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Association between documented family history of cancer and screening for breast and colorectal cancer

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ABSTRACT

Background. Previous research on ascertainment of cancer family history and cancer screening has been conducted in urban settings.

Purpose. To examine whether documented family history of breast or colorectal cancer is associated with breast or colorectal cancer screening.

Methods. Medical record reviews were conducted on 3433 patients aged 55 and older from four primary care practices in two rural Oregon communities. Data collected included patient demographic and risk information, including any documentation of family history of breast or colorectal cancer, and receipt of screening for these cancers.

Results. A positive breast cancer family history was associated with an increased likelihood of being up-to-date for mammography screening (OR 2.09, 95% CI 1.45–3.00 relative to a recorded negative history). A positive family history for colorectal cancer was associated with an increased likelihood of being up-to-date with colorectal cancer screening according to U.S. Preventive Services Task Force low risk guidelines for males (OR 2.89, 95% CI 1.15–7.29) and females (OR 2.47, 95% CI 1.32–4.64) relative to a recorded negative family history. The absence of any recorded family cancer history was associated with a decreased likelihood of being up-to-date for mammography screening (OR 0.70, 95% CI 0.56–0.88 relative to recorded negative history) or for colorectal cancer screening (OR 0.75, 95% CI 0.60–0.96 in females, OR 0.68, 95% CI 0.53–0.88 in males relative to recorded negative history).

Conclusion. Further research is needed to determine if establishing routines to document family history of cancer would improve appropriate use of cancer screening.

Introduction

Cancer is the second leading cause of death in the U.S. (Minino et al., 2011), with colorectal and breast cancers ranking as the second and third most common causes of cancer deaths, respectively (Horner et al., 2009). In addition, the economic burden from cancer related morbidity and mortality is high with medical care expenditures estimated at 26 billion dollars in 2006 for these two cancers (NIH NCI, 2007). Screening for breast and colorectal cancer has been shown to reduce mortality (Kerlikowske et al., 1995; Mandel et al., 1993; Nyström et al., 2002; Tabar et al., 2003) and to be cost effective (Ahern and Shen, 2009; Lindfors and Rosenquist, 1995; Pignone et al., 2002), thus making it a clinical priority as noted by the U.S. Preventive Services Task Force (USPSTF) (USPSTF, 2002, 2008). This is especially true among patients with a family history of both of these cancers, as risk for both is subsequently increased (Slattery and Kerber, 1994).

Assessing family history may be the most important step a primary care clinician can take in identifying those who will most benefit from screening. The Agency for Health Care Research & Quality recommends taking a family history (Qureshi et al., 2007), and a recent editorial (Acheson, 2011) discussed the importance of collecting standardized information on family history of cancer and then updating it consistently every 5–10 years for patients between the ages of 30 and 60 (Ziogas et al., 2011). However, while several studies show physicians often report that they collect family history information (Acton et al., 2000; Lynch et al., 1995) and value its contribution (Summerton and Garrood, 1997), other studies using actual encounter data suggest that

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family history is either not obtained or is underutilized in risk assessments (Acheson et al., 2000; Murff et al., 2007; Sifri et al., 2002; Sweet et al., 2002). The collection of family history information allows physicians to tailor screening services to the individual. However, there is a paucity of literature about how family history information is captured in primary care offices and whether this affects either provider recommendation or actual use of cancer screening services. One study conducted by Felson et al. (2011) found that having a personal or family history of colorectal cancer increased the odds of being up-to-date for colorectal cancer screening. This study focused only on colorectal cancer screening and the study focused on an urban population. Research in rural areas is especially lacking and findings in this understudied population may differ from urban primary care practices.

We conducted a detailed assessment of the relationship between family history of breast and/or colorectal cancer and being up-to-date with appropriate screening tests in rural primary care settings. We specifically examined whether patients with a documented positive family history of these diseases in their medical record were more likely to receive screening services. The results of this study will inform primary care clinicians about the effects that recording family history may have on activating physician behavior toward targeted screening.

Methods

Study population

Data for the study were obtained by abstraction of patients' medical records from four primary care clinics in two rural Oregon communities. Two of the clinics were private practices and two were federally qualified health centers (FQHCs); one of each type of practice was represented in each community. Forty-two clinicians served patients in the enrolled clinics and each had between 3 and 289 patients (median of 54 patients, interquartile range of 21–112). Patient-level eligibility criteria included being aged 55 or older and having at least one clinic visit within the prior two years. This was done to ensure both eligibility of screening tests under study and evidence of sufficient opportunity to receive either the test or the recommendations from their clinician to be screened.

Oregon Health & Science University's Institutional Review Board approved all study activities. No identifiers were collected during the medical record review; thus a HIPAA waiver was obtained for collection of personal health information without consent. In three of the four practices, all charts of age eligible patients were reviewed and abstracted. In one practice, 1000 patients were selected at random for review. This was done because this practice was very well established and had significant numbers of patients in the age range under study.

Medical record review

The medical record review instrument was adapted from one used by members of the research team in another study (Dietrich et al., 1992) and was pretested in two non-study clinics, one using paper charts and one using electronic medical records to simulate the varying health record formats used in the study clinics. We collected data on receipt of breast and colorectal cancer screening tests, including the dates tests were received for up to 10 years. Breast cancer screening included mammography, and colorectal cancer screening included fecal occult blood test (FOBT), colonoscopy, flexible sigmoidoscopy, and double contrast barium enema (DCBE). For colorectal cancer screening, we did not include fecal immunochemical testing, because it was not specifically recommended at the time.

Patient information was also collected to characterize demographic and risk factors of the study sample. These data included age, race/ethnicity, body mass index, marital status, occupation, health behaviors, such as smoking status and alcohol use, insurance status and type, total number of visits in the previous five years, number of health maintenance visits, co-morbidities, and family history. Family history of cancer was also collected and was defined as having an affected first-degree relative (mother, father, sister, brother, son, or daughter), which was categorized according to the type of cancer (breast, colorectal, or other). Because we were interested in determining if the presence of a positive family history is correlated with increased screening rates, we categorized family history as No Documented Family History Information, Notation of a Negative Family History and Notation of a 1st Degree Relative with the specific cancer under study (breast or colorectal).

Two specially trained medical record reviewers abstracted the medical records, which included all patient-related information (e.g., patient intake form, problem lists, progress notes). Ten percent of the records were reviewed for reliability by a third independent reviewer. Kappa coefficients for agreement between reviewers were 0.75 for family history of CRC or BC, 0.56 for FOBT within 1 year, 0.87 for flexible sigmoidoscopy within 5 years and 0.80 for colonoscopy within 10 years. A total of 3593 patients aged 55 and older were eligible using our visit history criteria, and their records were abstracted for this analysis. The chart reviews were conducted between October 2008 and August 2009.

Statistical analysis

The final analysis set consisted of 3433 patients (1870 women and 1563 men). Of the 3593 patients whose medical records were reviewed, 160 patients were excluded from the final analysis due to prior diagnosis of cancer or missing age information: nine ovarian cancer survivors, 100 breast cancer survivors, 38 colorectal cancer survivors, one survivor of both ovarian and breast cancer, one survivor of ovarian and colon cancer, five survivors of breast and colon cancer, one survivor of breast, ovarian and colon cancer, and five subjects for whom age was missing, resulting in a total of 3433 patients included in the analysis. Analysis of up-to-date status for mammography excluded 11 women with bilateral mastectomies or recent abnormal mammograms, which might indicate that mammograms were follow-up rather than screening. USPSTF guidelines in effect during the time period covered by the chart audits (e.g., 10/2008–08/2009) were used for determination of up-to-date status for mammography and colorectal cancer screening according to the patient's risk level. Subjects were classified as up-to-date on colorectal screening if any FOBT, flexible sigmoidoscopy, DCBE or colonoscopy screen was within the risk status specific guideline for that test. Subjects were classified as high risk if they had a positive family history of colon cancer or a history of abnormal colon cancer screening tests result. Because current USPSTF guidelines exclude patients aged 75 and older, a sensitivity analysis was performed excluding patients in this age range to test the effect of the exclusion on the strength of the observed associations.

All statistical analyses were performed using Statistical Analysis System (SAS) version 9.3. Random effect logistic regression models were used to assess the effect of documented family history of cancer on up-to-date cancer screening status, adjusted for potential confounding variables. Because of possible correlation of screening rates within patients, according to their physician in the same clinic, clinics were treated as a random effect in logistic regression models. Odds ratios and 95% confidence intervals were estimated for each family history category, adjusted for a set of pre-selected confounders. To maintain uniform adjustment for confounders, a single set of demographic variables was selected for adjustment on the basis of a statistically significant association with up-to-date screening status for any cancer prior to the addition of comorbidity and family history to the models. The selected confounders were age (category), ethnicity, smoking status, BMI class, length of contact with the clinic, total number of patient visits, and insurance status.

Co-morbidity adjustment included variables significantly associated with the cancer specific screening status in models that included demographic variables but excluded family history. Specifically, analyses of up-to-date status for breast cancer screening were adjusted for asthma and cardiovascular disease co-morbidity, while analyses of up-to-date status for colorectal cancer screening were adjusted for cardiovascular and digestive disease and performed for men and women separately.

Results

Distributions of social, demographic, clinic visit and health characteristics, such as number of co-morbid conditions were similar between men and women represented in this study (Table 1). Eighteen hundred and fifty-nine women were included in the analysis of mammography screening according to family history (Table 2). Of the 1859 women, 44% had no documented information regarding their family history, 45% had documented negative family history and 11% had a first-degree relative with breast cancer. Fifty-three percent of the women with a family history of breast cancer were up-to-date for mammography screening within the last year and another 16% were up-to-date for screening