Research Article

Beliefs About Cancer and Diet among Those Considering Genetic Testing for Colon Cancer

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ABSTRACT

Objective: To assess beliefs about the role of diet in cancer prevention among individuals considering genetic testing for Lynch Syndrome.

Design: Family-centered, cascade recruitment; baseline assessment of a longitudinal study.

Setting: Clinical research setting.

Participants: Participants were 390 persons, ages 18 and older, including persons with a Lynch Syndrome-associated cancer and suspected of carrying a disease causing mutation, and relatives at risk for inheriting a previously identified mutation.

Main Outcome Measures: Assess clustering of beliefs about the role of diet in cancer prevention and predictors of class membership.

Analysis: Confirmatory factor analysis; 2-class factor mixture model with binary indicators; multilevel regression analyses, individuals nested within families.

Results: Women endorsed a relationship between diet and cancer prevention more often than men ($P < .01$). A 2-class model was used where Class 1 indicated less likely to link cancer to diet, and Class 2 indicated more likely. Factors associated with increased odds of membership in Class 1 expressed belief that nothing can prevent cancer ($P < .01$) and fate attribution ($P < .01$); Class 2 mentioned personal cancer history ($P < .05$) and genetic knowledge ($P < .01$).

Conclusions and Implications: Identifying factors associated with a belief in cancer prevention through dietary behaviors can inform targeted interventions.

Key Words: health beliefs, dietary beliefs, cancer prevention, hereditary cancer, Lynch Syndrome (*J Nutr Educ Behav*. 2011;43:150-156.)

INTRODUCTION

It has been estimated that 50% of cancer in the general population is preventable through modifying lifestyle factors, such as diet, physical activity, alcohol consumption, and tobacco use.[1] Existing research suggests that beliefs about the causal relationship between diet and cancer influences compliance with recommended cancer prevention strategies within the general population. This finding has provided an interesting domain for research. For example, Harnack et al demonstrated that as their participants' level of cancer prevention-related knowledge increased, their reported fruit and vegetable intake more closely approximated recommendations for appropriate fruit and vegetable consumption.[2] Satia and Galanko found that a strong belief in a cancer-diet relationship was associated with greater compliance to participate in prostate and breast cancer screening.[3] These studies provide evidence that the general population commonly makes an association between diet and cancer, and that this belief may serve to motivate behavioral changes.

Such beliefs among individuals at an increased risk of hereditary cancer syndromes have not been widely studied. Understanding the degree to which perceptions about genetic susceptibility to cancer aligns with a general belief in the controllability of disease is an important research question with practical implications, particularly in the areas of nutrition education, genetic counseling, and health intervention design.[4,5] Dietary beliefs and behaviors are especially interesting because they often reflect a larger health belief model of which other types of cancer prevention behaviors, such as participation in screening for early detection, may be a part.[3,6,7]

To fill this research gap, the authors conducted an exploratory study of diet-related cancer prevention beliefs among participants suspected to

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have or be at risk of developing an inherited form of cancer known as hereditary nonpolyposis colorectal cancer (HNPCC), or Lynch Syndrome.[8] Hereditary nonpolyposis colorectal cancer is a dominantly inherited cancer susceptibility syndrome that significantly increases risks for cancers of the colon, endometrium, stomach, ovaries, small intestine, hepatobiliary system, upper uroepithelial tract, pancreas, and brain.[9] It results from mutations in any of 4 mismatch repair genes. Risks for colon cancer are reported to reach 70% by the age of 70. An estimated 3%-5% of colorectal cancer cases diagnosed annually within the United States are attributed to HNPCC.[10,11]

Drawing on perspectives from the Cultural Consensus Theory (CCT)[12,13] and the Health Belief Model (HBM),[14] the authors surveyed beliefs about the link between diet and cancer among individuals at high risk for HNPCC-associated cancers who were considering genetic testing. A major premise of CCT is that culture, when defined as a set of shared beliefs, behaviors, and common experiences, may be operationalized by evaluating the extent to which there is agreement among individuals about a particular cultural domain.[12,13] Beliefs about cancer causation and controllability are examples of cognitive domains that are amenable to analysis using CCT. Accordingly, individuals may be grouped together based on their agreement about specific health beliefs, rather than on sociodemographic variables such as race, ethnicity, age, sex, or level of education. The rationale for using CCT in this study stems from the assumption that, for an inherited cancer syndrome like HNPCC, similarities in health beliefs may emerge from comparable experiences dealing with familial cancers, interactions with health care providers about cancer diagnoses and treatment, and information gained through lay information seeking about disease causation and prevention (eg, Internet, friends, support groups). Factor mixture modeling was employed to identify consensus among study participants regarding a relationship between diet and cancer causation and controllability.

The HBM is a conceptual framework that characterizes the relationships between an individual's perceived susceptibility for and severity of disease, his or her beliefs about the controllability or preventability of disease, and perceptions about his or her ability to engage in behaviors that would lead to decreased risk of disease.[14] It is a useful approach to uncover latent variation in beliefs among individuals in sociodemographically homogenous groups. In the present study, ideas drawn from the HBM were used to consider the broader context of health beliefs in which a diet-cancer relationship was endorsed or not among participants at high genetic risk of cancer.

Together, these theoretical orientations provide a basis for addressing the following research aims among persons receiving genetic counseling and considering genetic testing for HNPCC: (1) to identify and group together study participants based on a shared belief, or consensus, in a diet-cancer relationship; and (2) to examine other aspects of participants' health belief models, specifically nondietary-related perceptions about cancer controllability, demographic characteristics, and level of genetic knowledge, which distinguish the groupings identified through aim 1.

METHODS

Study Design

Data for the present report were gathered as part of the baseline assessment from a prospective study conducted jointly by the National Institutes of Health (NIH) and the National Naval Medical Center (NNMC). This longitudinal study was designed to investigate the psychological, behavioral, and social outcomes resulting from the introduction of genetic risk information within families experiencing an inherited disease. The appropriate NIH and NNMC Institutional Review Boards reviewed and approved the protocol. All participants provided their written informed consent prior to participation.

Study Participants and Recruitment

Potential study participants were identified on the basis of clinical and pathological criteria. Clinical criteria included early age of onset (≤ 40 years of age) of an HNPCC-associated cancer, multiple primary HNPCC-associated cancers, and/or a strong family history of HNPCC cancers suggesting a hereditary basis. Pathological criteria were met by the presence of "microsatellite instability" in a colon or other HNPCC-associated tumor. Individuals who exhibited the clinical and pathological criteria for HNPCC (index cases) were referred to the study team, received detailed information about the study, and consented to participate, if willing. A family medical history was collected by either a genetics counselor (certified by the American Board of Genetic Counselors) or an advanced practice nurse, with training in clinical genetics; a 4-generation pedigree was constructed from the family medical history to clarify biological relationships. Participants then completed a questionnaire, which collected demographic information and the variables of interest. Following questionnaire completion, each participant participated in structured genetic education and client-centered counseling sessions. Following counseling, participants were offered genetic testing without cost.[15] Index cases choosing genetic testing and found to carry a disease causing mutation could refer their first-degree relatives (ie, children, siblings, and parents) at risk to inherit the familial mutation into the study. These relatives underwent the same process for consenting, questionnaire completion, education, counseling, and the option of genetic testing as the index case. Relatives found to carry the familial mutation could then offer their first-degree relatives the opportunity to participate in the study. This cascade sampling approach to recruitment was allowed to continue as far into the family as relationships allowed or knowledge of kinship (or contacting information) existed. In 58 of the index cases, no mutation was identified, which precluded recruitment of their family members. A total of 390 participants, including 109 index cases and 281 family members, participated in the study.

Measurement Instruments

Two items examined participants' beliefs about the relationship between