Colorectal Cancer in Arkansas: An Updated Epidemiological Review of Incidence

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BACKGROUND

The incidence and mortality rate of colorectal cancer (CRC) has decreased over time in the US, but Arkansas ranks 6th highest in CRC mortality and 5th highest in incidence.[1] Common social determinants of health that can increase a person's risk of CRC include age, tobacco use, alcohol use, and family history of CRC – information that is available at the central cancer registry level in Arkansas.[2] However, to date, a descriptive report on CRC incidence burden among Arkansans has not been recently published. The purpose of this study is to perform an epidemiological overview of CRC incidence in Arkansas. In addition to providing information beyond CRC case characteristics, our study performed a preliminary logistic analysis comparing the odds of late-stage diagnosis for selected CRC incidence groups. As such, we anticipate our study to be of use for current statewide CRC control and prevention programs as well as setting the stage for a deeper exploration for CRC studies using registry data.

METHODS

Cancer incidence data was used from the Arkansas Central Cancer Registry (ACCR) for the years 2013–2020. The dataset included Arkansas residents at least 18 years of age or older using SEER Site Recode. The dataset contained case level characteristics (sex, race, year of diagnosis, geographic counties), available risk factors (history of alcohol use, history of tobacco use, family history of cancer), and tumor staging. Ethnicity was excluded from analysis due to low counts in the state. Binary staging was classified using SEER Summary Stage where in situ and local were grouped as early stage while regional or distant were grouped as late stage. Age-adjusted incidence rates (AAIR) were standardized to the 2000 US standard population and are expressed per 100,000 population. An odds ratio (OR) model was performed to examine the associations of late-stage diagnosis as the main outcome measure by sex, race, age group, geographic counties, and risk factors.

RESULTS

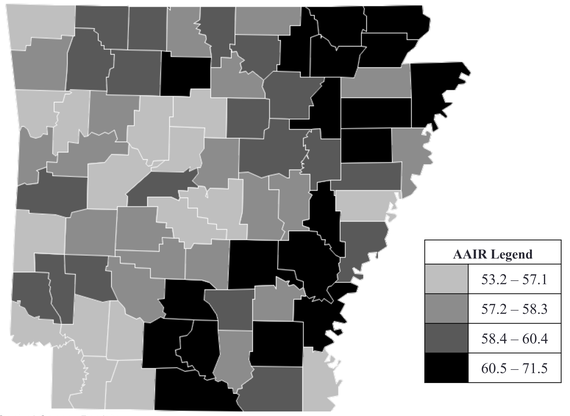
This study included 8,954 Arkansans diagnosed with CRC between 2013-2020. Our cohort consisted of approximately 54% males, 84% White individuals, and 64% from rural counties (**Table 1**). Descriptive statistics (AAIR/100,000 population) show a greater burden of CRC among northeast and southeast Arkansas counties (**Figure 1**). After stratifying by race/sex, African American males had a higher overall CRC rate [AAIR=42.5, 95%CI: 39.0-46.0] compared to other groups. They were also the highest among rural counties [AAIR=65.7, 95%CI: 59.1-72.2] and higher rate of being diagnosed at late-stage [AAIR=21.9, 95%CI: 19.4-24.4] (**Figures 2a-f**). Preliminary logistic analysis show males have about 19% higher odds of late-stage diagnosis compared to females [OR=1.19, 95%CI: 1.04-1.36]. Additionally, CRC cases <50 years of age had a 97% higher odds of late-stage diagnosis compared to cases 50-75 years of age [OR=1.97, 95%CI: 1.57-2.47] (**Table 2**).

Table 1. Study Cohort of Newly Diagnosed CRC Cases by Characteristics, Adults 18 Years and Older, Arkansas, 2013-2020

	Number of new CRC cases	%
Arkansas	8,954	*100*
Sex		
Female	4,083	*45.6*
Male	4,871	*54.4*
Race		
African American	1,286	*14.4*
White	7,478	*83.5*
Other	161	*1.8*
Unknown	28	*0.3*
Geographic region		
Rural	5,697	*63.6*
Urban	3,238	*36.2*
Unknown	19	*0.2*
ACCR Risk Factors		
History of alcohol use		
None	4,467	*49.9*
Current	2,255	*25.2*
Former	419	*4.7*
Unknown	1,813	*20.3*
History of tobacco use		
None	3,393	*37.9*
Current	1,706	*19.1*
Former	2,447	*27.3*
Unknown	1,408	*15.7*
Family history of cancer		
No	2,459	*27.5*
Yes	4,322	*48.3*
Unknown	2,173	*24.3*
SEER Summary Stage		
Early-Stage Diagnosis	2,617	*29.2*
Late-Stage Diagnosis	5,634	*62.9*
Unknown	703	*7.9*

Source: *Arkansas Central Cancer Registry*

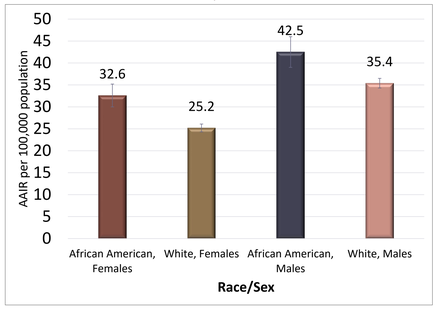
Figure 1. AAIR of CRC by County Map, Arkansas, 2013-2020



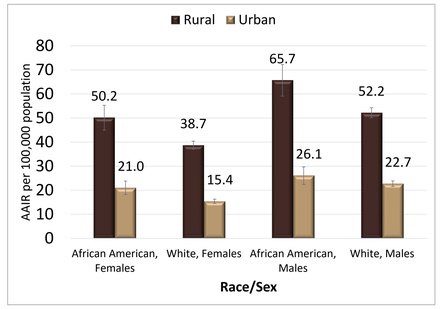
Source: *Arkansas Central Cancer Registry*

Figures 2a-f. Age-Adjusted Incidence Rate of CRC Study Cohort Characteristics by Race/Sex, Arkansas, 2013-2020

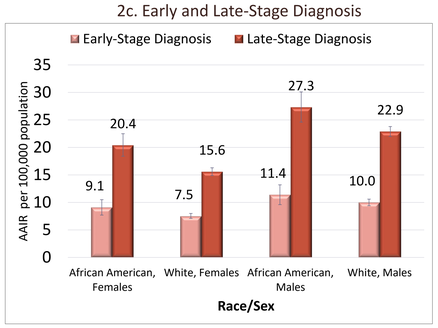
2a. Race/Sex Overall



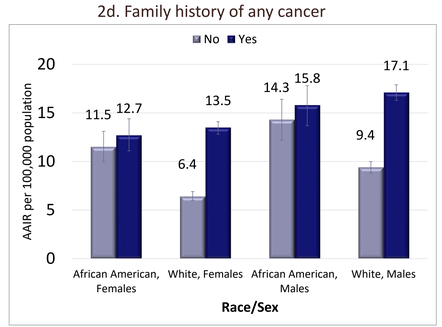
2b. Rural and Urban Counties



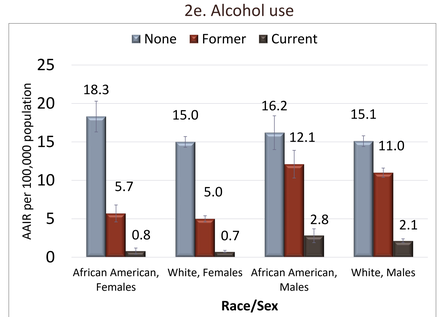
2c. Early and Late-Stage Diagnosis



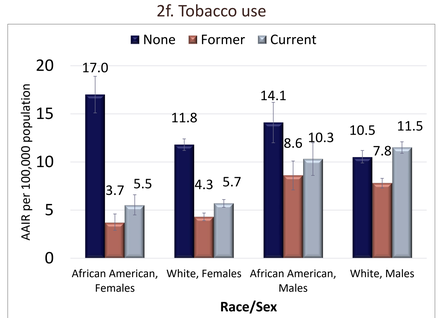
2d. Family history of any cancer



2e. Alcohol use



2f. Tobacco use



Source: *Arkansas Central Cancer Registry*

Table 2. Odds ratio and 95% CI of CRC for late-stage CRC diagnosis, Arkansas, 2013-2020

	OR	95% CI
Sex		
Female	*Ref*	
Male	1.192	1.042 – 1.364
Race		
African American	1.286	1.065 – 1.552
White	*Ref*	
Age Group (years)		
18-49	1.970	1.573 – 2.469
50-75	*Ref*	
76+	0.844	0.722 – 0.987
Geographic region		
Rural	0.979	0.857 – 1.118
Urban	*Ref*	
History of alcohol use		
None	*Ref*	
Current	0.811	0.699 – 0.941
Former	0.907	0.688 – 1.195
History of tobacco use		
None	*Ref*	
Current	1.055	0.883 – 1.260
Former	0.968	0.829 – 1.129
Family history of cancer		
No	*Ref*	
Yes	1.054	0.920 – 1.207

CONCLUSIONS

Arkansas rural counties had a higher rate of CRC compared to urban areas. Counties near the eastern border had a higher rate of CRC, an area with delta designated counties (**Figure 1**). African American males had the highest rate of CRC compared to other race/sex groups overall, with those residing in rural counties experiencing the highest CRC incidence rate. Furthermore, African American males also experienced the highest rate of CRC being diagnosed at a late-stage (regional or distant). Descriptive statistics also show White males with a family history of any cancer had the highest rate of CRC, meanwhile African American females with no history of alcohol or tobacco use had the highest rate of CRC. However, risk factor data from the registry has its limitations including a high percentage (more than 10%) of unknown/missing data, and family history of cancer variable not defined to a particular cancer, for which caution is suggested in interpretation. Based on the preliminary regression analysis, the odds of late-stage colorectal cancer among 18-49 age group is high compared to older populations (50+ age) underlining the importance of colorectal cancer screening[4]. This study is consistent with national findings with a higher burden of CRC among African American communities, especially among males, and a need to encourage screening for early detection of CRC. Although this study provides an updated general overview of CRC incidence burden in Arkansas, more research is needed. More information is needed to understand the contributions of late-stage CRC incidence among all Arkansans, how CRC mortality rates compare to incidence, and what strategies to implement to promote CRC screening among younger age groups.

References:

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