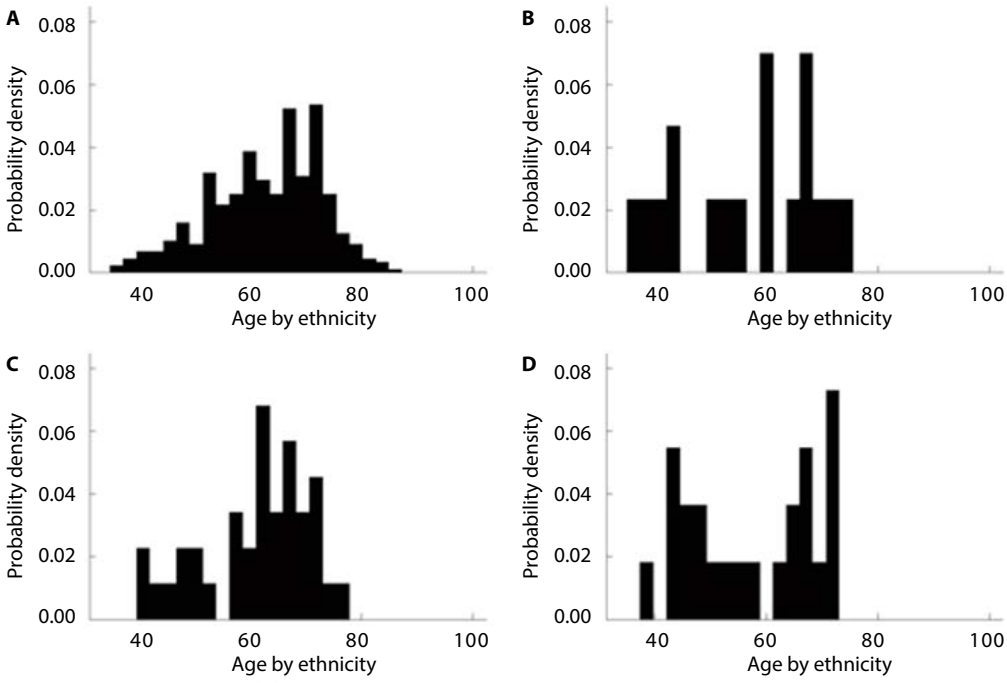

Figure 3: Age and probability density by ethnicity in patients diagnosed with diverticular disease[10]
A – white, B – Asian, C – other black, D – black African

with age, especially in the 60–80 years category. Risk factors for diverticular disease include age, diet, abnormal colonic motility and pressure, and obesity. In Africa, the exact incidence per country is unknown, as there have been few studies. The reason is that diverticular disease has been rare among Africa's indigenous people. However, in the past 40 years, the disease has become more common. It is postulated that the increase in its incidence in Africans is due to a change in their traditional, high-fibre diet. This means they are consuming a more Western diet, which is low residue, high-protein. More research is needed to probe deeper into the question of diverticular disease among indigenous Africans, whether it is still a myth or a common 21st-century problem.

Declaration

The authors wish to declare that the review was published in the book *Diverticular bowel disease – diagnosis and treatment* (ISBN: 978-0-85466-203-6).

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