

Factors Associated with Breast Cancer Prevention Communication between Mothers and Daughters

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Abstract

Objective: Mother-daughter communication may be a potential pathway between family history and cancer prevention behavior. We examined the degree to which mothers reported providing advice on breast cancer prevention to their daughters, the content of such advice, and correlates of providing such advice.

Methods: Data were collected via a mailed questionnaire to 1773 women from 355 families in the Minnesota Breast Cancer Family Study. Women were asked whether or not they had provided advice to their daughters on what they should do to prevent breast cancer. An additional open-ended question asked them to describe the types of advice they had provided.

Results: Nine hundred seventy-six (55%) of the women reported providing breast cancer prevention advice to their daughters. The most frequent types of advice were to have a mammogram (51%), perform breast self-examination (BSE) (39%), have a clinical breast examination (CBE) (30%), and maintain a healthy lifestyle (21%). From multivariate logistic regression, older age ($p < 0.001$), having a personal history of breast cancer ($p < 0.001$), higher degree of breast cancer worry/concern ($p < 0.001$), engaging in a higher number of health-promoting behaviors ($p < 0.001$), and ever performing a BSE ($p = 0.04$) were factors independently associated with the provision of advice. Analyses accounting for sample nonindependence did not change our results.

Conclusions: Breast cancer prevention behaviors were associated with providing advice. By better understanding the pathways through which breast cancer family history is associated with screening mammography and other prevention behaviors, researchers can develop more effective, tailored prevention interventions at the family level.

Introduction

ONE IN EVERY EIGHT WOMEN will be diagnosed with cancer of the breast during her lifetime.¹ Women with a family history of breast cancer (BC) among their first-degree relatives have about twice the risk of developing cancer as women without such family history. Research has shown that women who are aware of their BC family history are more inclined to engage in risk reduction (i.e., speaking with healthcare provider about ways to reduce risk, eating a low-fat diet, increasing exercise, cutting down on alcohol, and not smoking).²⁻⁶

Despite this positive association, other studies suggest that women are often uncertain about how their BC family his-

tory affects their personal BC risk and the steps they should take to minimize such risk.^{4,7} Thus, although research indicates a consistent association between family history and prevention behavior, little is known about the mechanisms underlying this association or how these mechanisms cause appropriate or inappropriate prevention strategies. Finally, this association does not account for the large number of women who have family history but are not aware of it. In fact, a recent study by Mellon et al.⁴ indicated that barriers to communication about BC family history still exist. Their focus groups with BC survivors found that women reported fear of finding out risks, lack of proven options for risk intervention, and intrusions on daily life as barriers to com-

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municating about risk and prevention to their female first-degree and second-degree relatives. Given these limitations, we sought to explore the potential role of family influence on BC prevention behavior in the form of advice between mothers and daughters who have BC in their families.

Although little is known about the role of family communication on screening mammography behavior, data on family communication about genetic testing for BC risk indicate that information sharing among family members about BC genetic testing influences the likelihood that individuals members will undergo BC genetic testing and surveillance behaviors.²⁻⁶ The literature on social support yields further evidence that family relationships affect psychological well-being and health behaviors by shaping one's social environment and lifestyle.⁸⁻¹¹ The social cognitive model of health promotion views personal change as occurring within a network of social influences.^{12,13} This theory stresses that an individual's closest social network, such as the family, tends to have the most impact on behavior by influencing one's personal norms and beliefs and by presenting a family culture holding its own norms and beliefs.

The naturally occurring support from family members has been shown to increase healthy lifestyle behaviors through providing information, role modeling, and social support.¹⁴ Thus, family relationships can influence one's aspirations, self-efficacy beliefs, personal standards, emotional states and other self-regulatory influences, which, in turn, inform and alter subsequent behavior. From this perspective, health promotion and disease prevention have evolved into a multifaceted model that addresses the reciprocal interplay between personal (e.g., self-efficacy) and social-environmental (e.g., modeling, social persuasion) determinants of health behavior.¹³

Mothers may be a potential source to educate and promote BC awareness and prevention among daughters.¹⁵⁻¹⁷ For example, a mother may affect her daughter's sense of self-efficacy in overcoming perceived barriers to BC prevention in the form of instrumental support (material aid), informational support (advice, guidance), or emotional support (nurturance, empathy).¹⁸ Furthermore, exposure to a mother's attitude and health behavior practices toward BC prevention may influence a daughter's conception about the benefits and susceptibility of BC prevention. Thus, a mother's knowledge about family history, modeling norms of healthy lifestyle practices, and support of health prevention behaviors could be influential in their daughter's development of evolving behaviors that contribute to the awareness and prevention of BC.

In an earlier work,¹⁹ we found that only 9% of women enrolled in the Minnesota Breast Cancer Family Study who responded to our survey reported receiving BC prevention advice from their mothers. The women who received advice from their mothers were more likely to engage in health-promoting behaviors, such as screening mammography and breast self-examination (BSE) compared with those who did not report such advice. Despite the positive association, the proportion of women who reported receiving advice was relatively small. Given that BC taboos have been broken and BC is communicated more openly in public, treatment outcomes are more favorable, and more attention has been turned to raising awareness and promoting prevention

through mass screenings,^{20,21} we hypothesize that family taboos and barriers to discussing BC will also have been broken and that these same women will more openly discuss BC prevention with their own daughters, especially in the context of familial risk.

In this next study, therefore, we examined the degree to which women enrolled in the Minnesota Breast Cancer Family Study reported providing advice on BC prevention to their daughters, the content of such advice, and correlates of providing advice. We hypothesized that significantly more than 9% of these women would report providing BC prevention advice to their daughters (compared to the proportion who reported receiving advice from their mothers) and that those who reported providing BC prevention advice to their daughters would report a stronger BC family history, significantly higher levels of perceived BC risk, BC worry/concern, and BC prevention behaviors compared with those who did not report providing such advice.

Materials and Methods

This study was approved by the Institutional Review Board at the Mayo Clinic-Rochester. Details of the baseline²² and first follow-up (FU-1)²³ phase of the Minnesota Breast Cancer Family Study have been published. Briefly, a family study of BC was initiated in 1944 at the University of Minnesota. BC probands were women ascertained at the Tumor Clinic of the University of Minnesota Hospital between 1944 and 1952 ($n = 544$). From 1990 to 1996, 426 families were updated; each proband's first-degree and second-degree female relatives and spouses of male relatives (marry-ins) were contacted, and extensive risk factor data were collected by telephone interview on 6194 women (94.6% of those eligible). The vast majority of the cohort is of northern European descent.

Additional follow-ups of the families were conducted in 2001 and 2003 using a mailed survey, followed by phone contacts for nonresponders. The 2003 survey included an update of demographic data and cancer status, as well as a survey that assessed participants' attitudes and behaviors related to BC prevention. Preaddressed stamped envelopes were included with each questionnaire. When possible, individuals not returning forms within 4 weeks of mailout were sent a reminder postcard. If the questionnaire was not received, participants were called to see if they would complete the questionnaire or if they would do a brief phone survey, which included demographic and medical history questions. Of the 4493 women alive and eligible to complete the 2003 survey, 3158 (70.3%) participated and 671 refused (14.9%), we were unable to contact 310 (6.9%) after repeated attempts (contact information presumed to be accurate), and 354 (7.9%) were lost to follow-up. Of those participating, 2459 completed the full survey, and 699 completed an abbreviated survey by telephone.

Measures

Dependent variable: Giving advice to daughter(s). To assess advice respondents gave to their daughter(s) to prevent BC, respondents were asked, "Have you provided advice to your daughter(s) about things they should do to lower their breast cancer risk?" Response categories included yes, no,

and not applicable. Those responding yes to having given advice were then asked the open-ended question, "What advice did you provide?"

Independent variables. A variety of demographic, medical, psychosocial, and behavioral variables were included in the survey for this study. Participants were asked to provide information on their age, education, marital status, and number of children. Personal and family history was also assessed, and previous studies using these measures show a 99% concordance between self-reported BC and medical record validation.²⁴ Participants' BC screening behaviors (i.e., Breast Self Exam [BSE], clinical breast examination [CBE], and screening mammography) and the frequency of these behaviors were collected via 10 self-report questions.²⁴ For example, those who took part in the survey were asked, "Have you had a breast exam by a clinician for the detection of breast cancer?" Response categories were yes and no. Those who responded yes were also asked, "How many have you had in the last 3 years?" Response categories ranged continuously from 0 to 3 or more.

Perceived cancer risk and degree of cancer worry/concern were single-item questions adapted from items originally constructed by Lerman and Schwartz,²⁵ and responses were scored on a 5-point Likert scale. Respondents were asked, "How would you rate your risk of breast cancer?" from (1) no risk to (5) extremely high risk and "How often do you worry about breast cancer?" from (1) not at all to (5) all of the time.

Lifestyle behaviors were measured collectively via the health behavior checklist.²⁶ In brief, women were asked: "Which of the following approaches have you used for your overall health or for the prevention or early detection of breast cancer? (Mark all that apply)." The 11 options included behaviors that have been shown to improve overall health or decrease BC risk (i.e., physical activity, decrease smoking and alcohol use).²⁷ Results were truncated to form a health behavior score, which could range from 0 to 5.

Statistical methods

Qualitative analysis. Qualitative analytic techniques were employed for the analysis of the open-ended questions about types of advice received. Two trained research assistants reviewed and coded open-ended responses to types of advice given to daughters to uncover emerging themes and categories of response.²⁸ To develop the set of codes and procedures for coding, a random sample of 50 responses was initially coded. For purposes of triangulation (use of multiple investigators to inform emerging findings to ensure internal validity),²⁹ coding of these 50 responses was then discussed and verified by two of the investigators who have expertise in cancer prevention and screening. Once consensus was reached, the set of codes was refined. The research assistants independently coded responses into eight categories that reflected the type of advice the respondents gave to their daughters. In coding the questionnaires, discrepancies in coding between the two assistants occurred for 19 of 980 responses (1.9%). Coding conflicts were resolved among the two research assistants by discussions with the two investigators until consensus was reached.

Quantitative analysis. Data were descriptively summarized using frequencies and percents for all categorical vari-

ables and means, standard deviations (SD), and ranges for all continuous variables. We compared selected study variables across women who did and did not report providing advice to their daughters about BC prevention, using *t* tests for all continuous variables and chi-square tests for categorical variables. We then assessed the independent associations of each of these variables with receiving advice by simultaneously including them in a multivariate logistic regression analysis, modeling advice as the outcome variable. Primary analyses assumed independence across all observations. However, we also considered analyses that account for possible nonindependence of effects, realizing that lifestyle and medical behaviors may be correlated among individuals within the same family. This was carried out using generalized estimating equation methodology. Family-specific correlations for each outcome were modeled using an exchangeable covariance matrix.

We compared attributes of providing advice to daughters across various levels of receipt of advice from mothers using chi-square tests of significance. Among women who received advice from their mothers, we compared the extent to which they followed that advice across levels of providing advice to their daughters using Cochran-Mantel-Haenszel tests for trend. All statistical tests were two-sided, and all analyses were carried out using the SAS system (SAS Institute, Inc., Cary, NC).

Results

Respondent characteristics

Of the 3158 respondents, 2459 completed the full survey that included the questions on providing advice. Of these 2459 women, 1773 women reported whether they provided advice about BC prevention to their daughters, 639 answered not applicable, and the remaining 47 left the question blank. When compared with eligible women who did not provide a response to the advice questions, women who did respond either yes, no, or not applicable were younger (mean age 62.6 vs. 70.3, *t* test *p* value < 0.001), were more likely to have some posthigh school education (52 vs. 38%, chi-square *p* value < 0.001), and were more likely to be married (79 vs. 63%, chi-square *p* value < 0.001). Responders and nonresponders did not differ with respect to smoking status or alcohol consumption (*p* ≥ 0.05 for each).

Of the 1773 women reporting whether they provided advice, the mean ± SD age was 64.3 ± 12.8 years (range 29–96), with year of birth ranging from 1907 to 1975, and 48% reported a posthigh school education. Fifty-seven percent (*n* = 1004) were blood-related to the proband, and 43% (*n* = 769) were marry-ins, women in the study who were not blood-related to the proband.

Provision of BC prevention advice to daughters and categories of advice

Overall, 976 (55%) of the women reported providing advice to their daughters for prevention of BC. The eight categories of advice identified were (1) perform BSE, (2) have a mammogram, (3) have a CBE, (4) knowledge of family history of BC, (5) avoid hormone replacement therapy (HRT), (6) live a healthy lifestyle (i.e., change health behaviors), (7) BC awareness and education, and (8) other. The seven types

of advice were then grouped into three general categories: (1) detection (perform BSE, have a mammogram, and have a CBE), (2) lifestyle (know your family history of BC, avoid HRT, live a healthy lifestyle, and other), and (3) both detection and lifestyle advice.

Table 1 shows the frequency of the different categories of advice and illustrates the responses within each. The most frequent types of advice were to have a mammogram (51%), perform BSE (39%), have a CBE (30%), and maintain a healthy lifestyle (21%).

Overall, 455 (47%) of these 976 women provided one type of advice to their daughters, 389 (40%) reported two types of advice, and 78 (8%) reported provision of three or more types of advice. Moreover, 644 (66%) of the women reported they gave advice related to detection, 128 (13%) reported advice related to lifestyle, and 150 (15%) reported providing both kinds of advice. Fifty-four women (6%) did not specify the type of advice provided.

Correlates of providing BC prevention advice to daughters

Table 2 presents respondent demographic, behavioral, and psychosocial factors by whether or not the respondents reported providing BC prevention advice to their daughters. Compared with those who did not provide advice, women who provided advice to their daughters were generally older, were more likely to be married, had more children;

and were more likely to have had a personal diagnosis of BC. In addition, they also reported engaging in a higher number of health-promoting behaviors and were more likely to report mammography screening and performing BSE in the past 3 years. Finally, they also reported higher levels of perceived risk for BC and worry/concern about BC. We assessed the independent effects of these variables using a multivariate logistic regression model. After simultaneously accounting for the effects of each measure in Table 2, the following variables remained significantly correlated with giving advice: older age ($p < 0.001$), having a personal history of breast cancer ($p < 0.001$), higher degree of worry/concern ($p < 0.001$), higher health behavior score ($p < 0.001$), and ever performing a BSE ($p = 0.04$) (Table 2). All other variables were no longer independently associated with provision of advice. Analyses accounting for the possibility that data are correlated with a family did not appreciably change results (data not shown).

Discussion

This is one of the first studies to explore communication about BC prevention between mothers and daughters in the context of family history. A strength of this study is that it used a large cohort of women participating in the Minnesota Breast Cancer Family study and allowed us to correlate our exploratory and open-ended questions about providing ad-

TABLE 1. FREQUENCIES OF ENDORSEMENT OF EIGHT CATEGORIES OF TYPES OF ADVICE GIVEN TO DAUGHTERS ABOUT BREAST CANCER PREVENTION (N = 976)

Category	n (%) ^a	Quotes from women
1. Have mammogram	495 (51)	Get a mammogram soon! You need to establish a baseline. Encouraged her to have yearly mammograms. Start having mammograms at age 40. Mammograms—a must.
2. Perform BSE	382 (39)	Check breasts for lumps. Perform monthly self-exams. Do breast exams.
3. CBE	293 (30)	Things they should watch for—lumps and bumps. Get yearly checkups. Have annual doctor breast exam.
4. Healthy lifestyle	204 (21)	Get checked every year by a doctor. Model healthy living. Stop smoking and drinking wine. Lose weight.
5. Knowledge of family history of breast cancer	48 (5)	Exercise regularly, eat healthy. Tell their doctors that I have had breast cancer. Be aware that cancer is prevalent on paternal side.
6. Cancer awareness/education	23 (2)	Talked about grandma, who died from removing both breasts. Ask questions. Get education. Pay attention to breast cancer concerns. Put up exam guides.
7. Avoid hormone replacement therapy	14 (1)	Don't take any pill that hurts your body like birth control pills. Be careful of hormone therapy.
8. Other	12 (1)	No birth control use or estrogen therapy. Prophylactic surgery when older. Breastfeed children. Pray daily that God will heal your body.

^aPercentages do not total 100%, as categories are not mutually exclusive; that is, women could endorse more than one type of advice given to them by their mothers.

TABLE 2. DEMOGRAPHICS AND BREAST CANCER FAMILY HISTORY AMONG ALL PARTICIPANTS (N = 1773)

Characteristic	Advice provided n = 976 ^a	Advice not provided n = 797 ^a	p value ^b
Mean age, (SD, range)	65.9 (11.3, 36–96)	62.4 (14.2, 29–94)	<0.001
Marital status, n (% distribution)			0.02
Married	797 (82)	640 (80)	
Living with someone	18 (2)	14 (2)	
Separated or divorced	67 (7)	54 (7)	
Widowed	93 (10)	79 (10)	
Never married	0 (0)	9 (1)	
Education, n (% distribution)			0.93
High school education or GED	507 (52)	416 (52)	
Post-high school	468 (48)	381 (48)	
Mean number of children (SD, range)	3.3 (1.7, 0–11)	3.0 (1.8, 0–12)	0.002
Respondent's personal history of breast cancer, n (% distribution)			<0.001
No	861 (88)	773 (97)	
Yes	115 (12)	24 (3)	
Relationship to closest person affected with breast cancer, n (% distribution)			0.14
1st degree	181 (19)	120 (15)	
2nd degree	384 (39)	319 (40)	
Marry-in	411 (42)	358 (45)	
Mean health behavior score (SD, range)	1.8 (1.1, 0–4)	1.4 (1.1, 0–4)	<0.001
Mammogram in past 3 years, ^c n (% distribution)			<0.001
No	59 (6)	90 (12)	
Yes	899 (94)	657 (88)	
Ever mammogram, ^c n (% distribution)			0.01
No	28 (3)	40 (5)	
Yes	933 (97)	710 (95)	
BSE in past 3 years, n (% distribution)			<0.001
No	99 (10)	123 (16)	
Yes	866 (90)	665 (84)	
Ever BSE, n (% distribution)			0.002
No	72 (7)	94 (12)	
Yes	896 (93)	698 (88)	
Mean perceived breast cancer risk (SD, range)	2.7 (0.9, 1–5)	2.6 (0.9, 1–5)	<0.001
Mean degree of worry/concern (SD, range)	2.3 (1.0, 1–5)	2.0 (0.9, 1–5)	<0.001

^aValues presented as number (%) unless otherwise indicated. Percentages are based on nonmissing data.

^bChi-square tests for categorical variables and *t* tests for continuous and ordinal variables.

^cSubset of women aged ≥ 40 at time of survey.

vice with medical, demographic, psychosocial, and behavioral factors.

Results showed that over half (55%) of the respondents reported providing advice to their daughters on what they should do to lower their risk of BC. In contrast, in our prior investigation of this same sample of women,¹⁹ only 9% indicated they had received advice from their mother about preventing BC (Table 3). This is a substantial increase (55% vs. 9%) in the proportion of women who provided BC prevention advice to their daughter(s) compared with the previous generation. The women who received advice from their mothers were significantly more likely to provide advice to their daughters. This apparent increase in mother-daughter communication is likely due to increased BC awareness in the general public.^{20,21} However, other possi-

bilities, such as memory differences and differences in communication understanding between mothers and daughters, also are possible.

Multiple factors were found to be significantly associated with providing advice to daughters in the univariate analysis. Despite being significant, many of these findings may not be clinically relevant. For example, those who provided advice were, on average, 66 years old vs. 62 years old for those who did not provide advice. Whether this information is clinically relevant is difficult to determine, as we do not know the average age of these women's daughters. Could a 4-year difference in the respondent's age separate mothers who have daughters at the age to begin screening mammography? In the multivariate analysis, characteristics that remained significantly correlated with providing advice to

daughters were older age, a personal history of BC, a higher degree of perceived risk and cancer worry/concern, a higher health behavior score, and ever performing BSE. Whereas our findings are consistent with studies that have shown that cancer worry and concern provide motivation to improve health behavior in the context of familial risk,^{2,30–32} further study is needed to determine which factors are most clinically relevant.

In addition to multiple strengths of this exploratory study, there are also limitations and areas in need of further investigation. Although our response rate was 70% overall to this follow-up, only 78% of the respondents completed the full questionnaire that included the psychosocial assessment, giving an overall response rate to the psychosocial questions of 55% (2459 of 4493). Lower response rates for follow-up surveys from long-term cohorts, such as this one initiated in 1944, are common.³³ We were able to compare women who completed the full questionnaire with all eligible women who did not provide any psychosocial data (nonparticipants and participants who only did the short questionnaire), and consistent with survey trends, women completing the full questionnaire were younger and more likely to be married and have a higher level of education. However, any bias in our results is difficult to quantify, and these results may be less generalizable to women not from these groups. Another limitation to the results is that the age of the respondents' daughters is unknown, and it is possible that age could account for whether or not women would report discussing BC prevention or the type of advice a mother would provide. There is a need to investigate patterns of communication styles used by mothers who provide BC prevention advice to their daughters in regard to timing (i.e., age of daughter), frequency (how often prevention is discussed), and the style of communication (i.e., directive vs. nondirective). Furthermore, we surveyed only the mothers, not the daughters. Future studies would be strengthened by collecting data from both mothers and daughters and looking for concordance in responses. This approach would allow researchers to determine if advice as reported by the mother could be correlated with behavior as reported by the daughter.

An even stronger but more complex design would be to include multiple family members, not just mother and daughters. Among focus groups of families at risk for BC,⁴ women indicated that worry about cancer in their daughters and vigilance, or watching out, for cancer was expressed as a facilitator to communication about cancer in families. The women thought that vigilance or taking control could make a difference for their entire family, including children and future generations. Further studies are needed to determine if mothers' affects relative to BC risk are passed down to their daughters and, if so, how this influences their behavior and communication about cancer. Women in our study who provided advice to their daughters also appeared to engage in more health-promoting behaviors and screening practices to prevent cancer. We examined communication only in the form of advice provided to daughters. However, role modeling may be a mediator of the relationship between advice and BC prevention behavior. Our cross-sectional study design did not allow us to test this relationship, as we did not assess actual behaviors of the daughters to determine if they followed through with the advice. Therefore, whereas

this study opens an interesting avenue to investigate family influences on BC prevention, future study using more complex designs is needed to fully understand the role of the family on BC prevention behavior.

Conclusions

Given the substantial number of women who reported giving advice to their daughters in the current investigation and the association found between receiving advice and acting upon such advice reported from our earlier study, family-level interventions to enhance and facilitate family communication may present an opportunity to increase appropriate screening and prevention, especially among populations at increased risk because of family history. By better understanding the multilevel pathways through which BC family history is associated with screening mammography and other prevention behaviors, researchers can develop more effective, tailored prevention interventions.

Disclosure Statement

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