

Differences in Response to a Dietary Intervention Between the General Population and First-Degree Relatives of Colorectal Cancer Patients

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ABSTRACT

Objective: To determine whether response to a dietary intervention is greater among people with family history of colorectal cancer (CRC) compared with a general population.

Design: Cohort study examining participants from 2 related studies.

Setting: Rural Virginia.

Participants: Seventy people with first-degree relatives with CRC and 113 participants from the intervention arm of a trial in the general population.

Intervention: Both studies implemented a low-intensity intervention delivered via telephone and mail, including low-literacy self-help booklets and personalized dietary feedback.

Main Outcome Measures: Fat, fiber, and fruit and vegetable behavior.

Analysis: Propensity score matching controlled for confounders. Mixed-model ANOVAs compared samples; mediation by perceived cancer risk was assessed.

Results: Participants in both groups significantly improved fat, fiber, and fruit and vegetable behavior at 1-month follow-up; there was significantly greater improvement in the general population sample. Cancer risk perception did not mediate the relationship between study sample and dietary change.

Conclusions and Implications: Contrary to expectations, first-degree relatives of CRC patients did not respond better to a dietary intervention than the general population, nor was risk perception related to dietary change. Given the role of diet in CRC risk, additional research should investigate targeted strategies to improve dietary intakes of people at higher cancer risk.

Key Words: family history, colorectal cancer, diet intervention (*J Nutr Educ Behav.* 2014;46:376-383.)

Accepted February 22, 2014. Published online April 17, 2014.

INTRODUCTION

Great strides have been made in reducing incidence and mortality from colorectal cancer (CRC) in the US over the past decade. Colorectal cancer rates decreased from 52.3/100,000 in 2003 to 45.5/100,000 in 2007. In addition, mortality rates

decreased from 19.0 cases/100,000 in 2003 to 16.7 cases/100,000 in 2007.¹ However, additional work is necessary to achieve Healthy People 2020 (the US government's prevention agenda for building a healthier nation) objectives of reducing CRC incidence to 38.6 cases/100,000 and deaths to 14.5/100,000.² The need for targeted

intervention is particularly great in rural areas, where residents continue to manifest higher rates of CRC.³

Relatives of patients with CRC are at increased risk of developing the disease. A meta-analysis estimated that individuals with a first-degree relative (FDR) (a parent, sibling, or offspring) with CRC were more than twice as likely as those without an FDR to have the disease, which highlights the need for targeted intervention among this higher-risk group.⁴

Although it is not known whether increased risk of CRC in FDRs is genetic or caused by common environmental exposures,⁵ engaging in protective health behaviors, such as maintaining a low-fat, high-fiber diet, can reduce the risk of developing colon cancer in this high-risk population.⁶ Importantly, knowledge about susceptibility to a serious disease may increase the likelihood of engaging in preventive behaviors,⁷ although

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<http://dx.doi.org/10.1016/j.jneb.2014.02.015>

knowledge alone may not be sufficient to change complex behaviors, such as dietary intake. Evidence suggests that relatives of cancer patients are motivated to adopt health behavior changes.⁸ For example, previous investigations found that FDRs of CRC patients were more adherent to screening recommendations than the general population and had a greater response to screening interventions.^{9,10} Furthermore, in a longitudinal study of FDRs of women with breast cancer, relatives increased fruit and vegetable consumption 6 months after their family members' diagnoses.⁸ Similarly, twins of colon cancer patients were more likely than the general population to be screened after their co-twin's diagnoses.¹¹ Less is known about whether FDRs of CRC patients are more likely to adhere to preventive dietary behaviors than the general population. Indeed, the Families in Behavioral Intervention for Risk Reduction (FIBERR) study, upon which the current study is based, was the first dietary intervention specifically targeted to relatives of patients with CRC.¹² Within the FIBERR study, Bean et al¹² found that family members with higher perceived closeness to their FDR with CRC had worse dietary behaviors than those with lower perceived closeness. However, greater family support was associated with healthier diets among FDRs. These results suggest that family factors influence dietary behaviors among FDRs, yet they also highlight the complexity of these relations. Because of the paucity of research in this area, additional investigation into the dietary habits of FDRs is warranted. Furthermore, although there is strong theoretical support for the role of perceived risk in cancer-preventive behavior,^{13,14} empirical results are mixed.¹⁵⁻¹⁷ Further examination of the role of cancer risk perception in dietary change is needed.

The researchers examined dietary intakes of participants from 2 related dietary intervention studies to determine whether family history status was associated with greater dietary behavior change. Specifically, results from a study of FDRs of CRC patients were examined, and compared with results from a randomized study that used the same dietary intervention in a general population. Given

support for greater engagement in preventive behaviors (ie, screening) among FDRs, it was hypothesized that FDRs of colon cancer patients would exhibit greater change in dietary behavior, to reduce their associated higher risk for cancer. In addition, perceived cancer risk was examined as a potential mediator of response to treatment.

METHODS

Study Design and Procedures

This cohort study examined participants from 2 studies who participated in the same dietary interventions: the Families in Behavioral Intervention for Risk Reduction Project¹² and the Rural Physician Cancer Prevention Project¹⁸ (referred to here as the Family Member sample and the General Population sample, respectively). Both studies were community-based and examined the impact of the same dietary intervention. Subjects in the General Population sample made up the intervention arm of a randomized controlled trial that targeted a rural, low-education, low-literacy population, whereas members of the Family Member sample were the single arm of a pilot study targeting FDRs of people with CRC. Both studies were conducted in rural counties in Virginia by the same study team, using essentially the same intervention and measures. All participants provided informed consent. Assessments were conducted via telephone at baseline and 1 and 3 months postintervention for the Family Member sample and at baseline and 1, 6, and 12 months postintervention in the General Population sample. The current study examined baseline and 1-month postintervention data from both studies because these represented the common assessments. The 2 parent studies were each approved by the Institutional Review Board of Virginia Commonwealth University.

Participants and Recruitment

General Population sample. This study recruited healthy patients from 3 medical practices in rural Virginia. Eligible patients were 18–72 years of age and were not seriously ill or on a medically supervised diet (see Fries et al¹⁸ for the CONSORT diagram

and complete study methods). Potential participants ($n = 4,211$) were sent letters from their primary care physician inviting them to participate in the study; 754 were randomized to either the dietary intervention or a control arm. Of those randomized to the dietary intervention ($n = 377$), 224 completed the 1-month follow-up survey and were included in the current study. Participants who did not respond at 1 month were similar regarding race, gender, education, and whether they lived in or outside of town, but were less likely to be unmarried (54% vs 69%; $P = .003$) and were younger (45 vs 49 years of age; $P = .009$) than respondents.

Family Member sample. This sample from the FIBERR study targeted family members of patients with CRC. Recruitment for this study was described in detail in Bean et al.¹² Patients diagnosed with CRC (in the previous 5 years) at Massey Cancer Center and its rural outreach clinics were sent letters from their physician endorsing the study and asking for their participation ($n = 474$ patients); 157 provided names of FDRs. One FDR was randomly selected from each family. Of 226 FDRs, 103 were eligible and consented. Family Member sample participants were either the sibling (22%), offspring (75%), or parent (3%) of the referring patient. The current study includes the 81 subjects who completed the 1-month follow-up assessment. Participants not responding at 1 month were similar regarding age, gender, marital status, and whether they lived in or outside of town, but were more likely to be black (45% vs 20%) than those who responded at 1 month ($P = .01$).

Dietary intervention. The dietary intervention used in both studies was the same (except for cancer risk information; see subsequent description), and is described in detail elsewhere.¹⁸ In brief, both studies used the same theoretically guided, low-intensity, physician-endorsed dietary intervention, designed for a rural, low-income population. After completing baseline assessments, participants received tailored dietary feedback¹⁹ through the mail and via

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