

■ *Original Article*

## Racial differences of colorectal cancer in a single institution in Northeast Louisiana primarily serving the underserved population

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### Abstract

**Background:** Colorectal cancer (CRC) screening has helped decrease the incidence of CRC in the last two decades. Still African Americans share a higher burden of CRC disease in the United States in comparison to Caucasians. **Objective:** To study racial differences of colorectal cancer in low income patients. **Methods:** Retrospective chart review of all admitted patients with a diagnosis of CRC was done by the lead author over a period of eight months. **Results:** This study, drawn from a poor, diverse population of Louisiana residents suggests socioeconomic factors may explain observed differences in CRC rates between African Americans and Caucasians. **Conclusion:** Large scale surveillance studies that address social determinants of CRC are needed to further explore this association.

**Keywords:** colorectal cancer, African Americans, Caucasians, disparity, socioeconomic factors

### Introduction

Colorectal cancer (CRC) is found everywhere in the world. Developed countries have much higher incidence than the developing world, with the United States reporting one of the highest rates of CRC in the world. By comparison the incidence of CRC is about tenfold lower in parts of Asia and Africa.<sup>1,3</sup> CRC ranks as the third leading cancer in both incidence and death both in men and women in US.<sup>2</sup>

Public health surveillance data indicates African Americans have a higher incidence of CRC than in Caucasians (62.1 versus 51.2 per 100,000).<sup>2</sup> African Americans are more likely to be diagnosed with a more advanced disease and at an earlier age.<sup>4</sup> Reasons for this disparity are not known but perhaps it may be related to dietary and other lifestyle related factors. Recently published results of multi-ethnic cohort study suggested that differences in the distribution of known/suspected risk factors account for only a modest proportion of the ethnic variation in CRC risk and that other factors, possibly including genetic susceptibility, are important contributors to the observed disparities in incidence and disease severity.<sup>5</sup> Mutations profile in MSH and MLH1 genes were different in Asian and Caucasian groups for hereditary CRC in the study

published by Wei et al (2010).<sup>6</sup>

Prior work and clinical experience suggests that socioeconomic conditions as well as genetic factors may contribute to observed racial disparities in severity of CRC. To explore this further, we conducted a retrospective study of patients receiving care from EA Conway Medical Center (EACMC), major hospital for the indigent, uninsured and underserved populations in Northeast Louisiana. The study focused on sidedness of CRC (e.g., left or right) as a proxy for severity and indicator of higher mortality. We hypothesized the rates of right-sided CRC between African Americans and Caucasians would be the same among low-income patients served by EACMC.

### Methods

All patients with a diagnosis of CRC admitted at EA Conway Medical Center for CRC-related treatment between January 1995 and December 2004 were identified by the billing system database. All patients receiving screening services for CRC were excluded. Only two hundred and thirty seven charts were available for analysis. Retrospective chart review was performed by the lead author over a period of eight months collecting relevant data from the chart, including race, age at diagnosis, gender, location of CRC (e.g., side), other co-morbid conditions (e.g., diabetes, hypertension) and family history of cancer. Univariate differences between African Americans

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and Caucasians were assessed by chi square and t-test depending on the variable type. A multivariate model was created via logistic regression to estimate the odds ratio for right-sided CRC by race, adjusting for age and gender. Right-sidedness was selected as an outcome variable due to its association with higher mortality and possible contribution to health disparities related to CRC. EA Conway Medical Center’s Institutional Review Board approved this study.

**Results**

The billing system database included two hundred and

eighty five patients with a CRC diagnosis. The analysis is limited to two hundred and thirty five patients for whom medical charts were available and race was documented therein. Race data was missing for just one of the available charts. Of the two hundred and thirty five included patients, one hundred and thirty eight (or 58.7%) were African American and ninety seven (or 41.3%) were Caucasian. The mean age was 55.7 years (range 26, 80); 54.5% of patients were female. Table 1 presents patient attributes, stratified by race.

**Table 1:** Attributes of CRC Patients

Race	African American		Caucasian		Total		p
	n = 138		n = 97		n = 235		
Gender							0.069
Male	40.6%		52.6%		45.5%		
Female	59.4%		47.4%		54.5%		
Age (mean ± standard deviation)	54.5 ± 10.8		57.4 ± 9.7		55.7 ± 10.4		0.032 *
CRC Family History							0.007 *
First Degree Relative with CRC	8.7%		19.6%		13.2%		
Other Type or Relative	21.7%		29.9%		25.1%		
No History	69.6%		50.5%		61.7%		
Co-morbidities							
Any	68	49.3%	34	35.1%	102	43.4%	0.030 *
- Cancer	6	8.8%	6	17.6%	6	5.9%	
- Diabetes Mellitus	23	33.8%	13	38.2%	36	35.3%	
- Hypertension	51	75.0%	22	64.7%	73	71.6%	
- Other Co-morbidity	32	31.4%	18	17.6%	50	49.0%	
Site of CRC							0.536
Right-sided	41.3%		45.4%		43.0%		
Left-sided	58.7%		54.6%		57.0%		

Foot notes: \* p < 0.05

Left-sided cancer was more common (57%) than right-sided cancer (43%) among the patients. Among the 138 included African Americans, 57 (or 41.3%) had right-sided cancer. By comparison, 44 of 97 (or 45.4%) of Caucasians had right-sided cancer. No statistically significant difference in sidedness by race was observed, p = 0.536.

**Table 2:** Summary of Mutivariate Logistic Regression Model to Predict Right-sided CRC

Variable	Odds Ratio	
Race (African American)	0.94	(0.54, 1.62)
<i>Adjusted Cofactors</i>		
Gender (Female)	1.19	(0.70, 2.02)
Age (years)	1.00	(0.98, 1.03)
First Degree Relative with CRC	1.95	(0.90, 4.24)
Contant	0.57	

When adjustments were made for age, gender and first-degree relative family history of CRC in the multivariate model, the race odds ratio for right-sided CRC was 0.94 (95% CI: 0.54, 1.62), indicating no association between sidedness and race in the study sample. Moreover, this logistic model revealed a poor fit for the data as only 59% of cases were classified correctly. The variable age was re-coded as a

categorical variable (i.e., < 50, 51-60, 61-70, 71+ years) to further assess the potential association between sidedness and age. In this approach, there was no significant association between age category and sidedness and there was no change in the odd ratio for race, in comparison to original model.

**Discussion**

CRC is third leading cancer in the US. Incidence of CRC has declined in the last two decades perhaps due to early detection and removal of polyp through screening colonoscopy.<sup>2</sup> Since 2001 Medicare and Medicaid services has covered expenses for screening colonoscopy. During the past decade researchers have observed that African Americans have a higher likelihood of developing CRC at an earlier age.<sup>7</sup> Some have suggested this is related to inter-related dietary

and socioeconomic factors. Others have implicated genetic susceptibility.

While our study was unable to explore issues related to CRC screening, it was able to examine severity of disease among low-income patients diagnosed with CRC. The homogeneity of the population, in terms of income, allows us to control for, to a limited degree, the possible effects of education and access to medical care - two factors which are known to be associated with early detection of CRC and therefore, severity. Since EACMC serves large communities of African Americans and Caucasians, we are able to assess differences between these two race groups and contribute information to understanding CRC health disparities.

In our study we observed no statistically significant difference in right-sidedness of CRC between African Americans and Caucasians undergoing treatment for CRC. If severity of CRC was greater for African Americans, one would expect the rate of right-sided CRC to be larger as well. However, it was not substantially different. While race has been implicated as a contributor to CRC incidence, our data suggests that the racial difference may not carry forward into the severity of CRC at one medical center under investigation. Newer CRC screening guidelines state that screening should start at age 45 in African Americans as opposed to 50 for the other individuals. This is due to the fact that CRC has been found to occur at an earlier age in African Americans.<sup>7</sup>

It may be worthy to study the potential benefit of screening guidelines based on socio-economic factors other than race. Our study provides limited empirical support for this concept on its own, but there is other supporting evidence to consider. For example, a recently published study by Boehmer et al<sup>8</sup> reported that, after adjusting for confounders, there were no racial/ethnic differences in timely one-year CRC screening. Burgess et al<sup>9</sup> found that health disparities in CRC screening are greatly attenuated in the Veteran Affairs system where both Whites and Blacks have substantially higher rates of screening than the national average. A sub-analysis in that study pointed to the targeting of screening efforts on unmarried, low income white men and higher income black men whose screening rates were low.<sup>9</sup> Decreasing family income was associated with decreasing colorectal cancer screening rate.<sup>10</sup>

This study and its conclusions are limited by its small sample drawn from a single center and the retrospective nature of its design. The study did not have access to actual income data either, which prevented an analysis on the independent effect of this variable. The actual poverty status of subjects could not be confirmed. We seek to replicate this study with samples from similar institutions.

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