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The Relationship between Holding Back from Communicating about Breast Concerns and Anxiety in the Year following Breast Biopsy

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Abstract

Purpose—Evidence suggests open communication about breast cancer concerns promotes psychological adjustment, while holding back can lead to negative outcomes. Little is known about the relationship between communication and distress following breast biopsy.

Design/Sample—Women (N=128) were assessed at the time of breast biopsy and again one week and three, six, and 12 months post-result.

Methods—Linear mixed modeling examined relationships between holding back and anxiety for women with benign results ($n=94$) or DCIS/invasive disease ($n=34$) following breast biopsy.

Findings—Anxiety increased among women with a benign result engaging in high but not low or average levels of holding back. Holding back was positively associated with anxiety post-result in breast cancer survivors, with anxiety decreasing over time.

Conclusions/Implications—Interventions to enhance communication are warranted, and knowledge of the differences among women with benign results and/or DCIS/invasive disease may allow for the development of tailored interventions.

Breast cancer is the most frequently diagnosed cancer in women, with 246,660 new cases estimated in 2016. ¹ The diagnosis of breast cancer involves a breast biopsy. In the United States alone, more than one million women are expected to undergo breast biopsies in the next year. ² While approximately 80% of women who have a breast biopsy receive a benign

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result, for many, the procedure is associated with emotional distress, and in particular anxiety.^{3,4} Women may report clinically elevated levels of anxiety at the time of biopsy,^{3,4} and for some, pre-biopsy levels of emotional distress may remain elevated well beyond the biopsy event.^{5,6}

Women receiving a benign result have been found to experience elevated emotional distress relative to that of healthy women without a history of breast biopsy^{6,7} and similar levels of distress to those experienced by women diagnosed with malignant breast disease.^{5,6} Pre-biopsy emotional distress has been associated with more severe pain^{8,9} and greater physical discomfort during the procedure⁹ while persistent post-biopsy distress has been linked to greater psychological distress in response to breast symptoms (e.g., tenderness, skin irritation),¹⁰ reduced natural killer cell activity,⁶ cytokine dysregulation,⁶ and poorer adherence to recommended breast cancer screening.¹¹

For women whose biopsy results indicate a diagnosis of breast cancer, emotional distress experienced during the diagnostic period, including biopsy, has been associated with negative consequences.^{5,12,13} Research suggests that high levels of pre-biopsy anxiety and distress may remain stable or increase post-biopsy.^{5,14} Post-biopsy distress can also have important implications for psychological outcomes and physical symptoms across a patient's treatment trajectory. In fact, high levels of emotional distress following biopsy and prior to breast surgery are predictive of post-surgical pain, nausea, and fatigue.¹³ For some, depression and anxiety present following diagnosis can remain high for at least a year^{12,15} and may affect whether patients play an active role in medical decision making¹⁶ as well as adherence to recommended treatment.¹⁷ Research suggests that depressed breast cancer patients may receive less cancer treatment (e.g., fewer cycles of chemotherapy, fewer radiation treatments) than non-depressed patients,¹⁷ which may impact risk of disease progression and overall survival.

Several factors may contribute to women's experiences of emotional distress around the time of biopsy. Sociodemographic variables (e.g., fewer years of education, younger age), personality characteristics (e.g., greater dispositional anxiety), cancer-related beliefs (e.g., greater perceptions of breast cancer risk), and family history of cancer have been associated with higher levels of breast cancer specific distress at pre-biopsy and/or persistence of distress following a benign breast biopsy.^{7,18} Greater optimism, lower cynicism, increased mastery, use of self-regulatory strategies (i.e., cognitive reappraisal, problem solving), and seeking informational and emotional support may facilitate recovery of psychosocial wellbeing following a benign breast biopsy.^{7,18} For women receiving a diagnosis of breast cancer, lack of social support,¹² cognitive avoidance,¹⁴ and negative perceptions of life events¹⁹ may contribute to post-biopsy psychological distress.

Little is known about the role of communication style in the presence and/or persistence of distress following a biopsy result. Openly communicating with close others (e.g., family members, friends) about health concerns has been shown to be an effective strategy for promoting psychological adjustment.^{20,21} In fact, cancer survivors who share their cancer-related concerns with close others may experience less distress^{22,23}; communicating about cancer-related concerns may assist them with receiving support as well as engaging in

cognitive strategies to effectively process their concerns.^{24,25} In contrast to openly communicating, women may instead “hold back” from discussing their breast concerns. Holding back describes the deliberate effort not to share one’s thoughts or feelings related to a disease experience with others.²⁶ Holding back has been consistently associated with negative outcomes including lower relationship functioning and partner intimacy, decreased social support and social wellbeing, increased psychological distress, and poor symptom-related coping across a variety of populations,²⁷ including cancer survivors.^{22,23,28,29}

Despite the relationship between holding back and negative outcomes, to our knowledge, the effect of holding back on the psychological wellbeing of women who receive a breast biopsy has yet to be studied. The present study aims to examine the relationship between anxiety and women’s tendencies to hold back from discussing concerns about breast problems at both the time of biopsy and over the year following receipt of the benign result.

Method

Participants

Participants were recruited through the outpatient breast biopsy clinic at a National Cancer Institute designated Comprehensive Cancer Center from August 2010 to February 2011. Eligible participants were women who were: a) at least 21 years old, b) scheduled for a percutaneous imaging-guided diagnostic procedure (i.e., ultrasound- or stereotactic-guided core needle breast biopsy or ultrasound-guided diagnostic cyst aspiration), c) able to speak and read English, and d) able to provide meaningful consent. Women who had an imaging-guided breast biopsy in the previous six months were excluded. The study was performed under an institutional review board-approved protocol and was HIPAA compliant. Data presented in this paper were collected as part of a larger longitudinal study of adherence to recommended care that followed participants for three years after biopsy.

Overall, 207 women met the eligibility criteria for the study. Of these, 152 women (73%) were accrued and completed informed consent. Patients received a parking pass for their participation. Twenty-four of the women who consented (16%) were excluded from the present analyses: 19 did not complete study measures after receipt of biopsy results, four did not receive a biopsy procedure, and one had cognitive impairments that interfered with questionnaire completion. The present analyses utilize data obtained from the 128 remaining participants. Using chi-square analyses or independent samples t-tests, as appropriate, there were no significant differences in sociodemographic or baseline characteristics of participants included in the present sample (n=128) and the women excluded due to missing data on follow-up assessments (n=19).

Procedures

Study participants completed informed consent and written questionnaires in the biopsy clinic on the day of their procedure. Follow-up assessments were completed one week after receipt of biopsy results, and again 3, 6, and 12 months after receipt of biopsy result. Of the 128 participants, all completed assessments on the day of the biopsy procedure and one week following receipt of biopsy results. Our goal was to try to capture women in the year

following their biopsy result. One hundred twelve women completed one or more of the 3, 6, and 12 month follow-up assessments: 80 completed the 3-month follow-up, 77 completed the 6-month follow-up, and 76 completed the 12-month follow-up.

Questionnaires completed on the day of biopsy included measures of anxiety and social support, as well as assessments of socio-demographic (e.g., age, marital status, race) and medical characteristics (e.g., personal cancer history, family breast cancer history, previous imaging-guided breast biopsy). Assessments conducted one week after receipt of biopsy results included measures assessing anxiety and holding back from discussing concerns about breast problems. Anxiety was also assessed 3-, 6-, and 12-months following receipt of results. Histologic results from biopsies (i.e., benign vs. invasive breast cancer or DCIS) were collected via medical record.

Measures

Demographic and Medical Information—Participants completed a questionnaire assessing demographic and medical characteristics on the day of biopsy (either before or after the procedure as time allowed). Demographic information included age, race, education, and marital status. Medical information included history of depression or anxiety, cancer history, and history of breast biopsy and/or surgery.

Anxiety—The State Anxiety Scale of the State-Trait Anxiety Inventory, a widely used and well-validated measure of state anxiety, was used to assess levels of anxiety pre-biopsy and at each assessment post-biopsy.³⁰ The State Anxiety Scale is a 20-item self-report scale which assesses how much anxiety a person feels at that moment when completing the questionnaire (e.g., “I feel nervous”). Each item is rated on a four-point scale from 1 “not at all” through 4 “very much.” Items are summed to create a total score (possible range 20 to 80) with higher scores indicating greater anxiety. Internal consistency in this sample was high (Cronbach’s alpha = .91 to .92).

Holding Back—Holding back from discussing concerns about breast problems was assessed one week after receipt of biopsy results using a modified version of a measure developed by Pistrang and Barker.²⁶ The original measure asks participants about holding back from a partner/other helper about cancer-related concerns. The modified measure consists of four items that ask women to rate the extent to which they hold back from discussing concerns about *breast problems* with their spouse/partner, family, children, and friends. Items are rated on a scale from 0 “not at all” to 5 “a lot”. Scores were summed to create a total holding back score, with higher scores indicating more holding back. This measure has been shown to be reliable in other samples of cancer patients.^{29,31} Internal consistency for the present this sample was Cronbach’s alpha=.83.

Perceived Social Support—Pre-biopsy levels of social support were assessed using the 19-item MOS Social Support Survey.³² Participants are asked to rate items on a five-point response scale ranging from 1 “none of the time” to 5 “all of the time.” A total social support score was computed by first averaging across items; a linear transformation was then conducted so that the lowest possible score is 0 and the highest possible score is 100. Higher

scores indicate more frequent perceived availability of social support. Internal consistency was high (Cronbach's $\alpha = .96$).

Statistical Analysis

Bivariate analyses (i.e., Pearson correlations and point-biserial correlations as appropriate) were conducted to examine associations between study variables (i.e., anxiety, holding back) and participant demographic and medical characteristics. Significance was set at $\alpha < .05$.

Longitudinal linear mixed modeling [MIXED procedure, SPSS 19] was used to examine the relationship between anxiety and holding back in the year following receipt of the biopsy result. This method uses all available data, allows for randomly missing observations within a subject, and is appropriate for correlated data (i.e., repeated measures collected from an individual). Data were nested within participant to address non-independence due to repeated measures. Separate models were conducted for women with benign biopsy results and those with invasive breast cancer or DCIS. Results did not differ when examining women with invasive breast cancer or DCIS; thus, due to the relatively small sample of women diagnosed with a malignancy, we chose to collapse across diagnoses.

We used an empirical selection of control variables [i.e., correlations between potential controls and anxiety were obtained, and only variables correlated ($p < 0.10$) with outcomes were retained]. The model examining women receiving a benign result controlled for age, perceived social support, years of education, and pre-biopsy anxiety. The model examining women receiving a result of invasive cancer or DCIS controlled for age, relationship status (married or partnered vs. not), and pre-biopsy anxiety. Continuous variables were mean centered for ease of interpretation. Time was coded as months since receipt of biopsy result with the assessment conducted one week after receipt of result coded as 0. The holding back $\times$ time interaction was included in each model to test whether change in anxiety over time differed across levels of holding back. Based on log likelihood ratio tests ($p = 0.05$), unstructured covariance structure was specified.³³ Simple slopes analyses were conducted to facilitate interpretation of significant interactions.³⁴ To calculate the simple slopes and plot the interaction for interpretation, values one standard deviation above and below the mean of holding back were used.

Results

Descriptive Statistics

Descriptive statistics are provided for participant demographic characteristics at the time of biopsy as well as medical variables (see Table 1). On average, participants ($N = 128$) were 52 ($SD = 12.23$) years old and had 15.60 ($SD = 3.28$) years of education. The sample was predominantly Caucasian (70.3%) and married or living with a romantic partner (62.2%). Seventeen percent of women had a personal history of breast cancer and 19.7% had a first degree relative with breast cancer. For final histologic result of biopsy, 73.5% of women received a benign biopsy result ($n = 94$) and 26.5% were diagnosed as having invasive breast cancer or DCIS ($n = 34$). Of those with a malignancy, 20.6% were diagnosed with DCIS while 79.4% were diagnosed with invasive breast cancer. When compared to women with

invasive breast cancer or DCIS, women who had a benign result were significantly younger [$t(126)=-2.07, p=.04$] and more likely to be pre-menopausal [$X^2(1)=4.53, p=.03$]. Women with invasive breast cancer or DCIS did not differ from those with benign results on any other demographic or medical variables ($p's > .05$).

Descriptive statistics for study variables are displayed in Table 2. At the pre-biopsy assessment, anxiety was high for both groups of women ($M_s > 40$), with scores well over the values often used to indicate clinically elevated levels of anxiety [39–40; ^{30,35}]. At the first post-result assessment, anxiety was significantly lower in women who received a benign result compared to those with invasive cancer or DCIS [$t(126)=-6.29, p<.001$]. The average anxiety score on the State Anxiety scale of the STAI was 30.85 ($SD=10.31$) for women with benign results and 44.63 ($SD=12.56$) for women with invasive breast cancer or DCIS. At the 3 month assessment, anxiety remained significantly higher in women with invasive breast cancer or DCIS compared to those with a benign result [$t(78)=-2.85, p=.006$]. Anxiety did not significantly differ by result at the 6 and 12-month follow-ups.

Levels of holding back from discussing concerns about breast problems did not significantly ($p=0.25$) differ between women who received a benign result ($M=7.23, SD=5.50$, range=0 to 20) and those with invasive breast cancer or DCIS ($M=8.50, SD=5.55$, range=0 to 19) in the week after receiving the biopsy result.

Bivariate Analyses

Pearson and point-biserial correlations were conducted to examine relationships between participant characteristics, holding back, and anxiety. Among women with a benign result, lower levels of holding back were associated with having a personal history of cancer ($r=-.23, p=.03$), older age ($r=-.23, p=.03$), and greater perceived social support ($r=-.45, p<.001$). There were no significant associations between participant characteristics and holding back among women with invasive breast cancer or DCIS ($p's > .30$).

For women with a benign result, higher levels of social support were associated with lower levels of anxiety at post-result ($r=-.20, p=0.06$) as well as the 3- ($r=-.37, p<.01$), 6- ($r=-.27, p=.06$), and 12-month ($r=-.29, p=.04$) assessments. Greater levels of education were associated with lower levels of anxiety at the post-result assessment ($r=-.20, p=.05$), higher anxiety pre-biopsy was associated with higher anxiety at the 3-month assessment ($r=.26, p=.05$), and younger age was associated with greater anxiety at the 12-month assessment ($r=-.27, p=0.06$); these relationships were not found at other time points. Anxiety in women with a benign result was not associated with any other participant characteristics at the post result, 3-, 6-, and 12-month follow-up assessments ($p's > .05$).

For women with invasive breast cancer or DCIS, greater anxiety at the post-result, 3-, and 6-month follow-up assessments was significantly associated with greater anxiety pre-biopsy ($r=.41$ to $.55$). Younger women experienced greater anxiety at the post-result assessment ($r=-.41, p=.02$) while married or partnered women experienced less anxiety at the 3-month assessment ($r=-.51, p=.02$). No other sociodemographic variables were significantly associated with anxiety among women with invasive breast cancer or DCIS.

Correlations between holding back and anxiety at the post-result time points are displayed in Table 3. Among women with a benign result, holding back was not related to anxiety at the post-result assessment. However, holding back demonstrated a significant positive relationship with anxiety at the 3-, 6-, and 12-month follow-up assessments ($r=.28$ to $.41$). For women with invasive breast cancer or DCIS, holding back was significantly and positively associated with anxiety at the post-result and 3-month follow-up assessments ($r=.39$ to $.42$); holding back was not significantly related to anxiety at the 6 and 12-month follow-up assessments.

Linear Mixed Models

Table 4 reports the fixed effects of the linear mixed models. For women with benign results, after controlling for age, perceived social support, years of education, and pre-biopsy anxiety, the Holding Back X Time interaction was significant ($B = 0.20$, $SE = 0.099$, $t = 2.032$, $p = .046$). Figure 1 displays anxiety over time across low (one SD below the mean), average (at the mean), and high (one SD above the mean) levels of holding back. Examination of simple slopes analyses for low, average, and high levels of holding back found that the slope for high levels of holding back was significantly different from zero ($B = 1.84$, $SE = 0.73$, $t = 2.53$, $p = 0.01$). Simple slopes were not significant for low and average holding back. This indicates that anxiety increased over time among women who engaged in high levels of holding back, but not among women who engaged in low or average levels of holding back. There were also significant main effects of social support and education, with individuals with higher levels of social support and more years of education experiencing less anxiety after receiving their biopsy results.

Among women with invasive breast cancer or DCIS, after controlling for age, relationship status, and pre-biopsy anxiety, the holding back X time interaction effect was not significant ($p=.10$). This indicates that the rate of change in anxiety did not differ based on levels of holding back. Significant main effects of holding back ($B = 0.931$, $SE = 0.284$, $t = 3.275$, $p = .003$) and time were found ($B = -2.472$, $SE = 0.790$, $t = -3.130$, $p = .004$), suggesting that, while anxiety decreased over time, those with high levels of holding back experienced greater anxiety after receiving their biopsy results. Significant main effects were also found for relationship status and pre-biopsy anxiety such that women who were married/partnered and those who had lower levels of pre-biopsy anxiety experienced lower levels of anxiety after receipt of results.

Discussion

The present study represents the first to examine the relationship between holding back from communicating about breast concerns and anxiety among women receiving a breast biopsy result. Women were followed from the time of biopsy to one year post-result. Separate analyses examined women receiving a benign result and women whose biopsy resulted in the diagnosis of invasive breast cancer or DCIS. A graded response was found for the relationship between holding back and anxiety among women receiving a benign result, with anxiety increasing over time for women engaging in high rather than average or low levels of holding back. Significant main effects were found for holding back and time among

women diagnosed with invasive breast cancer or DCIS; while anxiety appears to decrease over time, holding back was positively associated with post result anxiety.

Benign results are common following breast biopsy, ³⁶ with close to three quarters of the present sample receiving a benign result. Prior research has consistently found the experience of a breast biopsy and subsequent benign result to elicit distress. ^{37,38} While sociodemographic factors, including younger age and fewer years of education, have been identified as risk factors for distress among women receiving a benign result, ³⁸ holding back has yet to be examined. In the present study, a subset of women receiving a benign result who reported high levels of holding back experienced increasing anxiety over the year following receipt of the result. While anxiety may increase as women approach their next, routine screening mammogram, it appears that women who hold back from communicating about breast concerns following breast biopsy may be at greatest risk for anxiety during this period. These findings extend the literature by suggesting that open communication about breast concerns may be protective against anxiety while holding back may be a risk factor for anxiety.

Identifying risk factors for anxiety among women receiving a benign result is important. Routine surveillance occurring every 6–12 months is recommended for women following a benign breast biopsy as they may be at increased risk for developing breast cancer. ³⁹ Anxiety and anxiety-related cognitions and behaviors (e.g., avoidance and intrusive ideation about breast cancer risk) following benign biopsy are associated with nonadherence to recommended follow-up. ¹¹ Interventions to improve adherence to recommended follow-up are needed, and anxiety may be an important target for such interventions. The present study suggests that communication also may be an important intervention target for women receiving a benign breast biopsy result, and women who experience high levels of holding back may be appropriate candidates for such an intervention.

When compared to women receiving a benign result, women receiving a diagnosis of DCIS or invasive breast cancer experienced higher levels of anxiety post-result and three months following receipt of results. The diagnosis of breast cancer brings multiple unknowns for patients related to their treatment course, the potential for side effects/health complications, and their mortality, all of which can result in anxiety. ⁴⁰ The present study suggests that anxiety is high following diagnosis during the period when patients typically initiate adjuvant treatment and decreases in the year following diagnosis; this is consistent with prior research examining the trajectory of distress for breast cancer survivors. ⁴¹ Anxiety appears to decrease below clinically significant levels as patients move through the survivorship trajectory and become more familiar with their treatment routine and medical team.

The effect of the cancer diagnosis on close others is a significant concern and source of distress for women diagnosed with breast cancer. ⁴² Patients may hold back from expressing concerns to protect their family members from added distress. ⁴³ However, the results of the present study suggest that holding back is associated with higher levels of post-result anxiety for women diagnosed with invasive disease or DCIS. This is consistent with prior research among those with cancer ^{22,28,44,45} finding that, instead of buffering loved ones from

emotional distress, holding back may instead result in greater distress for patients as well as those close to them.

Interestingly, there was a significant main effect of partner status on post-result anxiety for women diagnosed with invasive breast cancer or DCIS and a significant main effect of social support on post-result anxiety for women receiving a benign result. Women diagnosed with cancer who were married or partnered at the time of breast biopsy experienced lower post-biopsy anxiety as did women receiving a benign result who had higher levels of pre-biopsy social support. These results suggest that having identifiable close others may be a protective factor against distress for women receiving a breast biopsy. The findings may also indicate that women receiving a breast biopsy may utilize support differently depending on their biopsy result. Future research is necessary to better understand how patients' support needs and sources of support may change over the course of the biopsy trajectory.

This study has several strengths. First, a prospective, longitudinal design was used. Second, we used a robust analytic strategy—linear mixed modeling—to ensure inclusion of cases with missing data. Third, to our knowledge, ours is the first study to examine the effect of holding back on anxiety over time for women receiving a benign result, a group who is at risk for nonadherence to routine follow up due to distress. Finally, the results suggest that communication may be an important intervention target for future studies aimed to reduce distress among women undergoing breast biopsy.

While this study has several strengths, there were also limitations. First, the relatively small sample size and the fact that the sample was primarily Caucasian and highly educated may limit the generalizability of these findings to other racial groups and individuals with lower educational attainment. Additionally, this study was conducted with women who were scheduled for a breast biopsy; thus, the results may not generalize to men or individuals receiving a biopsy of another disease site. Second, holding back was not examined over time. Thus, we cannot determine whether changes in holding back covary with changes in anxiety. Additional studies with larger and more diverse samples (i.e., gender, disease site, sociodemographic characteristics) are warranted to better understand the nature of the relationship between holding back and anxiety.

Finally, though not statistically significant, there was a larger percentage of women with a personal history of breast cancer in the DCIS/invasive disease group (20.6%) than in the group of women receiving a benign breast biopsy (16.1%). It is possible that the differences seen in the pattern of effects between the two groups may be in part attributed to their historical experience with cancer. For example, among women receiving a benign result, having a personal history of cancer was significantly correlated with lower levels of holding back post-result; however, this relationship was not found for women diagnosed with DCIS/invasive disease. Thus, it is possible that women's history of breast cancer may impact their communication about breast cancer during a subsequent biopsy. The small sample size in the present study and relatively small numbers of women receiving a diagnosis of invasive disease/DCIS ($n=7$) or a benign ($n=15$) result with a personal history of cancer limits our ability to examine the effect of breast cancer history on these relationships. Future studies utilizing a larger sample should examine whether the impact of holding back on anxiety

differs based on women's breast cancer histories. In sum, this study suggests that holding back is associated with anxiety among women receiving a breast biopsy. While the pattern of results differed based on biopsy result, these findings place importance on identifying and intervening with women who hold back prior to and at the time of a breast biopsy procedure. Interventions to enhance communication regarding breast cancer concerns are warranted, and knowledge of the differences seen among women with a benign result and those diagnosed with invasive disease or DCIS may allow for the development of individually tailored interventions.

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Figure 1. Anxiety over time across low (one SD below the mean), average (at the mean), and high (one SD above the mean) levels of holding back among women who received a benign biopsy result.

Table 1

Sample description

	Benign Result (<i>n</i> =94)		Invasive breast cancer or DCIS (<i>n</i> =34)		Total (<i>n</i> =128)	
	% (<i>n</i>)	Mean (<i>SD</i>)	% (<i>n</i>)	Mean (<i>SD</i>)	% (<i>n</i>)	Mean (<i>SD</i>)
Age (years) *		50.70 (12.68)		55.71 (10.17)		52.03 (12.23)
Education (years)		15.80 (3.18)		15.06 (3.53)		15.60 (3.28)
Race (% Caucasian)	68.1% (64)		76.5 (26)		70.3% (90)	
Relationship status (% married/living with a romantic partner)	62.8% (54)		60.6% (20)		62.2% (74)	
Personal history of cancer	24.7% (23)		29.4% (10)		26.0% (33)	
Personal history of breast cancer	16.1% (15)		20.6% (7)		17.3% (22)	
First degree relative with breast cancer	19.4% (18)		20.6% (7)		19.7% (25)	
Post-menopausal *	48.9% (44)		71.0% (22)		54.5% (66)	
History of anxiety or depression	21.5% (20)		29.4% (10)		23.6% (30)	
Number of comorbid illnesses		1.83 (1.56)		2.06 (1.76)		1.89 (1.61)

Note: All available data was used;

* $P < .05$

Table 2

Descriptive statistics for study variables.

	Benign result (n=94)	Invasive breast cancer or DCIS (n=34)	Total (n=128)
	Mean (SD)	Mean (SD)	Mean (SD)
Holding back post-results	7.23 (5.50)	8.50 (5.55)	7.57 (5.52)
Anxiety pre-result	43.70 (12.46)	47.09 (10.86)	44.60 (12.10)
Anxiety post-results *	30.85 (10.31)	44.63 (12.56)	34.51 (12.50)
Anxiety 3 months *	31.11 (9.37)	38.06 (11.06)	33.11 (10.31)
Anxiety 6 months	32.30 (11.35)	37.24 (12.31)	33.97 (11.84)
Anxiety 12 months	33.23 (10.35)	36.02 (10.30)	34.05 (10.36)

Note: All available data was used;* $p < .05$

Table 3

Correlations among study variables

	Holding back post-result	Anxiety post-result	Anxiety 3 month follow-up	Anxiety 6 month follow-up	Anxiety 12 month follow-up
Benign result					
Holding back post-results	1.00				
Anxiety post-results	.06	1.00			
Anxiety 3 months	.41*	.20	1.00		
Anxiety 6 months	.28*	.32*	.60*	1.00	
Anxiety 12 months	.32*	.32*	.56*	.68*	1.00
Invasive breast cancer or DCIS					
Holding back post-results	1.00				
Anxiety post-results	.39*	1.00			
Anxiety 3 months	.42*	.52*	1.00		
Anxiety 6 months	.25	.16	.65*	1.00	
Anxiety 12 months	.24	.30	.53*	.27	1.00

Note: All available data was used;

* $p < .05$

Table 4

Fixed Effects of Linear Mixed Models Examining the Relationship between Anxiety and Holding Back in the Year following Receipt of the Biopsy Result

	B	SE	t	p
Benign result				
Intercept	31.586	0.983	32.122	<.001**
Age	-0.001	0.070	-0.018	0.986
Perceived social support	-0.150	0.060	-2.493	0.015*
Years of education	-0.628	0.285	-2.205	0.030*
Pre-biopsy anxiety	0.115	0.069	1.674	0.098
Holding back	0.001	0.203	0.000	1.000
Time	0.844	0.483	1.748	0.085
Holding back x time	0.200	0.099	2.032	0.046*
Invasive breast cancer or DCIS				
Intercept	45.273	2.570	17.613	<.001**
Age	-0.075	0.153	-0.492	0.627
Relationship Status	-5.952	2.741	-2.172	0.039*
Pre-biopsy anxiety	0.507	0.141	3.592	0.001**
Holding back	0.931	0.284	3.275	0.003**
Time	-2.472	0.790	-3.130	0.004**
Holding back x time	-0.231	0.135	-1.705	0.100

Note

*
 $p < 0.05$;

**
 $p < .01$;

marital status: 0=not married, 1=married or partnered