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Short communication

The incidence and histo-pathological characteristics of colorectal cancer in a population based cancer registry in Zimbabwe

Leolin Katsidzira[a,b,*], Eric Chokunonga[c], Innocent T. Gangaidzo[a], Simbarashe Rusakaniko[d], Margaret Borok[a,c], Zvifadzo Matsena-Zingoni[e], Sandie Thomson[b], Raj Ramesar[f], Jonathan A. Matenga[a]

[a] Department of Medicine, College of Health Sciences, University of Zimbabwe, P.O. Box A178, Avondale, Harare, Zimbabwe
[b] Division of Gastroenterology, Department of Medicine, University of Cape Town, Cape Town, Groote Schuur Hospital, Observatory 7925, Cape Town, South Africa
[c] Zimbabwe National Cancer Registry, P.O. Box A449, Avondale, Harare, Zimbabwe,
[d] Department of Community Medicine, College of Health Sciences, University of Zimbabwe, P.O. Box A178, Avondale, Harare, Zimbabwe
[e] National Institute of Health Research, Cnr Mazowe/Josiah Tongogara street, Harare, Zimbabwe
[f] MRC/UCT Human Genetics Research Unit, Division of Human Genetics, Institute of Infectious Disease and Molecular Medicine, University of Cape Town, South Africa

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ABSTRACT

Background: Data on colorectal cancer (CRC) in sub-Saharan Africa is mainly based on hospital series which suggest low incidence and frequent early onset cancers. This study characterises colorectal cancer in a population-based cancer registry in Zimbabwe.
Methods: Cases of CRC recorded by the Zimbabwe National Cancer Registry between 2003 and 2012 were analysed. Demographic and pathological characteristics were compared according to ethnicity and age. Trends in age standardised incidence rates (ASR) were determined.
Results: There were 886 and 216 cases of CRC among black Africans and Caucasians respectively, and 26% of the black Africans were younger than 40 years. Signet ring cell carcinomas were more common among black Africans compared to Caucasians (4% vs 1%, p = 0.027). ASR increased by 1.9%/year and 3.9%/year among black African males and females respectively.
Conclusion: CRC incidence is rising among black Africans and has unique demographic and pathological characteristics.

1. Introduction

Although colorectal cancer is widely regarded as uncommon in sub-Saharan Africa, it is probably underestimated [1]. There were approximately 40,400 cases in Africa in 2012, representing 3% of the global burden [2]. The age standardised incidence rate (ASR) per 100,000 in males and females respectively, vary from 3.1 and 2.9 in Malawi to 12.9 and 11.2 in Zimbabwe [3,4]. In contrast, the highest rates globally are in the Australia/New Zealand region with an ASR of 44.8 and 32.2 in males and females, respectively [2]. There are no reliable figures in most countries in Africa, as less than 2% of the population is covered by high quality cancer registries [2]. Estimates are often made from single-centre case series or even extrapolations from neighbouring countries. Although these estimates all seem to suggest that the incidence is low, there is significant under-diagnosis and under-reporting.

In contrast to incidence, mortality from colorectal cancer in sub-Saharan Africa is considerably higher than in developed countries. The most recent reported 5-year survival rates from this region were 8.3% in Uganda and 17.4% in Zimbabwe between 1993 and 1997 [5,6]. In contrast, more current 5-year survival rates from the United States in 2005–2011 and England and Wales in 2010–2011 were 64.9% and 58.7%, respectively [7,8]. Despite this lack of recent data from our region, there is little reason to expect significant improvement in survival as most patients continue to present with advanced disease [9].

While resource limitations and late presentation are the major causes of the high mortality in sub-Saharan Africa, it is likely that certain biological factors associated with aggressive tumour behaviour also contribute. Colorectal cancer in sub-Saharan Africa is characterised by a high frequency of early-onset disease, often

* Corresponding author at: Department of Medicine, College of Health Sciences, University of Zimbabwe, P.O. Box A178, Avondale, Harare, Zimbabwe.
E-mail address: lkatsidzira@hotmail.com (L. Katsidzira).

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with mucinous and signet ring cell morphology [9–11]. These features are, to a variable extent, associated with a poor prognosis [12,13]. While this argument is compelling, the supporting epidemiological data is based on hospital-based retrospective case series, which are not truly representative. This study aims to contribute to more epidemiologically sound data of colorectal cancer in a sub-Saharan African country using a population based registry.

2. Material and methods

2.1. Setting

The Zimbabwe Cancer Registry was established in 1985, and it achieved complete coverage of its target population of the capital city, Harare by 1990. Population-based data for Harare have been included in the last four successive volumes of the 'Cancer Incidence in 5 Continents' monographs jointly published by the International Agency for Research on Cancer (IARC) and the International Association of Cancer Registries (IACR). Cancer registration is achieved by active and passive surveillance of public and private institutions (hospitals, specialist clinics, diagnostic laboratories, radiotherapy centres and radiology departments) and government death registration offices. The data are processed using the CanReg4 cancer registration software provided by the IARC. The software has in-built automatic checks for data validity. There are robust manual and electronic record linkage systems to avoid multiple registrations. Apart from a brief period of under-registration in 2007–2009 after severe socio-economic challenges affected the healthcare system, the data have been substantially complete [14].

2.2. Data collection

Datasets on colorectal cancer cases recorded between 2003 and 2012 were retrieved. Colorectal cancers were retrieved using the International Classification of Diseases for Oncology third edition (ICD-O-3) codes as follows; C18.0–C18.9, C19.9 and C20.9). Tumours of the appendix and anal canal, carcinoid tumours, Kaposi sarcoma, lymphomas and gastrointestinal stromal tumours were excluded. Demographic and pathological characteristics including age, gender, race, tumour location and histological groups were extracted. The histological groups considered were adenocarcinoma, mucinous, signet ring cell, squamous cell, small cell, undifferentiated, and adenosquamous carcinomas (ICD-O-3 codes 8140/3, 8480/3, 8481, 8490/3, 8041/3, 8070/3, 8560/3, 8510/3, 8020/3). Age standardised incidence rates among black Africans in Harare City were calculated for 2003 and 2012. Cases originating out of Harare were excluded from the incidence calculation and the population at-risk was projected from the 2002 and 2012 Zimbabwean national censuses.

2.3. Statistical methods

Demographic characteristics, tumour location and histological subtypes were compared between different ethnic groups using the χ^2 test or the Fisher's exact test for categorical variables and the student *t*-test for continuous variables. Differences in demographic and pathological characteristics between black Africans aged 40 years or younger, and those older than 40 years were compared using the χ^2 test. A p value of 0.05 or less was regarded as significant. The statistical analyses were computed using STATA/MP version 12.0 (College Station, Texas) or CanReg 4. Trends in colorectal cancer incidence between 2003 and 2012 were analysed using the National Cancer Institute's Joinpoint Regression Program (version 4.2.0.2) [15].

3. Results

A total of 1457 cases of colorectal cancer were recorded among Harare residents between January 2003 and December 2012. Of these cases, 1117 were confirmed histologically and were considered for further analysis.

3.1. Demographic and histological patterns of colorectal cancer

Of the 1117 cases of confirmed colorectal cancer, 886 (79.3%) were black Africans, 216 (19.3%) were Caucasians and 15 (1.4%) were classified as being of other ethnic origins. Table 1 compares the demographic and pathological characteristics of colorectal cancer between Caucasians and black Africans. The male: female ratio was 1.7:1 among Caucasians and 1.13:1 among black Africans. The mean age at diagnosis was lower among black Africans compared to Caucasians (52.9years vs 69.5years, $p < 0.001$). A higher proportion of black Africans with colorectal cancer were younger than 40 years at diagnosis compared to Caucasians (26.3% vs 1%, $p < 0.001$). Of note, only two Caucasians were under 40 years of age. The age distribution of colorectal cancer between the two groups and the population pyramids are shown in supplementary Figs. 1 and 2 respectively. The black African population has a broad base, and is younger than the Caucasian population.

Colonic tumours were more common than rectal tumours among both black Africans and Caucasians (Table 1). Signet ring cell and mucinous carcinomas were more common in black patients (4% and 7%) compared to Caucasians (1% and 4%) ($p = 0.027$).

3.2. Demographic and pathological patterns of colorectal cancer among black Africans

More than a quarter of the black Africans were aged 40 years or less. The gender distribution and tumour location were similar between these young black African patients and their older counterparts (Table 2). There were significant differences in histopathological characteristics between young and older black patients; signet ring cell tumours were more common in young black patients compared to older adults (10% vs 2%, $p < 0.001$).

3.3. Incidence of colorectal cancer

The age standardised incidence rate per 100,000 of colorectal cancer among black Africans was 9.5 and 8.9 in males and females

Table 1
Comparison of demographic and pathological characteristics between different population groups.

Variable	Black Africans n = 886	Caucasians n = 216	P value
Gender			
Males	471 (53%)	136 (63%)	0.009
Mean age (SD)[a]	52.9 (16.6)	69.5 (10.8)	<0.001
Site			
Colon	487 (55%)	135 (62%)	
Rectum	399 (45%)	81 (38%)	0.133
Histology[b]			
Adenocarcinoma	768 (87%)	202(94%)	
Mucinous adenocarcinoma	59 (7%)	10(4%)	
Signet ring cell carcinoma	37 (4%)	3(1%)	
Other	22 (2%)	1(1%)	0.024

[a] 39 black Africans and 4 Caucasians had missing ages.
[b] Fisher's exact test.