Preventive Medicine Reports 2 (2015) 15–20

Contents lists available at ScienceDirect

Preventive Medicine Reports

journal homepage: http://ees.elsevier.com/pmedr

Cancer screening among a population-based sample of insured women

Sharon Hensley Alford [a,b], Steven Leadbetter [c,*], Juan L. Rodriguez [c], Nikki A. Hawkins [c], Lawrence E. Scholl [d], Lucy A. Peipins [c]

[a] Department of Public Health Science, Henry Ford Health System, Detroit, MI, United States
[b] Department of Women's Health, Henry Ford Health System, Detroit, MI, United States
[c] Epidemiology and Applied Research Branch, Division of Cancer Prevention and Control, CDC, Atlanta, GA, United States
[d] ICF International, Fairfax, VA, United States

ARTICLE INFO

Available online 28 November 2014

Keywords:
Cancer screening
Mammography
Pap test
Colorectal cancer screening

ABSTRACT

Purpose. Screening has been shown to lower the morbidity and mortality for breast, cervical, and colorectal cancers. Despite the availability of cancer screening, nearly 70,000 women die each year from these cancers. We conducted a study in 2008 within a privately-insured patient population of women who were members of an integrated health care system in Southeastern Michigan, for whom information on ovarian cancer risk as well as personal and family history of cancer was available. *Methods.* We used a population-based, weighted stratified random sample of women from a single health care institution to assess the proportion with up-to-date breast, cervical, and colorectal screening. Multivariable analyses were conducted to identify predictors of screening behavior. *Results.* In our study, women reported cervical and breast cancer screening above 90% and colorectal cancer screening above 75%. *Conclusions.* The results of our study hold promise that Healthy People 2020 cancer screening objectives might be obtainable as access to health insurance is expanded among US residents.

Introduction

Screening has been shown to lower morbidity and mortality for breast cancer, cervical cancer, and colorectal cancer (CRC) (Zappa et al., 1997; Laara et al., 1987; IARC Working Group, 1986; van der Graaf et al., 1988; Mook et al., 2011). Despite cancer screening, nearly 70,000 women die yearly from these cancers (Jemal et al., 2013). Healthy People 2020 objectives aim to have 81% of the eligible population screened for breast cancer with mammography, 93% for cervical cancer, and 70% for CRC (Healthy People 2020, 2013). However, results from the 2010 US National Health Interview Survey recently showed that overall screening rates are well below Healthy People 2020 targets (Coleman King et al., 2012; Smith et al., 2011). Several studies have shown strong associations between health insurance coverage and uptake of cancer screening services (Farkas et al., 2012; Fedewa et al., 2012; Carney et al., 2012; Akinyemiju et al., 2012; Zhao et al., 2011; Palmer et al., 2011; Shires et al., 2011), recent changes in the US health care system might address this major barrier of access to care.

As opportunities for health care coverage in the US increase, additional factors might continue to pose barriers to cancer screening. Previous studies of cancer screening have highlighted disparities associated with race, ethnicity, income, education, and other socio-economic factors (Smith et al., 2011; Shires et al., 2011; Klabune et al., 2013; U.S. Preventive Services Task Force, 2002; Swan et al., 2010; Courtney-Long et al., 2011; Miller et al., 2012; Shapiro et al., 2012; Joseph et al., 2012; Rauscher et al., 2012; Berry et al., 2009). In addition, several studies have also found that family history of cancer has been associated with uptake of cancer screening (Townsend et al., 2013; Zlot et al., 2012; Vyas et al., 2012; Meissner et al., 2007). As more individuals enter the health insurance market, having a greater understanding of the barriers to cancer screening uptake among insured populations will facilitate more focused strategies and interventions to reach Healthy People 2020 objectives.

We conducted a study within a privately-insured patient population of women who were members of an integrated health care system in Southeastern Michigan. Our sampling method permitted population-based estimates of reported breast, cervical, and CRC screening.

Methods

Study population

We used baseline data from a Centers for Disease Control and Prevention (CDC) study evaluating cancer risk perception and ovarian cancer screening among women within the Henry Ford Health System (HFHS). Eligible women were 30 years of age or older, had no previous diagnosis of ovarian cancer, and had not undergone bilateral

* Corresponding author. Fax: +1 770 488 4286.
E-mail address: SLeadbetter@cdc.gov (S. Leadbetter).

http://dx.doi.org/10.1016/j.pmedr.2014.11.004

oophorectomy. We excluded younger women because their risk of ovarian cancer is very low. HFHS provided a list of 55,887 potential eligible patients and their contact information. The survey was conducted in two phases—an eligibility screener and the full interview. The eligibility screener consisted of a five-minute series of questions on personal history of breast or ovarian cancer, bilateral oophorectomy, and breast and ovarian cancers among first- and second-degree relatives. Based on this screener, women were classified into ovarian cancer risk groups (average, elevated, and high) for stratified random sampling purposes, insuring sufficiently-powered subsamples from each risk group, including an oversample of women at high risk. Between January 16, 2008 and December 13, 2008 the programmed computer-assisted telephone interview (CATI) system randomly selected eligible respondents for participation in a full interview (Leadbetter et al., 2013). Approval for the study was obtained from the Institutional Review Boards (IRBs) of the CDC and the HFHS. All respondents provided informed consent before we conducted interviews.

Outcome measures

Respondents were asked if they had ever had a mammography or a Pap test and when they had their most recent exam. Women who reported having had a mammogram in the past two years or a Pap test in the past 3 years were classified as compliant with screening guidelines for a mammography or Pap test, respectively (Smith et al., 2011; Shires et al., 2011; U.S. Preventive Services Task Force (USPSTF), 2011). Respondents were asked if they had ever heard of or had a fecal occult blood test (FOBT), a colonoscopy or a sigmoidoscopy, and when they had their most recent exam. We classified respondents who reported having had a colonoscopy in the past 10 years, a sigmoidoscopy in the past 5 years, or an FOBT in the past year as having had a CRC test within recommended screening guidelines (Smith et al., 2011; U.S. Preventive Services Task Force (USPSTF), 2011). For the analyses of mammography, we included women ≥40 years of age because during the study period the USPSTF recommended ages for screening included women aged 40–49 (U.S. Preventive Services Task Force, 2002). Women ≥30 years of age and without a hysterectomy were included in the Pap test analyses as the youngest women in our sample were age 30; CRC testing analyses included women ≥50 years of age (Smith et al., 2011; U.S. Preventive Services Task Force (USPSTF), 2011). No upper age limit was imposed in these analyses.

Covariates

Using the detailed family cancer history from the baseline survey, we defined an indicator for any breast cancer, cervical cancer or CRC history in the family and used the respondent's personal cancer history information to determine cancer survivorship status. We included age, race/ethnicity, marital status, education, and income. Missing income data were imputed using hot-deck imputation.

Statistical analyses

Prevalence estimates of up-to-date mammography, Pap testing, and CRC testing used responses weighted to reflect selection probabilities based on the risk group-specific sampling rates and also to adjust for non-response. We conducted a bivariate analysis of these prevalence estimates by demographics and by various cancer history covariates, testing for general associations with chi-square statistics. Multivariable logistic regression models for each screening test were used to determine the fully-adjusted associations between each outcome and the demographic variables, and between each outcome and the cancer history variables. For each logistic model, these covariate associations were determined by Wald F-test statistics; potential effect modification and model lack-of-fit were also assessed. We defined the referent level for each covariate as the category with the smallest cancer testing prevalence estimate from the bivariate analysis. Adjusted testing percentages or predicted marginals (PMs) were derived for each category of the model covariates. Rate ratios (RRs) were calculated as the PM of each non-referent category relative to the PM of the referent category for each covariate, with 95% confidence intervals (CIs). All statistical analyses were performed using SAS 9.2 with SUDAAN (Research Triangle Institute, Research Triangle Park, NC) to calculate appropriate standard errors for the stratified sample design. We considered any test with a p-value ≤ 0.05 to be statistically significant.

Results

Of 55,887 women in the master list of patients, 20,483 (36.7%) underwent eligibility screening and 16,720 (81.6%) were determined to be eligible for the study. A total of 3307 women were invited to participate in the study and 2524 women were successfully consented and interviewed (overall response rate 76.3%) (Leadbetter et al., 2013). Table 1 provides sample sizes and unweighted percentages corresponding to the demographic distributions of the participating women.

Bivariate analysis

Table 2a presents the prevalence rates for mammography, Pap test, and CRC testing overall and by demographics. Overall, 91.0% of participants aged ≥40 (n = 2297) had a mammography within the past two years, 91.3% of participants aged ≥30 and who did not have a hysterectomy (n = 2152) had a Pap test within the past three years, and 78.7% of participants aged ≥50 (n = 1755) were compliant with CRC testing.

For mammography, women aged 50–69 were more likely to report having had a screening test than women aged 40–49 (p = 0.0004) and aged ≥70 (p < 0.0001). For Pap tests, women aged 30–69 were more likely to report being tested compared to those aged ≥70 (p <

Table 1
Demographics of study population, women, aged 30 or older, Henry Ford Health System, 2008.

Characteristic	n	(%)
Total study population	2524	(100%)
Age group (n = 2524)		
30–39	227	(9.0)
40–49	542	(21.5)
50–59	837	(33.2)
60–69	641	(25.4)
70 or older	277	(11.0)
Race/ethnicity (n = 2507)		
Non-Hispanic White	1659	(66.2)
Non-Hispanic Black	691	(27.6)
Other[a]	157	(6.3)
Marital status (n = 2523)		
Married/partnered	1692	(67.0)
Separated/divorced	380	(15.1)
Single	231	(9.2)
Widowed	219	(8.7)
Education (n = 2523)		
<High school	89	(3.5)
High school/GED	687	(27.2)
College, <4 years	830	(32.9)
College, ≥4 years	484	(19.2)
Graduate degree	433	(17.2)
Income[b] (n = 2523)		
<$25,000	263	(10.4)
$25,000–<$50,000	706	(28.0)
$50,000–<$75,000	592	(23.5)
$75,000 or more	962	(38.1)

Abbreviation: GED, general educational development (high school equivalency).
[a] "Other" includes Latina, non-Hispanic multiracial, and non-Hispanic of "other" or unspecified race.
[b] Refused or unknown income was imputed with hot-deck imputation procedures.