Clinicopatholigical Presentation and Treatment Modalities of Colorectal Cancer in a Low-Middle-Income Country

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ABSTRACT

Background

Colorectal cancer (CRC) is one of the leading causes of cancer morbidity and mortality worldwide, with a rising incidence in low- and middle-income countries (LMICs). In Sub-Saharan Africa (SSA), limited screening, diagnostic delays, and weak health infrastructure contribute to late-stage presentation and poor outcomes. This study assessed the clinicopathological presentation and treatment modalities of CRC patients in a tertiary cancer centre within a resource-constrained setting.

Methods

A retrospective review was conducted using electronic medical records of CRC patients managed at the MEDSERVE–LUTH Cancer Centre, Lagos, Nigeria, between May 2019 and June 2024. Data extracted included demographic characteristics, clinical presentation, histology, stage, metastatic sites, and treatment received. Descriptive and correlation analyses were performed using SPSS version 27.

Results

A total of 448 CRC patients were analyzed, with a mean age of 54.07 ± 14.08 years (range: 10–89 years). Males comprised 57.2%. The most frequent presenting symptoms were rectal bleeding (51.3%), weight loss (44.2%), and abdominal pain (38.2%). Adenocarcinoma was the predominant histological type (87.3%), with 77.5% of tumors located on the left side. Nearly half (46%) presented with stage IV disease. The liver (27.2%) and lungs (20.5%) were the most common metastatic sites. Surgery was performed in 64.1% of patients, chemotherapy administered to 35.9%, and radiotherapy to 44.4%. Comorbidities were present in 46.2% of patients, mainly hypertension and diabetes.

Conclusion

Colorectal cancer in Nigeria continues to present at a relatively young age and advanced stage, with left-sided adenocarcinoma predominating. Limited access to screening, diagnostics, and comprehensive treatment underlies poor outcomes in LMICs. Strengthening public awareness, early detection programs, and health-system capacity are essential to improve survival and reduce the growing burden of CRC in Sub-Saharan Africa.

Keywords: Colorectal Cancer, Clinicopathological Presentation, Treatment Modalities, Low-middle-income countries

INTRODUCTION

Colorectal cancer (CRC) is the third most frequent cancer worldwide, with an estimated 1.5 million new cases, and it has the second-highest mortality rate, 576,858 deaths in 2020 (1). In males, it is the third most common in terms of incidence and mortality; however, in females, it is the third most common in terms of incidence and second in terms of mortality (2). According to a major Austrian study, men are twice as likely as women to develop CRC (1). LMICs account for 70% of all CRC-related deaths (3). In Sub-Saharan Africa (SSA), the crude incidence rate is 4.04 per 100 000, with a male to female ratio of 1.2:1 (1). The occurrence of CRC) is rising among younger individuals across all racial groups, especially among African Americans under 50, who often present with more advanced tumors (4). In the United States, CRC tends to be more aggressive and diagnosed at an advanced stage in younger populations. The most significant rise in incidence occurs between 40 and 44 (5). A study conducted in Ghana indicated that the average age for individuals receiving their first CRC diagnosis was 54 ± 16.8 years, with the most commonly reported symptoms being weight loss (44.80%), rectal bleeding (39.82%), and abdominal pain (38.91%) (6). Furthermore, a five-year prospective study in Nigeria found that most CRC patients at initial diagnosis were aged between 51 and 60, with 31% being 40 or younger (7).

Late presentation is a persistent problem in low-resource settings. Studies in several LMICs offer evidence for extended patient and health-system delays between symptom onset and ultimate diagnosis, which translate to high rates of stage III–IV disease at presentation and poorer survival. Contributing factors are limited public awareness of CRC symptoms, financial and geographic access barriers, decreased primary care recognition, and endoscopy and imaging shortages (8). Clinicopathological reports in LMIC cohorts are generally characterized by a predominance of left-sided tumors and rectal cancers among symptomatic patients, high frequencies of presentation with obstructive or bleeding symptoms, and a high percentage of tumors in young adults (<50 years) (9).

The primary treatment options for CRC are surgery, chemotherapy (CT), targeted agents, and radiotherapy (RT). However, the choice significantly depends on the site of the tumor, stage at presentation, individual patient factors, and increasingly, its molecular subtype (1). Over the years, systemic treatment for CRC has evolved from 5-fluorouracil (5-FU) to combination regimens involving 5-FU, oxaliplatin, irinotecan, or both, as well as the introduction of targeted agents for those with metastatic settings (1). CRC mortality varies between countries based on human development index and racial characteristics, which is linked to the stage of disease at presentation, patient health-seeking behavior, and treatment accessibility. In high-income countries, mortality is decreasing, while in LMIC, it is increasing. SSA has the highest CRC mortality-to-incidence ratio in the world (3). Therefore, this study aims to investigate the clinicopathological presentation and treatment modalities used for CRC patients within a low-middle-income country setting.

METHODOLOGY

Study Area

The study area is the MEDSERVE – Lagos University Teaching Hospital (MEDSERVE-LUTH) Cancer Centre, which was established in 2019. MEDSERVE-LUTH Cancer Centre is a specialized cancer treatment centre that offers cutting-edge therapies and a modern approach to cancer care in Africa. Situated within the site of Lagos University Teaching Hospital, it possesses the largest and most experienced oncology team in Nigeria. The treatment centre is equipped with high-quality modern technology, such as linear accelerators, brachytherapy machines, and treatment planning systems. Several treatments are also available at the cancer centre, which include internal and external beam radiation therapy, chemotherapy, and pharmacy treatments.

Study design and data collection

This is a retrospective study using data from the physical and electronic medical records of the MEDSERVE-LUTH Cancer Centre between May 2019 and June 2024. Patient records diagnosed with colorectal cancer from May 2019 to June 2024 were reviewed. Records were excluded if the medical records were incomplete. Among

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the 713 colorectal cancer patients identified during the study period, 448 had complete Electronic Medical Records, and 265 case with an inconclusive diagnosis or missing results was omitted from the study. The information collated included age at presentation, sex, body mass index, presenting symptoms, comorbidities, family history of cancer, alcohol history, smoking history, histology, stage, metastases, treatment modalities, and outcomes.

Statistical Analysis

Descriptive statistics was used to analyze the clinicopathological features of all patients. Pearson correlation coefficients were employed to assess the relationship between laterality, age at diagnosis, disease site, smoking history, previous alcohol consumption, family history, comorbidities, and stage. The software SPSS Statistics version 27.0 was used for statistical analysis and p-values less than 0.05 was considered statistically significant.

RESULTS

The ages of the patients ranged from 10 to 89 years, with a mean age of 54.07 ± 14.08 years. The majority of patients, 106 (53.3%), were within the 50–69 years age group, followed by 57 (28.6%) between 30–49 years, 21 (10.6%) aged 70–89 years, and 13 (6.5%) aged 10–29 years. Most patients were 114 males (57.2%) and 85 females (42.6%). Regarding religion, 153 (76.8%) were Christians, 21 (10.7%) were Muslims, while 25 (12.5%) belonged to other faiths. Most of the respondents, 147 (73.9%), were married, while 18 (9.2%) were single, 9 (4.5%) were widowed, and 3 (1.6%) were divorced or separated. By ethnicity, 109 (55.1%) were Yoruba, 47 (23.6%) Igbo, 13 (6.5%) Edo, 4 (2.2%) Hausa, and 25 (12.5%) from other ethnic groups. In terms of lifestyle, 72 (36.2%) reported alcohol consumption, and 25 (12.5%) had a history of smoking. For body mass index (BMI), 82 (41.3%) had normal weight, 36 (18%) were underweight, 33 (16.7%) were overweight, and 19 (9.6%) were obese.

Table 1 Demographic and Lifestyle Characteristics of CC Patients

Variables	**Frequency**	**Percentage**
Age (years)		
10 – 29	27	6
30 – 49	128	28.6
50 – 69	239	53.3
70 - 89	49	10.9
Mean ± SD for age	54.07 ± 14.08	
Sex		
Male	257	57.2
Female	191	42.6
Religion		
Christianity	344	76.8
Islam	48	10.7
Marital Status		
Single	41	9.2
Married	331	73.9
Widowed	20	4.5
Divorced/Separated	7	1.6
Ethnicity		
Yoruba	247	55.1
Igbo	106	23.6
Edo	29	6.5
Hausa	10	2.2
Others	56	12.5

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Alcohol History	162	36.2
Smoking History	56	12.5
Body Mass Index		
Underweight	81	18
Normal Weight	185	41.3
Overweight	75	16.7
Obese	43	9.6

The most common presenting symptom was rectal bleeding in 99 (51.3%) patients, followed by weight loss in 85 (44.2%), abdominal pain in 74 (38.2%), and altered bowel movement in 73 (37.9%). Other symptoms included anal pain in 36 (18.8%), abdominal swelling in 27 (14.1%), and anal mass/swelling in 16 (8.3%). 89 (46.2%) of the patients had at least one comorbid condition, most commonly hypertension (58; 30.1%) and diabetes mellitus (20; 10.5%). 27 (13.8%) reported a family history of cancer. Histologically, adenocarcinoma was the most common tumor type, observed in 169 (87.3%) patients. Other histological types included squamous cell carcinoma (8; 4.0%), tubular adenoma (1; 0.4%), melanoma (1; 0.2%), neuroendocrine tumor (1; 0.4%), and sarcoma (1; 0.2%). At diagnosis, 89 (46%) presented with Stage IV disease, 60 (30.8%) with Stage III, 33 (17%) with Stage II, and 12 (6.3%) with Stage I. Regarding tumor location, 150 (77.5%) had left-sided tumors, and 33 (17.2%) had right-sided tumors. Metastatic spread was most frequently to the liver (53; 27.2%), followed by lungs (40; 20.5%), bones (15; 8%), and brain (3; 1.3%).

Table 2 Clinicopathological Presentation of CC Patients

Variables	**Frequency**	**Percentage**
Anal Pain	84	18.8
Anal Mass/Swelling	37	8.3
Altered bowel movement	170	37.9
Weight loss	198	44.2
Abdominal Pain	171	38.2
Abdominal Swelling	63	14.1
Rectal Bleeding	230	51.3
Comorbidities	207	46.2
Hypertension	135	30.1
Diabetes	47	10.5
Peptic Ulcer Disease	23	5.1
Family history of Cancer	62	13.8
Histology		
Adenocarcinoma	391	87.3
Squamous Cell Carcinoma	18	4
Tubular Adenoma	2	0.4
Melanoma	1	0.2
Neuroendocrine	2	0.4
Sarcoma	1	0.2
Stage		
Stage I	28	6.3
Stage II	76	17
Stage III	138	30.8
Stage IV	206	46
Laterality		
Left	347	77.5
Right	77	17.2
Metastatic Site		
Bone	36	8

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Lung	92	20.5
Liver	122	27.2
Brain	6	1.3

Surgery was performed in 128 (64.1%) patients, making it the most common treatment modality. The surgical procedures included colostomy in 35 (17.6%), hemicolectomy in 27 (13.6%), and rectal resection in 8 (4%) patients. Chemotherapy was administered to 72 (35.9%) patients, while radiotherapy was given to 88 (44.4%). Combined chemoradiation therapy was employed in 8 (4.2%) cases.

Table 3 Treatment Modalities of CC Patients

Variables	**Frequency**	**Percentage**
Surgery	287	64.1
Hemicolectomy	61	13.6
Colostomy	79	17.6
Rectal Resection	2	4
Chemotherapy	161	35.9
Radiotherapy	199	44.4
Chemoradiation	19	4.2

DISCUSSION

The present study investigated the clinicopathological features and treatment patterns of colorectal cancer (CRC) patients managed at the MEDSERVE–LUTH Cancer Centre, Lagos, Nigeria. The mean age of 54.1 ± 14.1 years, with most patients between 50–69 years, mirrors findings from other Nigerian and Sub-Saharan African (SSA) studies where the mean age at presentation ranges from 49 to 57 years (7,10–12). CRC appears to affect relatively younger populations in SSA compared to high-income countries (HICs), where the mean age of diagnosis is typically above 60 years (2). The high proportion of patients under 50 years in this study (34.6%) further emphasizes the emerging burden of early-onset CRC in Africa, as reported by Alatise et al. (11) in Ile-Ife and Irabor et al. (7) in Ibadan .

The male predominance (57.2%) in this cohort is consistent with several SSA studies, including reports from Nigeria, Kenya, and Uganda, where males accounted for 55–60% of CRC cases (7,13). A meta-analysis of African studies by Awedew et al. (14) also confirmed a male preponderance across the region. This gender difference may reflect variations in exposure to modifiable risk factors such as smoking, alcohol consumption, and diet rich in red meat and processed foods (15).

The most common presenting symptoms—rectal bleeding (51.3%), weight loss (44.2%), abdominal pain (38.2%), and altered bowel habits (37.9%)—are similar to findings in Nigeria and other SSA studies (11,13). In Ethiopia, Awedew et al. (14), also reported rectal bleeding and abdominal pain as dominant symptoms, while in Kenya, Wakhisi et al. (16) documented rectal bleeding in 47% of cases. These symptoms reflect late disease presentation and highlight the absence of population-based screening and weak symptom recognition in the region. Delayed diagnosis, often exceeding 6–12 months from symptom onset, remains a major cause of advanced disease presentation in Nigeria (17).

Left-sided lesions (77.5%) predominated in this study, consistent with most African reports that document rectal and sigmoid colon involvement as the most frequent tumor sites (10,13,14,18). Studies from Lagos, Kampala, and Addis Ababa have reported left-sided involvement in 65–80% of patients (11,14,19). Adenocarcinoma accounted for 87.3% of cases here, which aligns with other SSA series where adenocarcinoma constitutes over 85% of all CRC histology (11,13,20). However, molecular studies from Nigeria and Egypt suggest that African patients may have higher microsatellite instability (MSI) and KRAS mutation rates than Caucasian populations, indicating potential genetic and environmental interactions influencing tumor biology (21,22).

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Nearly half of the patients (46%) presented with stage IV disease, a figure comparable to reports from Nigeria (45–55%) (7,17), Kenya (48%) (16), and Ghana (43%) (23). Advanced stage at presentation is a hallmark of CRC in SSA and other LMICs, largely attributed to poor health-seeking behavior, low public awareness, limited endoscopy capacity, and absence of organized screening programs (1,14,24). In contrast, less than 20% of CRC patients in high-income countries present at stage IV due to widespread use of colonoscopy and fecal occult blood testing (2). The high prevalence of advanced disease contributes significantly to poor outcomes and survival disparities between SSA and developed regions.

The liver (27.2%) and lung (20.5%) were the most frequent metastatic sites, aligning with global and African patterns of CRC spread (10,14,25). Liver metastasis predominance has been reported in over 30% of Nigerian CRC cases (11,13). This reflects both the biological tendency for hematogenous dissemination via the portal system and delayed presentation. Multi-organ metastases in a subset of patients indicate further progression before treatment initiation, underscoring the urgent need for early detection and referral.

Surgery was performed in 64.1% of patients, while 35.9% received chemotherapy and 44.4% received radiotherapy. These figures align with previous studies in Nigeria and East Africa, where surgery remains the most accessible treatment modality, while chemotherapy and radiotherapy usage are constrained by cost and infrastructure (13,23,26). Alatise et al. (11) and Onwuka et al. (17) highlighted that limited access to chemotherapy drugs and radiotherapy machines continues to hinder guideline-based multimodal CRC management across SSA. In LMICs like India and Pakistan, similar treatment gaps persist, with fewer than 50% of eligible patients receiving adjuvant chemotherapy (27,28).

Almost half of the patients (46.2%) had comorbid conditions, mainly hypertension and diabetes, consistent with findings from Nigeria where comorbidities are increasingly reported among cancer patients (29). Lifestyle factors such as alcohol consumption (36.2%) and smoking (12.5%) observed in this study parallel rates reported in other African cohorts (13,14). Obesity and physical inactivity, though less pronounced in this cohort, are rising risk factors linked to CRC across LMICs (30).

Only 13.8% reported a family history of cancer, reflecting low awareness and lack of genetic counseling infrastructure in SSA. In developed settings, family-based cascade screening and genetic counseling are key strategies for early CRC detection and risk reduction (24).

CONCLUSION

This study demonstrates the overall patterns of colorectal cancer (CRC) in a low-middle-income country, with patients presenting at a younger age and with advanced disease stages. The median age of 54 and the preponderance of left-sided adenocarcinomas align with local reports across Sub-Saharan Africa. Nearly half of the patients presented with metastatic or stage IV disease, which demonstrates the urgent need for early detection strategies. Although surgery remains the mainstay of treatment, the relatively limited use of chemotherapy and radiotherapy reflects infrastructural limitations, unaffordable costs, and systemic inequities in cancer care in low-resource settings. The occurrence of comorbidities such as hypertension and diabetes also increases the challenge of treatment and negatively affects prognosis. Robust development of primary healthcare systems and national cancer control programs is an essential step toward the reduction of late presentation and mortality from CRC in low- and middle-income countries.

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