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CLINICAL PROFILE AND SURGICAL MANAGEMENT OF COLORECTAL CANCER IN A TERTIARY CENTER IN NORTHWEST NIGERIA: A 10-YEAR DESCRIPTIVE STUDY

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Abstract
Background: Colorectal cancer (CRC) is a common surgical problem globally, with an increasing incidence and worse outcomes in Low- and medium-income countries, where the magnitude remains under-reported.
Objective: To describe the presentation of colorectal cancer in a tertiary hospital in Northwest Nigeria and highlight the challenges of surgical management.
Methods: The study period was 10 years, January 2012 to December 2021, for all patients presenting with histologic diagnosis of colon or rectal cancer presenting through the surgical outpatient clinics, emergency departments, or seen through non-surgical wards of Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria during the study period.
Results: There was a total of 221 patients with histologically confirmed colon and rectal cancers over the study period. The male-to-female ratio was 1.1:1, age range was 14–80 years, and a peak age group of 30-40years. 195 patients (88.24%) were 50 years or less, early-onset CRC. There was a rise in the yearly hospital-based incidence of presentation in CRC for 12 patients in 2012 to 32 patients in 2019. Majority, 140 patients (63.35%), presented in emergency, and delay in presentation was a common feature, with over 60% of patients presenting for the first time 6 months after onset of symptoms. The rectum was the most affected site, accounting for 66.06% of patients (n=146). A third of patients did not receive surgical intervention due to advanced inoperable disease, financial constraints, or refusal of colostomy. Majority of the patients presented with advanced stage. 55% of patients (n=121) presented with Dukes' stage C. 10% of patients (n=22) had metastatic disease.
Conclusion: Colorectal Cancer incidence is increasing in our environment. Early-onset disease at an advanced stage is the common presentation. With the challenges of surgical care, poor outcomes have been maintained in our patients.

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1. Introduction

Colorectal cancer (CRC) remains a growing public health challenge, being the third most commonly diagnosed malignancy and the second leading cause of cancer death.(Bray et al., 2024) In 2022, 1.9 million new cases were recorded globally , and 903,859 deaths were estimated to occur in 2022, representing 9.6% and 9.3% cancer cases and deaths respectively.(Bray et al., 2024) The global burden of colorectal cancer (CRC) in 2012 was expected to increase by 60% to more than 2.2 million new cases and 1.1 million deaths by 2030.(Arnold et al., 2017) Incidence rates are approximately 4-fold higher in transitioned countries compared with transitioning countries, but there is less variation in the mortality rates because of higher fatality in transitioning countries.(Sung et al., 2021) CRC is considered one of the clearest markers of the cancer transition, replacing infection-related cancers in countries undergoing rapid societal and economic changes together with other cancers predominantly linked to western lifestyles, which are already frequently found in high-income countries.(Arnold et al., 2017)

According to global cancer observatory statistics, CRC is the 4th commonest cancer in Nigeria, with an incidence of 8 114 cases in 2022, accounting for 6.4% of all cancers in Nigeria. It stood at 4th position in the causes of cancer death in Nigeria, accounting for 5 912 deaths in 2022, representing 7.4% of all cancer deaths in Nigeria. The 5-year prevalence of the disease was 17–270 (8.0 per 100,000 population.(Bray et al., 2024)

The risk factors for CRC include older age male sex, dietary risk factors like consumption of low fiber diet, red meat, alcohol, and tobacco consumption, obesity, sedentary lifestyle, and hereditary factors. Irabor reported the emergence and rising trend of CRC in West Africa attributing this to lifestyle and dietary changes.(Irabor, 2017)The demography and pathological profile of CRC in sub-Saharan Africa is such that it is of earlier onset, higher in males, more left-sided, and mainly adenocarcinomas with higher incidence of signet-ring variety compared to the developed world.(Katsidzira et al., 2017) A study by Aliyu et al on the pattern and presentations of CRC in North-Eastern Nigeria between 2006 to 2013 revealed a rising incidence, male and rectal predominance, with 41.5% of patients presenting with locally advanced disease.(Ningi, 2020)

Information on the burden of a disease guides resource allocation toward disease control, directs further research, and assists in surgical education, all geared toward better patient care and improved health care. Epidemiological data from LMICs are generally poor. To the best of our knowledge, this is the first study to describe the burden of CRC in our center in the last 2 decades.

Research questions

This study aims to answer the following questions:

1. What is the hospital incidence of CRC in our Center?
2. The pattern of presentation and symptoms of CRC
3. Outcomes of surgical management of patients with CRC in a low-resource setting

Aims and Objectives

Aim: To describe the burden of colorectal cancer

Specific objectives: To determine

1. the incidence of CRC in our hospital
2. patterns of CRC presentation and symptoms
3. Surgical outcomes of patients with CRC in a low-resource setting

2. Patient and Methods

Study design: This was a 10-year, Jan 2012 to Dec 2021, retrospective, descriptive study.

Study setting: This study was performed at the general surgery unit of Usmanu Danfodiyo University Teaching Hospital. The hospital is a large multispecialty referral tertiary center providing manpower training and highly specialized care to residents of Sokoto, Zamfara, Kebbi, and Niger states (with a combined estimated 2016

population of 19,509,818)("List of Nigerian States by Population," 2021), including neighboring states of Niger and Benin republics.

Study population: The study population included all patients presenting with clinical, radiological, and histological diagnosis of colon or rectal cancer who presented through the surgical outpatient clinics or emergency departments or who were seen through non-surgical wards during the study period.

Inclusion Criteria

1. All patients who met the diagnostic criteria with histological confirmation.
2. Patients managed within the study period

Exclusion Criteria

1. Patients with incomplete case notes
2. Patients without histological confirmation

Data collection*:* Data were collected using a uniform proforma and entered into a spreadsheet. Information obtained included sociodemographic variables, clinicopathologic data, screening/investigation modalities, and treatment. Data collated and entered into the Statistical Package for Social Sciences Software for Windows for \analysis (IBM SPSS Statistics 25).

Data analysis: Continuous variables are presented as mean and standard deviation. Categorical data were analyzed using proportions. Charts and tables were used to present the frequency distribution of the variables. Comparative analysis of distribution of numerical and categorical variables was performed using the independent t-test and Chi-Square (or Fisher's test) respectively. Reporting of data obtained from this study followed the STROBE guidelines. Statistical significance was set at a p-value of <0.05. IBM SPSS Version 25.0 was used to analyze all data obtained in this study.

Ethical approval:

Ethical approval was obtained from the hospital's ethics and research. The confidentiality of patient information was ensured.

3. RESULTS

A total of 221 patients with histologically confirmed colon and rectal cancers were included in the study. The male and female patients included 117 and 104 patients, respectively, with a M: F ratio of 1.1:1.

The age range was 14–80 years, with a peak age group of 30-40 years. 195 patients (88.24%) were 50 years or less, early-onset CRC.

There was a rise in the yearly hospital-based incidence of CRC from 12 patients in 2012 to 32 patients in 2019, representing a 166.67% increase in the yearly incidence.

The tribe of patients, 67 patients (30.32%) were Fulani, 23 patients (10.4%) were Hausa and 70 patients (31.67%) were Hausa/Fulani.

The common clinical presentation of the patients are shown in Table 1. A total of 140 patients (63.35%) presented as emergency to the accident and emergency department, whereas only 81 patients (36.65%) were seen electively.

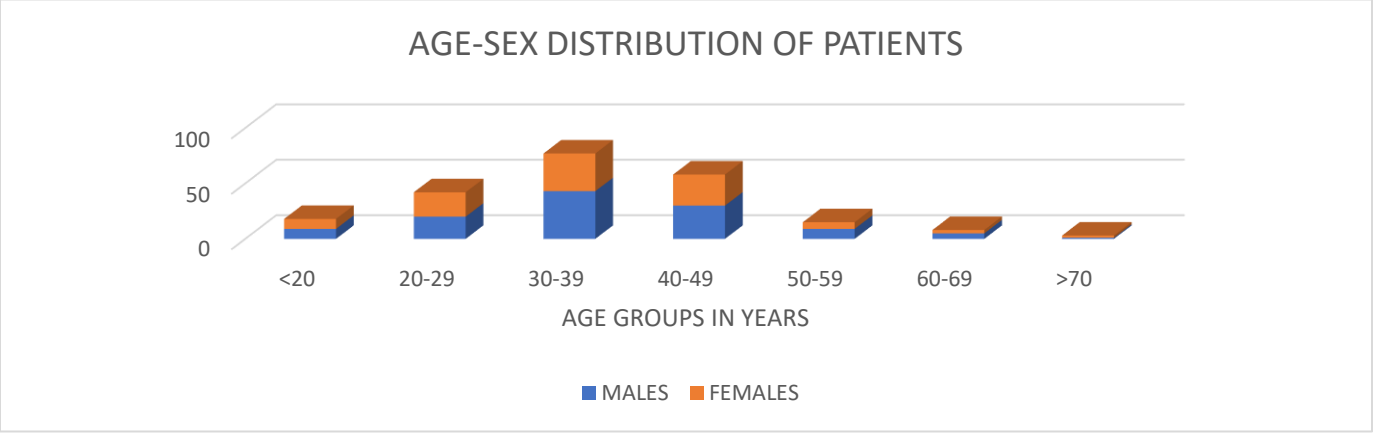

FIGURE 1: SEX AND AGE DISTRUBUTION IN PATIENTS WITH CRC

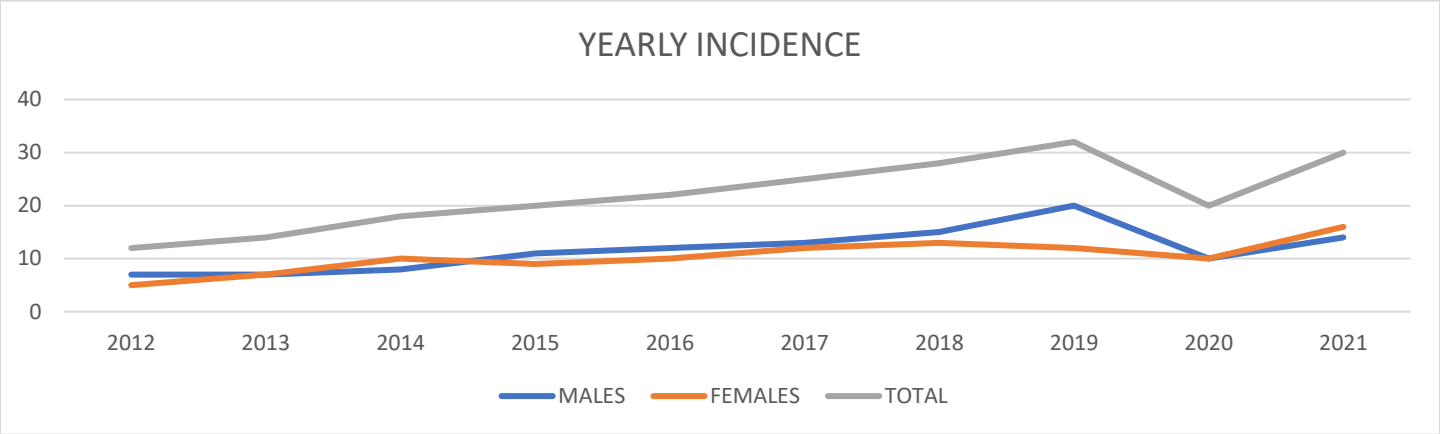

FIGURE 3: ANNUAL INCIDENCE OF CRC IN SOKOTO

S/N	**CLINICAL PRESENTATION**	**FREQUENCY**	**PERCENTAGE**
1	ACUTE INTESTINAL OBSTRUCTION	100	45.25%
2	ANEMIA	160	72.40%
3	CHANGES IN BOWEL HABIT	180	81.45%
4	RECTAL BLEEDING	135	61.09%
5	LOSS OF APPETITE	150	67.87%
6	WEIGHT LOSS	170	76.92%
7	DEHYDRATION/ELECT INBALANCE	95	42.99%

TABLE 1; COMMON CLINICAL PRESENTATION AMONG CRC PATIENTS IN SOKOTO

Delay in presentation was a common feature, with >60% of patients presenting for the first time 6 months after the onset of symptoms. Table 2 shows the duration after the onset of symptoms before presentation.

The rectum was the most affected site, accounting for 66.06% of patients (n=146), ascending colon including cecum 18.1% (n=40), sigmoid 10.86% (n=24), Descending Colon 2.71%, and transverse colon 2.26% (n=5).

A third of patients did not receive surgical intervention due to advanced inoperable disease, financial constraints, or refusal of colostomy. 66.52% (n=147) had received surgical intervention. Table 3 presents the types of surgery performed.

Patients were in the majority of times seen at an advanced stage. 55% of patients (n=121) presented with Dukes' stage C. 10% of patients (n=22) had metastatic disease.

S/NO	**DURATION OF SYMPTOMS**	**FREQUENCY**	**PERCENTAGE**
1	<3MONTHS	34	15.38%
2	3-6 MONTHS	44	19.91%
3	6MONTHS-1YEAR	130	58.82%
4	>1YEAR	13	5.88%

Table 2; DURATION OF SYMPTOMS BEFORE FIRST PRESENTATION TO THE HOSPITAL AMONG CRC PATIENTS IN SOKOTO

S/N	**TYPE OF SURGERY**	**FREQUENCY**	**PERCENTAGE**
1	DIVERTING COLOSTOMY	39	26.53%
2	RIGHT HEMICOLECTOMY	32	21.77%
3	ILEOCOLIC BYPASS	8	5.44%
4	LEFT HEMICOLECTOMY	11	7.48%
5	HARTMANN'S PROCEDURE	40	27.21%
6	ANTERIOR RESECTION	13	8.84%
7	ABDOMINOPERINEAL RESECTION	4	2.72%

TABLE 3; DISTRIBUTION OF SURGICAL PROCEDURES FOR CRC PATIENTS IN SOKOTO

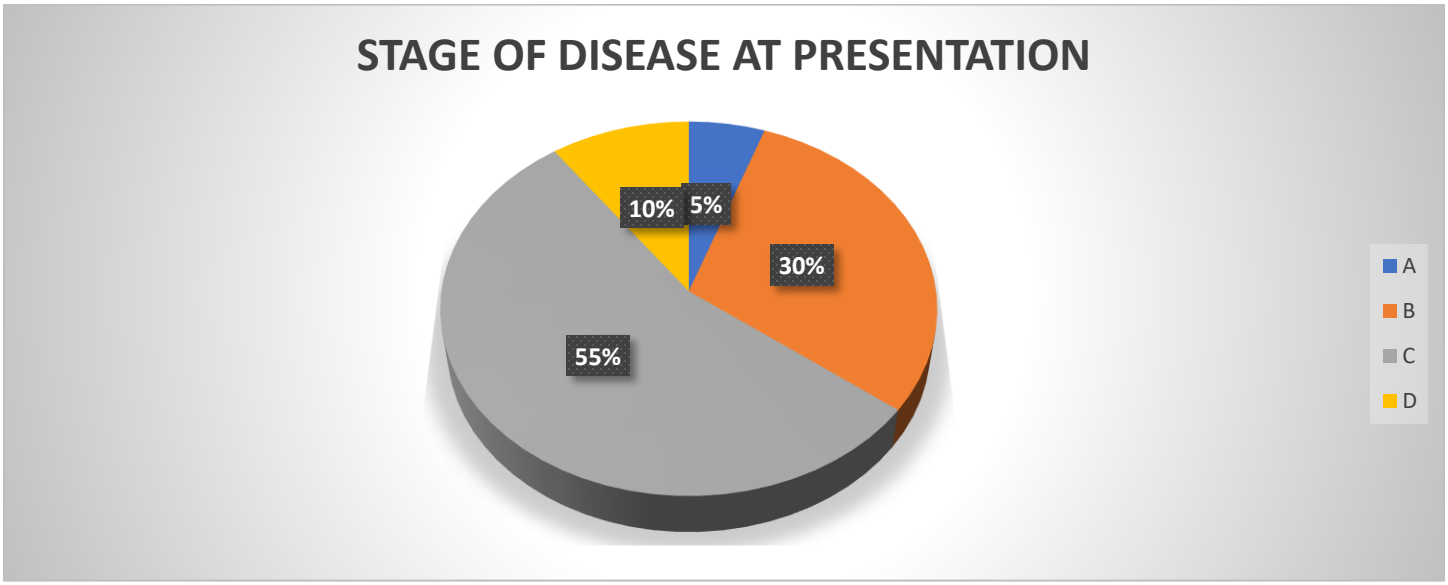

FIGURE 3 DUKE'S STAGE AT PRESENTATION OF CRC PATIENTS IN SOKOTO

4. DISCUSSION

The burden of CRC in Sub-Saharan Africa has seen drastic changes over the last three decades, from a rare disease to a disease of public health dimension. Several reports has shown decade after decade an increase in the incidence of the disease. (Irabor, 2017; Katsidzira et al., 2017) The total number of patients of 221 patients in this study seen over a 10-year period with a steady rise in the yearly incidence is consistent with the changing pattern of the burden of CRC in SSA. This is a sharp increase in frequency compared with 40 patients in eight years reported a 13 years prior to the onset period of the present study from same centre.(Mbah, 2009) There have been various narratives in literature trying to explain this changing trend in the burden of CRC in SSA. The effects of the dual phenomenon of westernization and urbanization on nutritional trends/physical inactivity, smoking, and alcohol consumption have been profusely expounded as major contributors to the increasing burden of CRC and non-communicable diseases in general.(Irabor, 2017; Jemal et al., 2012). Increasing life expectancy has also been thought to be partly responsible for the growing trends of CRC in SSA. Africa remains the youngest continent on earth, with only 5.55% (against 13.6% world-wide) of its population aged over 60 years; however, this narrative is changing, and the African population is aging, and this figure is thought to triple by 2050. Increasing capabilities for diagnosis and population-based registries are other factors that have been propounded to be responsible for increasing incidence of CRC in Africa.(Tazinkeng et al., 2024).

It is important to note that the majority of CRC (up to 55%) are preventable with evidence-based modification of risk factors such as smoking, obesity, alcohol consumption, physical inactivity, and low residue diet.(Awedew et al., 2022). The slight predominance of the disease of Male-female ratio of 1.1:1 seen in the present study, which is consistent with most studies from SSA and worldwide (Awedew et al., 2022; Baldwin et al., 2024; Bray et al., 2024), could be explained by the predominance of these modifiable risk factors in the male gender.

The peak age group of presentation and percentage of patients presenting before 50 years (early onset disease) of 30-40years and 88.2% respectively in the present study were striking and quite different from studies from other parts of Nigeria or the subregion. It has been widely reported that CRC occurs at a younger age in the fifth decade, with a percentage of early onset disease at 19-38% (Awedew et al., 2022; Baldwin et al., 2024) compared with reports from transitioned countries and even from North Africa (Awedew et al., 2022, 2022); however, the results in the present study show the disease occurring in much younger patients. There are two possible explanations for this result. The low life expectancy of the study population, which is even lower in rural parts of Northern Nigeria. The hospital where the study was conducted was a public hospital, and a large proportion of its patients were from rural areas. The second plausible explanation is the high proportion of hereditary forms of CRC. The

underlying reason will require genetic studies to further elucidate. There is a need for a multigene panel assessment of all patients aged below 50 years, as recommended by the National Comprehensive Cancer Network, to guide treatment, prognosis, and elucidate information for further research.

The present study clearly showed a pattern of late presentation where majority (64.7%) had significant symptoms ongoing before presentation and furthermore majority (63.4%) presented to the hospital as an emergency. This is the picture in many of the reports from SSA where the mean time of presentation has been reported to be 8-15months.(Irabor et al., 2014). Similar to most reports from SSA, the late presentation in the index study can be attributed to ignorance, poverty, gullibility, and poor health-seeking behaviour. There is an army of traditional medicine practitioners in the Northern part of Nigeria who attribute change in bowel, rectal bleeding, and other bowel to a term known as "Dan Kanoma". These traditional practitioners have practiced for generations and have a good information dissemination strategy that is readily accessible and their treatment affordable to the largely poor population. They claim to have remedies for these symptoms, but most often, they are unable to recognize the red flags for malignant disease. There is a strong acceptance of this mode of treatment among the local population, which is further strengthened by its accessibility (usually available in patients' neighbourhood, places of worship and/or workplace) and affordability. Therefore, they are the first point of call for most patients with colorectal cancer. Patients only seek orthodox care if symptoms become intolerable or complications develop. Unfortunately, patients present late to the orthodox practitioner with advanced disease and poor prognosis. The consequent high morbidity and mortality rate is seen as a failure of orthodox medicine provided by the tertiary hospitals. This further strengthens the belief that traditional medicine is more effective and that traditional practitioners are the preferred first choice for the treatment of "Dan Kanoma" among the local population. There is a need for concerted effort by all stakeholders to enlighten the local population to break this vicious cycle that has maintained late presentation in Northern Nigeria.

A large percentage of tumours in the cohort of patients in this study had a disease in the rectosigmoid region. This has been the predominant report from works in west African subregion.(Irabor, 2017)

The old assertion proposed by Burkitts(Burkitt, 1971) that this is due to more contact of feces with the rectum than other parts of the colon seems to be the most logical reason in the literature. The possibility of differences in the biology of rectal and colonic tumors as a reason for the differences in topographic peculiarities needs to be explored.

The results of this study show a grim picture of >60% of patients not having to undergo curative surgery. The main reasons for this were inoperable tumour, financial constraints, and patient refusal to undergo colostomy. This is similar to reports from other parts of Nigeria, and these have been reported to have a significant influence on the survival of patients in Nigeria.(Sharma et al., 2019). There is a need for stakeholders to brainstorm on sustainable health financing that will enable these poor patients to access treatment. Health education on treatment modalities, especially the role of colostomy, should be emphasized.

Conclusion

Colorectal cancer incidence is increasing in our environment. Early-onset disease in young people with late presentation at advanced stage is common. The low percentage of curative resections have maintained poor unacceptable outcome in our practice.

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