

Short Communication

Relationships among Breast Cancer Perceived Absolute Risk, Comparative Risk, and Worries¹

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Abstract

When trying to predict breast cancer screening, it may be important to understand the relationships between perceived breast cancer risks and worries about getting breast cancer. This study examines the extent to which women's worries about breast cancer correlate with perceptions of both absolute (assessment of own) and comparative (self versus other) 10-year and lifetime risks. As part of a larger randomized intervention trial concerning hormone replacement therapy, 581 women participated in a telephone baseline survey to assess their perceptions of breast cancer risks and worries. Worries about getting breast cancer in the next 10 years and in one's lifetime were related positively to both absolute and comparative 10-year and lifetime risks. The magnitude of these relationships did not differ by time frame. Worry about breast cancer is a function of both how a woman views her own risk and how she compares her risk with that of other women. Some practitioners may encourage women to get screened for breast cancer by using emotional appeals, such as heightening women's worries about breast cancer by using risk information. Our data suggest that they should give careful consideration how best to combine, if at all, information about absolute and comparative risks. For example, if the motivation to screen is based on a sequential assessment of risk beginning with comparative and then absolute risk, creating communications that heighten perceived risk on both of these risk dimensions may be needed to evoke sufficient worry to initiate breast cancer screening.

Introduction

Heightened perceptions of breast cancer risks and worries have been shown to increase breast cancer screening (1, 2), although very high levels of perceived risk and worry can interfere with screening in some populations, such as women with a family

history of breast cancer (*e.g.*, Refs. 3 and 4). Despite the importance of perceived risk and worry as predictors of breast cancer screening, these two constructs are rarely measured simultaneously within the same study sample. When they are, the correlations between perceived breast cancer risks and worries typically average 0.30 (1, 2, 5, 6).

Studies exploring perceived breast cancer risks and worries have not (*a*) assessed comparative risk (*i.e.*, risk for self versus risk for others) or (*b*) combined perceived breast cancer risk for self (*i.e.*, absolute risk) and perceived breast cancer risk for other women; thus, it is unclear which aspect of worry is related most strongly to which component of absolute risk (6).³ Consequently, the extent to which worries about breast cancer are related to women's perceptions about their absolute and comparative risks is an important but understudied issue. Assuming that absolute and comparative risks are related to worry, two additional questions can be addressed: (*a*) to what extent are breast cancer worries related to perceived absolute risks after accounting for perceptions of comparative risks? and (*b*) to what extent are breast cancer worries related to comparative risks after accounting for perceptions of absolute risks? We examine these questions in this report.

Understanding the relationship between breast cancer worries and risks may also improve prediction of breast cancer screening by specifying the time frame for the assessment of worry and risk. Is the relationship between breast cancer worries and perceived risks stronger for events framed within the relatively short term (*e.g.*, 10 years) than for events within the long term (lifetime)? Is this relationship similar for absolute and comparative risks? These questions merit attention for at least two reasons. First, medical decisions and health behaviors (*e.g.*, cancer screening) may be affected more powerfully by perceived short-term rather than long-term outcomes (7). Second, responses to questions using different time frames provide insights into women's sensitivity to changes in breast cancer risks across time and how changes in risks correspond to changes in perceptions of worry. Because breast cancer risk increases with age, and assuming that perceived breast cancer risks and worries are related, we should expect higher correlations between lifetime risks and worries than when the relationship is assessed for other time points. Indeed, correlations between risks and worries may be higher when framed within the context of a person's lifetime than any other time point. We also examined this issue.

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³ A possible exception to the general statement that breast cancer worries and comparative risks have not been examined together is the study by McCaul and O'Donnell (5). They assessed the relationship between absolute and comparative risks with the intrusion subscale of the Revised Impact of Events Scale (13) as a measure of breast cancer worry. Both risk estimates were related to more intrusive thoughts ($r_s = 0.34$ and 0.38 for the absolute and comparative risk measures, respectively, $p_s < 0.01$). For purposes of this study, it is questionable whether the Revised Impact of Events Scale should be considered a direct measure of the magnitude of breast cancer worries rather than a general measure of psychological distress.

Materials and Methods

Participants

Participants were recruited from a sampling frame of telephone numbers in Durham County, North Carolina. Women were selected from household lists to maximize the likelihood that an adult woman between the ages of 45–54 years lived in the household. Trained telephone interviewers from Battelle Centers for Public Health Research and Evaluation contacted these women. Once a woman was deemed age eligible, interviewers provided a brief description of and assessed interest in being in a study that entailed receiving written materials to help participants decide whether hormone replacement therapy was right for them. Consenting participants then completed a 25-min baseline survey.

A total of 2388 women were contacted. Thirty-five percent of the women contacted were ineligible ($n = 844$; women were either the wrong age or refused materials), and 25% ($n = 602$) were not reached during the recruitment period (September 21, 1998 through February 25, 1999). Of the remaining 942 women, 581 women (62%) agreed to participate. The mean age was 49.5 years (SD, 2.4 years), 75% were Caucasian, 75% had some college or greater, 75% were married, and 91% had enough income to pay the bills.

Measures

Absolute Risk. Perceptions of absolute risk were assessed using verbal and numerical measures within the time span of 10 years and lifetime (a total of four questions; see Ref. 8). The verbal measures asked “How likely are you to get breast cancer in the next 10 years/in your lifetime?” Response anchors were: (a) very unlikely; (b) unlikely; (c) 50–50 chance; (d) likely; and (e) very likely (scored 1–5, respectively.) For the numerical measures, women were asked: “On a scale from 0 to 100, where 0 = certain not to happen, and 100 = certain to happen, how likely are you to get breast cancer in the next 10 years/in your lifetime?” Actual 10-year and lifetime breast cancer risk was assessed using the algorithm of Gail *et al.* (9).

Comparative Risk. Women were asked: “Compared to other women your age and race, how likely are you to get breast cancer in the next 10 years/in your lifetime?” Anchors were: (a) much below average; (b) below average; (c) same average risk as other women your age; (d) above average; and (e) much above average (scored 1–5, respectively).

Worry about Getting Breast Cancer. Women were asked: “How worried are you about getting breast cancer in the next 10 years/in your lifetime?” Anchors were: (a) not at all worried; (b) slightly worried; (c) somewhat worried; (d) worried; and (e) very worried (scored 1–5, respectively).

Results

Perceptions of Absolute Risk Breast Cancer Risk. Based on the verbal indicators of risk, most women perceived their 10-year ($M = 2.3$; SD = 0.8) and lifetime ($M = 2.5$; SD = 0.9) risks as below average (*i.e.*, below the midpoint of the scale). Comparing women’s numerical perceived 10-year and lifetime absolute risks [$M = 30.2$ (SD = 21.7) and $M = 34.4$ (SD = 22.3) for 10-year and lifetime risks, respectively] with their actual 10-year (mean Gail score, 2.9%) and lifetime (mean Gail score, 8.1%) risks indicated that women greatly overestimated their risks.

Women were somewhat sensitive to the time frame of the risk, as suggested by slight differences in perceptions of their lifetime and 10-year numerical (0–100) absolute risks. Overall,

Table 1 Spearman correlations among absolute and comparative risks (10-year and lifetime risks)

	Absolute risk (0–100)		Comparative risk (1–5)	
	10-year	Lifetime	10-year	Lifetime
Absolute risk (0–100)				
10-year risk		0.83	0.54	0.60
Lifetime risk			0.53	0.64
Absolute risk (verbal 1–5)				
10-year risk	0.65	0.61	0.56	0.56
Lifetime risk	0.69	0.77	0.59	0.67

The correlation between 10-year and lifetime verbal absolute risk is 0.75, and the correlation between 10-year and lifetime comparative risk is 0.86. All correlations are significant at $P < 0.001$.

32%, 61%, and 7% viewed their lifetime risk as greater than, equal to, or less than their 10 year risk, respectively. A similar trend was found for verbal absolute risk (*i.e.*, very unlikely to very likely; data not shown). Perceptions of absolute risk were not affected by whether a woman did or did not have a mammogram.

Perceptions of Comparative Risks. Women believed, on average, that their 10-year and lifetime comparative risks ($M = 2.5$ and $M = 2.6$ for 10-year and lifetime risk, respectively) were lower than those of other women their age and race (<3 on the absolute scale, where 3 = same average risk as others). We examined whether this tendency for women to perceive their risks as lower than those of other women differed for 10-year and lifetime comparative risks. Overall, 48%, 41%, and 11% perceived their 10-year risks as lower than, the same as, or greater than those of other women their age and race; 43%, 44%, and 12% perceived their lifetime risks as lower than, the same as, or greater than those of other women their age and race. Furthermore, 12%, 84%, and 4% viewed their comparative lifetime risks as greater than, equal to, or less than their 10-year risk, respectively. Perceptions of comparative risk were not affected by whether a woman did or did not have a mammogram.

Correlations among Perceived Risk Indicators. Perceptions of 10-year and lifetime absolute and comparative risks were highly correlated (see Table 1). However, the numerical measures of absolute risk (*i.e.*, verbal and numerical) were more highly correlated with each other than with measures of comparative risks.

Relationships between Worry and Perceived Absolute and Comparative Risks. Greater worries about breast cancer were associated with higher perceived verbal/numerical absolute risks (correlations ranged from 0.32–0.46, $ps < .001$) and comparative risks (correlations ranged from 0.32–0.46, $ps < .001$), with the magnitude of the correlations being similar for 10-year and lifetime time frames. Partial correlations were performed between: (a) worry and verbal absolute 10-year and lifetime risks, partialling 10-year and lifetime comparative risk, respectively, and (b) worry and comparative 10-year and lifetime risk, partialling 10-year and lifetime verbal absolute risk, respectively.⁴ These results are presented in Table 2. Overall, the correlations of risk with worry decreased substantially (31%

⁴ We assessed partial correlations among the verbal anchors rather than verbal and numerical anchored responses to keep the scaling of the outcomes (*i.e.*, verbal) consistent.

Table 2 Partial correlations between worry and risk perceptions

A.	Lifetime absolute risk (partial lifetime comparative risk)	Lifetime comparative risk (partial lifetime absolute risk)
Worry (lifetime)	0.25 (0.46) ^a	0.19 (0.43) ^a
B.	10-Year absolute risk (Partial 10-year comparative risk)	10-Year comparative risk (Partial 10-year absolute risk)
Worry (10-years)	0.22 (0.35) ^a	0.16 (0.32) ^a

^aThese Spearman correlations use the 10-year and lifetime verbal absolute risks. The number in parentheses is the magnitude of the correlation before partialling.

to 56% relative change) regardless of whether absolute or comparative risk was partialled.

Discussion

We examined the relationships between worries about getting breast cancer and perceived absolute and comparative risks. The magnitude of the relationships (0.32–0.46) is very similar to or slightly higher than that found in most studies relating breast cancer risks and worries (see Ref. 1 for review). Moreover, our results are unique in that we assessed which expression of risk (absolute or comparative) contributed most to the relationship with worry. Breast cancer worries were significantly related to perceived (verbal) absolute risks after taking into account perceptions of comparative risks. Similarly, breast cancer worries were related significantly to perceived comparative risks after taking into account perceived (verbal) absolute risks. These results suggest that women may consider both comparative and absolute risks, perhaps equally, in their reports of how worried they are about breast cancer.

The latter findings have both theoretical and practical significance. The emotional reaction(s) associated with risk probabilities may mediate the relationship between risk perceptions and decision-making outcomes and behaviors. If so, the relations between breast cancer risk perceptions (a cognitive element) and emotions (*e.g.*, fear, worry, and anxiety) about getting breast cancer and how these pathways affect decision-making processes and behaviors should be further investigated. Our findings suggest, at least with respect to the relationship between risks and worries, that future studies should assess both absolute and comparative risk perceptions. From a practical perspective, if the intent is to encourage breast cancer screening via emotional appeals, such as increasing breast cancer worry by using risk information, careful consideration should be given as to how best to combine information about absolute and comparative risks. For example, if the motivation to screen for breast cancer is based initially on a sequential assessment of risk beginning with comparative and then absolute risk (7), creating communications that heighten perceptions of risk on both these risk dimensions may be needed to evoke sufficient worry to initiate the behavior change. Conversely, it is also possible that the intensity of worry derived from such communications may pose barriers to screening. In essence, whether the intensity of worry motivates behavior change (*e.g.*, screening), may be based, in part, on the differential magnitudes of perceived absolute and comparative risks.

There are several caveats about our results. First, they are

most generalizable to primarily white, well-educated, married women. Second, these results are cross-sectional, thereby limiting our ability to make causal statements. Third, we used single questionnaire items to assess magnitude of worry. This departs from other studies that have formed composite measures of worry based on three to four items (10–12). Nonetheless, it is comforting that the use of a single item closely replicated the magnitude of the associations between risks and worries found in other studies (5).³ This study should be regarded as a preliminary step in clarifying the relationships between breast cancer worries and perceived absolute and comparative risks using different time frames.

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