Colorectal Cancer Risk: How Does an Existing Tool Perform in Predicting Risk in Young, High-Risk Patients?

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Background and Purpose

Colorectal cancer (CRC) is likely the result of complex interactions between genetic susceptibility and environmental factors. While CRC incidence has remained stable or been reduced for adults over age 50 due to increases in surveillance colonoscopy uptake, young adults aged 18-50 have seen a dramatic rise in cases.

The National Cancer Institute's Colorectal Cancer Risk Assessment Tool (CCRAT) was developed for use by doctors and their patients to estimate 5-year and lifetime CRC risk. It is only risk assessment tools for CRC that provides an absolute risk estimate. It is designed for those between the ages of 45 and 85. Despite the increase in cases amongst those aged 50 and younger, the existing tool does not make cancer risk estimations based on age for most of this population.

The risk factors contributing to CRC amongst young adult populations are not as well-understood as they are amongst older adult populations. Risk factors may include smoking, obesity, physical inactivity, and reduced vegetable intake. Risk prediction of CRC for young adults based on behavioral inputs in a high-risk group using an existing tool has not been investigated.

Objectives

- To understand if behaviors and characteristics among young adults with CRC are meaningfully different from that of older adults with CRC
- To comment on the efficacy of an existing tool in predicting elevated risk among young adults

Methods

Data source

563 adult patients aged 18-90 at University of Texas, MD Anderson Cancer Center diagnosed with colorectal cancer completed a health behavior questionnaire at the time of recruitment into the study.

Inclusion/Exclusion criteria:

- Patients with microsatellite high (MS-H) or unstable adenocarcinoma were excluded
- Patients with known or suspected clinical diagnosis of a hereditary polyposis syndrome were excluded

Questionnaire and Analyses

Participants self reported health and lifestyle behaviors at time of enrollment into study by completing questionnaire.

- Administered between 2012 and 2021
- Questionnaire modified from the National Cancer Institute CCRAT (https://ccrisktool.cancer.gov/)

Risk scores were computed by entering questionnaire data into the CCRAT, which gives an output of 5-year and lifetime CRC risk based on relative risk and absolute risk models.

We compared risk scores and did descriptive analyses of health behaviors among 18-<45, 45-50, and >50-year-olds.

Results

Table 1. Elevated 5-year risk distribution by age

Age groups	Number of high risk	Total per age group	Percent of high risk
18-<45	117	276	42.391
45-50	81	178	45.506
50<	77	109	70.642

Preliminary results indicate a higher percentage of elevated 5-year risk (70.6%) among those aged 51+, compared to those aged 45 to 50 (45.5%) and those aged 18 to <45 (42.4%). A small difference between those 18 to <45 and those 45 to 50 suggests there may be slight behavioral differences, if this difference is significant.

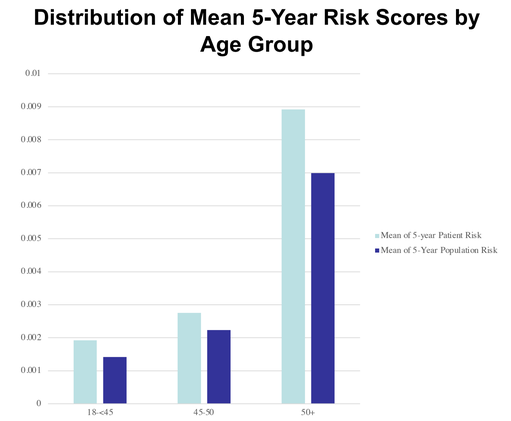

Fig. 1 Mean predicted 5-year risk scores compared to mean 5-year population risk scores are the most different among >50 individuals, suggesting that the existing risk predicting tool underperforms for young people.

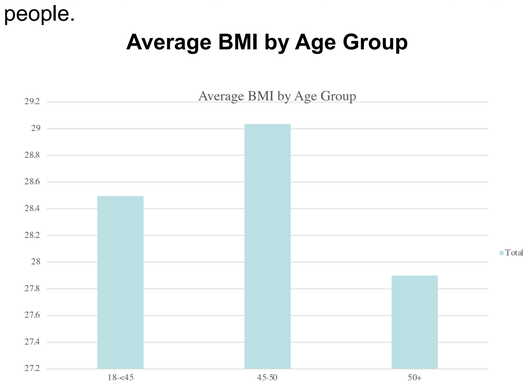

Fig. 2 Mean BMI is highest among 45-50-year-olds, with BMI of 29.0 nearly reaching the threshold for obesity (BMI of 30.0). Notably, all groups have a mean BMI that is considered overweight.

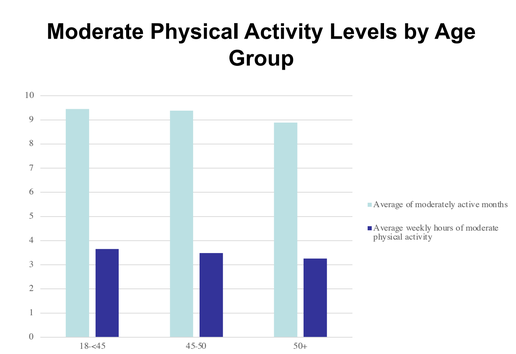

Fig. 3 Mean months spent engaged in moderate physical activity are highly similar among the three groups (9.4 months for 18-<45, 9.4 months for 45-50, 8.9 months for >50). The mean hours per week are also highly similar among the 3 groups, suggesting that moderate physical activity is not meaningfully different by age group.

The large difference in 5-year risk prediction for young and old onset cases suggests that the tool underperforms for young people.

Further analyses of behavioral differences are forthcoming. We hope to understand if there are significant differences in behavior among young-onset patients compared to old-onset patients. Additionally, we hope to further explore the differences in 5-year high risk among age groups to understand if the observed differences are significant.

Conclusions & Implications

- There are currently not observed differences in health behaviors measured between young-onset and old-onset patients.
- This, along with the observed differences in 5-year risk compared to general population, suggests the risk factors for young-onset patients may be different from old-onset as their predicted risk is much lower, despite being colorectal cancer patients.
- The CCRAT would need to be adjusted to accurately predict risk in young-onset patients.

References

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Responsible Conduct of Research

For this research project, the MD Anderson PI (Yi-Qian Nancy You, MD, MHSc) submitted a research protocol and obtained IRB approval for data collection. The data was de-identified. Dr. Y. Nancy You was responsible for maintaining documents and approvals for all modifications in the protocol.