Analysis of Colorectal Cancer Survival in Middle Eastern Patients using the California Cancer Registry

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Background

- Colorectal cancer (CRC) is the second leading cause of cancer-related mortality in the U.S.
- Literature on cancer outcomes in Middle Eastern and North African (MENA) individuals is limited.
- To address this gap, we estimated five-year CRC-specific survival by race and ethnicity, including patients of MENA ethnicity, in a diverse, population-based sample.

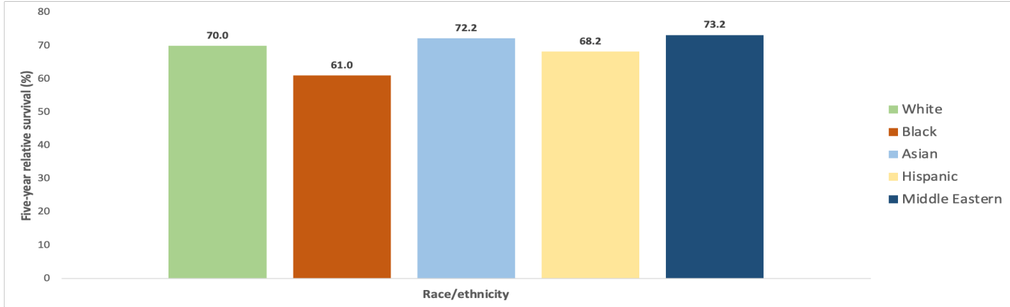
Methods

- We identified patients diagnosed with CRC (ages 18-79 years) from 2004 – 2017 using the California Cancer Registry (CCR), including patients who were White, Black, Asian, Hispanic, and MENA.
- Specifically, MENA patients were identified using a validated list of Middle Eastern surnames linked to the CCR.
- For each racial/ethnic group, we calculated five-year colorectal CRC-specific survival using Kaplan-Meier estimates and used Cox proportional hazards regression models to examine the association of race/ethnicity and survival, adjusting for age at diagnosis, year of diagnosis, sex, insurance, socioeconomic status, marital status, tumor site, stage at diagnosis, tumor grade/differentiation, and receipt of National Comprehensive Cancer Network (NCCN)-concordant treatment.

Table. Adjusted hazard ratios demonstrating association of race/ethnicity and survival (overall and colorectal cancer-specific, n=110,192), California Cancer Registry, 2004 – 2017

	Overall Survival				Colorectal Cancer-specific Survival			
	Adjusted HR and 95% CI			p-value	Adjusted HR and 95% CI			p-value
Age at diagnosis	1.03	1.03	1.03	<0.01	1.02	1.01	1.02	<0.01
Year of diagnosis	1.02	1.02	1.02	<0.01	1.00	1.00	1.00	0.71
Female	0.84	0.82	0.86	<0.01	0.90	0.88	0.92	<0.01
Race/ethnicity								
Middle Eastern/North African	0.80	0.74	0.85	<0.01	0.82	0.76	0.89	<0.01
Non-Hispanic White	Ref				Ref			
Non-Hispanic Black	1.11	1.07	1.15	<0.01	1.13	1.09	1.18	<0.01
Hispanic	0.92	0.90	0.95	<0.01	0.94	0.91	0.97	<0.01
Non-Hispanic Asian	0.83	0.80	0.85	<0.01	0.86	0.83	0.90	<0.01
Insurance								
Managed care[b]	Ref				Ref			
Medicare	1.11	1.09	1.14	<0.01	1.05	1.01	1.08	<0.01
Medicaid	1.33	1.28	1.38	<0.01	1.28	1.23	1.33	<0.01
Other (FFS, Tricare, VA, or NOS)	0.90	0.87	0.93	<0.01	0.92	0.89	0.96	<0.01
Not insured or unknown	1.21	1.15	1.27	<0.01	1.27	1.20	1.34	<0.01
Socioeconomic Status								
Lowest SES	1.34	1.30	1.39	<0.01	1.26	1.20	1.31	<0.01
Lower-middle SES	1.29	1.25	1.33	<0.01	1.23	1.18	1.28	<0.01
Middle SES	1.19	1.15	1.23	<0.01	1.17	1.12	1.21	<0.01
Higher-middle SES	1.13	1.09	1.16	<0.01	1.08	1.04	1.13	<0.01
Highest SES	Ref				Ref			
Marital status								
Single or other	Ref				Ref			
Married	0.79	0.78	0.81	<0.01	0.83	0.81	0.85	<0.01
Tumor site								
Colon	Ref				Ref			
Rectum	0.94	0.92	0.96	<0.01	1.02	0.99	1.05	0.19
Tumor stage								
I	Ref				Ref			
II	1.65	1.59	1.71	<.0001	2.84	2.66	3.03	<.0001
III	2.07	2.00	2.15	<.0001	4.82	4.54	5.12	<.0001
IV	11.42	11.05	11.80	<.0001	31.09	29.35	32.93	<.0001
Tumor grade or differentiation								
Grade I or well differentiated	Ref				Ref			
Grade II or moderately differentiated	1.20	1.15	1.25	<.0001	1.38	1.30	1.46	<.0001
Grade III or poorly differentiated	1.73	1.65	1.81	<.0001	2.16	2.04	2.30	<.0001
Grade IV or undifferentiated/anaplastic	1.88	1.74	2.03	<.0001	2.31	2.10	2.55	<.0001
Grade/differentiation unknown	1.94	1.85	2.03	<.0001	2.23	2.09	2.37	<.0001
NCCN-concordant treatment								
No	1.69	1.65	1.73	<.0001	1.77	1.73	1.82	<.0001
Yes	Ref				Ref			

Figure. Five-year colorectal cancer-specific survival (age 18-79 years) using Kaplan-Meier estimates, by race/ethnicity, California Cancer Registry, 2004 – 2017



Results

- We identified 110,192 patients with CRC, of whom 58,375 (53.0%) were White, 8,383 (7.6%) Black, 15,448 (14.0%) Asian, 23,539 (21.4%) Hispanic, and 2,656 (2.4%) MENA.
- Five-year CRC-specific survival was lowest in Black (61.0% ± 0.6%) and highest in MENA (73.2% ± 1.0%) patients.
- Asian (72.2% ± 0.4%) patients had higher survival compared to White (70.0% ± 0.2%) and Hispanic (68.2% ± 0.4%) patients.
- In adjusted analysis, MENA (aHR 0.82, 95% CI 0.76, 0.89), Asian (aHR 0.86, 95% CI 0.83, 0.90), and Hispanic (aHR 0.94, 95% CI 0.91, 0.97) race/ethnicity were associated with higher survival compared to White race/ethnicity, and Black (aHR 1.13, 95% CI 1.09, 1.18) race/ethnicity was associated with lower survival compared to White race/ethnicity.

Conclusion

- To our knowledge, this study is the first of its kind to report CRC survival in MENA patients in the U.S.
- We observed higher survival of MENA patients compared to other racial/ethnic groups, even after adjusting for clinical and sociodemographic factors.
- While higher observance of the Mediterranean diet, the “healthy immigrant effect”, and increased social support in MENA patients may, in part, explain survival differences, future studies are needed to identify protective factors in this unique population.