

Adjustment of Children and Their Mothers with Breast Cancer

Ronald T. Brown,¹ PhD, ABPP, Bernard Fuemmeler,² PhD, Deborah Anderson,³ PhD, Sara Jamieson,⁴ BA, Susan Simonian,⁴ PhD, Rayna Kneuper Hall,⁵ MD, and Frank Brescia,⁵ MD
¹Department of Public Health, Temple University, ²National Cancer Institute, ³Department of Pediatrics, Medical University of South Carolina, ⁴College of Charleston, and ⁵Hollings Cancer Center, Medical University of South Carolina

Objective To examine the adjustment of children of mothers with both active and nonactive breast cancers in comparison with a healthy community control sample. **Methods** Participants included 80 mothers and their children. Half of the mothers had breast cancer or a history of breast cancer. Children in both groups ranged in age from 8 to 19 years. Assessments included measures of maternal stressors and resources, maternal and child adjustment and posttraumatic stress, and maternal coping and illness uncertainty reported by both mothers and their children. **Results** Few differences were found between the groups, although there was a trend for girls of mothers with breast cancer to have a higher frequency of depressive symptoms. Children of mothers who perceived support from friends and family had fewer depressive symptoms, after we controlled for child gender. **Conclusions** The social support perceived by mothers with breast cancer may serve as a protective factor for their children's psychological adjustment.

Key words adjustment; breast cancer; social support.

Improvements in screening, detection, and treatment for breast cancer have resulted in long-term survival rates, and an increasing number of these women have young children and/or adolescents residing at home (American Cancer Society, 2000). A general consensus on the psychological adaptation of breast cancer survivors is that women experience increased levels of distress, particularly when they are first diagnosed with cancer, but that these symptoms of anxiety and depression typically abate over time (Ashing-Giwa, 1999). Nonetheless, a subset of women continue to report specific adjustment difficulties, including general distress and symptoms of posttraumatic stress, which involve reexperiencing symptoms (e.g., intrusive thoughts and nightmares), avoidance symptoms (e.g., avoiding reminders of the event or becoming estranged from others), and arousal symptoms (e.g., irritability, difficulty concentrating, and sleep disturbances) (Andrykowski, Cordova, McGrath, Sloan, & Kenady, 2000; Bleiker, Pouwer, van der Ploeg, Leer, & Ader, 2000).

The cancer experience is not just an intrapersonal one; it is also shared by those close to the person, such as spouse and children (Leventhal, Easterling, Coons, Luchterhand, & Love, 1986; Lewis, 1986, 1990). Only a few studies have examined the effect of parental physical illness on child adjustment (Armistead, Klein, & Forehand, 1995). Some researchers have suggested that children of parents with cancer suffer adjustment difficulties, such as anxiety, depressed mood, low self-esteem, somatic complaints, and behavioral difficulties (Beardslee & Hoke, 1997; Hoke, 1996; Lichtman et al., 1984; Siegal et al., 1992). These problems are often accompanied by declines in school achievement and decreased participation in extracurricular and social activities. Other investigators have provided more encouraging data on children's adjustment and adaptation, including behavioral functioning that is within normal limits (Armsden & Lewis, 1994) and moderate but non-clinical symptoms of adjustment difficulties (Compas

John Lavigne, Associate Editor, managed this manuscript.

All correspondence concerning this article should be addressed to Ronald T. Brown, PhD, ABPP, Department of Public Health, Temple University, 3307 North Broad Street, 300 Jones Hall, Philadelphia, Pennsylvania 19140. E-mail: rtbrown@temple.edu.

Journal of Pediatric Psychology 32(3) pp. 297–308, 2007

doi:10.1093/jpepsy/jsl015

Advance Access publication July 12, 2006

Journal of Pediatric Psychology vol. 32 no. 3 © The Author 2006. Published by Oxford University Press on behalf of the Society of Pediatric Psychology. All rights reserved. For permissions, please e-mail: journals.permissions@oxfordjournals.org

et al., 1994). A possibility for these discrepancies in findings is that type and severity of cancer may predict overall child adjustment.

In the few investigations that focused on psychological adjustment of children whose parents have a chronic illness, the variables of severity of the parent's illness, parent's psychological adaptation to the illness, and marital functioning were associated with adjustment outcomes (Howes, Hoke, Winterbottom, & Delafield, 1994). Compas and fellow researchers (1994) found that gender and age of the child and gender of the ill parent were viable predictors of children's psychological adjustment. Specifically, older daughters of women who had cancer were more apt to experience symptoms of distress compared with sons of women who were ill and daughters of men who were ill. Contrary to other findings among families in which one parent has a chronic illness (Howes et al., 1994), Compas et al. (1994) found that child distress was not associated with a parent's distress or rating of severity of cancer. Hoke (2001) reported on children of 28 mothers with a recent diagnosis of breast cancer (i.e., within the year preceding a survey) and compared this group with mothers with recent benign breast biopsies. No differences on psychological adjustment were found between the two groups, but the investigators issued a caveat that the small sample size could have reduced the likelihood of finding significant results that may have occurred with a larger sample.

Compas, Worsham, Ey, and Howell (1996) provided data to suggest that cognitive appraisals were associated with symptoms of anxiety and depression in children of parents diagnosed with cancer. Prognosis of the parent's disease was associated with avoidance appraisals. Greater emotion-focused coping was associated with greater anxiety and depression. Other researchers have underscored the importance of social support from both family and friends in negotiating the stressors associated with a chronic illness (Brown, 2005; Fuemmeler, Mullins, & Carpentier, 2006; Kazak et al., 1997).

The purpose of our investigation was to add to the extant literature on the adjustment of children of parents with cancer and more specifically children of mothers with breast cancer. Our investigation extends the research of Hoke (2001) because it includes mothers who had recently been diagnosed with the disease as well as mothers who had survived breast cancer for many years. It also extends the work of Compas et al. (1994) because it focuses specifically on breast cancer in mothers. The variability in the sample with regard to time since diagnosis and severity of side effects was specifically intended so the association between time since diagnosis and psychological adjustment among both maternal

cancer survivors and their children could be examined. We hypothesized that mothers surviving cancer and their children would exhibit greater symptoms of adjustment difficulties on measures associated with overall adjustment, anxiety, depression, and symptoms of post-traumatic stress disorder than a community control comparison group. In addition, it was hypothesized that child gender would be associated with children's adjustment, with daughters of women with breast cancer exhibiting a higher frequency of adjustment difficulties than daughters of women without breast cancer. Among the cancer group, we performed an exploratory analysis to examine potential predictors of children's adjustment employing the Transactional Stress and Coping model (Thompson, Gil, Burbach, Keith, & Kinney, 1993), where demographic variables and illness parameters were considered first, followed by adaptational processes (adjustment).

Method

Participants

Forty women with a history of breast cancer and their oldest child comprised the cases for this study. The community comparison group ($n = 40$) included families recruited throughout the area who were demographically matched to the case families on age of mother, age of child, gender of child, and socioeconomic status (SES) as measured by the Hollingshead index of social class (Hollingshead, 1975). The demographics for the sample are summarized in Table I. No differences were found between the breast cancer group and the community control group on such variables as maternal age, marital status, SES, age of children, and gender distributions, for both children and their mothers (all $ps > .05$), suggesting that the matching procedure was effective. Table II summarizes the medical status and treatment variables for mothers with breast cancer.

Procedures

Patients with a diagnosis of breast cancer were identified from a list of eligible patients from a middle-sized city in the southeastern part of the United States. This list was obtained from the cancer center's institutional database after obtaining permission from the patients during their clinic visits. Eligibility for the investigation was established by a review of the medical record by the attending physicians. Inclusion criteria consisted of women with a diagnosis of breast cancer who were at least 1 month from diagnosis and who had at least one child living at home who was at least 8 years of age. Eight years of age

Table 1. Means and Standard Deviations for Demographic Variables

Variable	Mothers with cancer (<i>n</i> = 40)					Controls (<i>n</i> = 40)				
	<i>M</i>	<i>SD</i>	Range	<i>F</i>	%	<i>M</i>	<i>SD</i>	Range	<i>F</i>	%
Mothers										
Chronological age	45.9	6.3	33–61			44.3	5.9	34–59		
Marital status										
Married or living with partner				33	82.5				28	70.0
Separated or divorced				7	17.5				12	30.0
Race										
African American				10	25.0				13	32.5
White				30	75.0				27	67.5
Family SES	39.6	13.1	17–61			44.9	11.7	18–64		
Children										
Chronological age	14.4	3.0	8–19			14.1	2.9	8–19		
Gender										
Daughters				21	52.5				20	50.0
Sons				19	47.5				20	50.0

F, frequency; SES, Hollingshead socioeconomic status factor score.

was chosen because this was the earliest age at which children could independently complete the child assessment questionnaires. Before a routine scheduled medical follow-up visit, the mother was mailed a letter from one of the two physician investigators explaining the purpose of the investigation. During the patient's routine clinical visit, the research assistant met with the patient to establish interest in participation and to answer any questions about the investigation. An appointment for completing questionnaires was scheduled for those who expressed an interest in participating (*n* = 46). Of these families, six did not meet inclusion criteria because of the fact that either they had no children who were residing in the home or the only children who were living in the home were less than 8 years of age. Data collection visits were scheduled at the family's home so that the child could also participate. Written informed consent was obtained in accordance with methods prescribed by the Institutional Review Board. The research assistant administering the questionnaires was available to patients or their children who required assistance in reading the questionnaire. Patients and their families were compensated with \$50 for their time and efforts with the investigation.

Measures¹

Measures were chosen that assessed a broad spectrum of adjustment symptoms, including anxiety, depression,

¹It is acknowledged that some of the instruments in this investigation were normed on children and adolescents through the age of 18 years. Thus, all of the data analyses were repeated in which any adolescents over the age of 18 years and 11 months were eliminated from the data analyses. This did not change the results of the study and hence the complete cohort is reported on for this article.

and posttraumatic stress disorder, in both mothers and their children. For mothers, an assessment also was made of general life stressors. For the children, wherever possible, assessment of functioning was made by self-report from the children and maternal report of the child's functioning. For the cases with cancer, an assessment of illness uncertainty and coping also was completed.

Demographics

Mothers were asked to complete a self-report form developed by the authors that provided demographic variables such as age, race, educational levels, household income, and gender of the participating child. Medical variables of length of time since diagnosis, type of treatment the patient had undergone, and prognosis were collected and then verified by means of chart review.

Maternal Stressors and Resources

The level and source of current stressors experienced by mothers as well as their available social resources were assessed with the 200-item Life Stress and Social Resources Inventory (LISRES-A) (Moos, Fenn, & Billings, 1988). The LISRES-A provides an integrated picture of an individual's current life context. It has 16 scales: nine measure life stressors and seven measure social resources. There are eight domains: physical health status, housing and neighborhood, finances, work, relationships with spouse or partner, relationships with children, relationships with extended family, and relationships with friends and social groups. The LISRES-A was normed on 1,884 adults (1,181 men and 703 women). Internal consistency

Table II. Medical Status and Treatment Variables for Mothers with Cancer

Variable	<i>F</i>	%	<i>M</i>	<i>SD</i>	Range
Stage of disease ^a					
I	17	44.7			
II	10	26.3			
III	7	18.4			
IV	4	10.5			
Type of surgery ^a					
Lumpectomy	20	25.0			
Mastectomy	16	20.0			
Both	3	3.8			
Type of therapy					
None	1	2.5			
Radiation	5	12.5			
Chemotherapy	5	12.5			
Radiation plus chemotherapy	29	72.5			
Serious complications ^{ab}					
Present	5	12.8			
Absent	34	87.2			
Severity of side effects ^a					
None or mild	9	24.3			
Moderate	21	56.7			
Severe	6	16.2			
Incapacitating	1	2.7			
Cancer reoccurrence					
Yes	8	20.0			
No	32	80.0			
Age at diagnosis			40.9	7.3	23–56
Months since diagnosis			57.6	39.5	2–174
Number of side effects ^c			3.5	1.6	0–8

^aNumbers do not total 40 because of unavailable data.

^bSerious complications: for example, hospitalizations for infections and hematomas.

^cSide effects: for example, nausea, diarrhea, skin irritations, hair loss, sleep disturbance, fatigue, and others.

reliabilities range from .77 to .93 for the stressor scales and .50 to .92 for the social resources scales. Because some of the mothers were not married or currently employed, the subscales focusing on work and spouse or partner relationships for all participants were excluded from the data analyses. Thus, only seven of the LISRES-A stressors scales (i.e., physical health status, housing, neighborhoods, finances, relationship with children, relationship with friends, and recent negative life events) and five of the LISRES-A resources scales (i.e., finances, relationship with children, relationship with extended family, relationship with friends, and recent positive life events) were included in the data analyses. The LISRES-A uses standardized *t* scores ($M = 50$, $SD = 10$).

Maternal Adjustment

Maternal adjustment was assessed with the 53-item Brief Symptom Inventory (BSI) (Derogotis, 1993), an instrument

that yields nine clinical dimensions of psychological distress and three global indices of distress. The BSI has high internal consistency and test–retest reliability. The overall Global Symptom Index (GSI) summary score of each of the nine clinical dimensions was used in the data analyses.

Maternal adjustment also was assessed by the Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971), which is a 65-item scale measuring six dimensions (tension, anger, depression, vigor, fatigue, and confusion) and was used to assess negative affectivity. A total mood disturbance score was calculated by summing scores across the subscales and was used for the data analyses. The POMS has high reliability, internal consistency, and good test–retest reliability (Carver et al., 1994). In the present investigation, internal reliability was .94 for the breast cancer group and .85 for the community control group.

Maternal Posttraumatic Stress

The frequency and severity of posttraumatic symptoms were assessed with the Posttraumatic Stress Diagnostic Scale (PDS) (Foa, 1996). This self-report questionnaire includes 49 items that correspond closely to Posttraumatic Stress Diagnostic (PTSD) criteria specified by the *Diagnostic and Statistical Manual of Mental Disorders-IV* (DSM-IV) (American Psychiatric Association, 1994). It yields a total severity score, three subscale severity scores (reexperiencing, avoidance, and arousal), and a functional impairment index. Psychometric data on the PDS indicate high internal consistency and test–retest reliability (Foa, Cashman, Jaycox, & Perry, 1987) with an internal reliability of .92 for the breast cancer group and .96 for the community control group. For these analyses, we used only the total severity score.

To gather cross-informant data, children's adjustment was assessed by self-report information and mothers' reports of symptoms. Following are assessment methods for children.

Children's Adjustment Children's adjustment was assessed by the Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, & Conners, 1997). The MASC is a 39-item measure of anxiety in children that yields a total score and four main factor scores: physical symptoms, social anxiety, harm avoidance, and separation anxiety. Excellent convergent and discriminant validity as well as high test–retest reliability have been demonstrated. We used the MASC total score in our data analyses. Internal reliability for the total sample was .88.

The Children's Depression Inventory (CDI) (Kovacs, 1981) was used to assess symptoms of depression in the children. The CDI consists of 27 items that quantify a

range of depressive symptoms. Adequate reliability and validity have been established for the CDI (Kazdin, 1981). Only the CDI total score was used in the analysis. Internal consistency for the CDI is generally considered to be good on most of the scales ranging from .71 on psychoticism to .85 on depression.

Child adjustment also was assessed by means of the Child Behavior Checklist (CBCL) (Achenbach, 1991), a 113-item scale that yields T-scores for nine different dimensions of symptoms associated with childhood psychopathology. It has been used extensively in both pediatric and clinical psychology research and has excellent reliability and validity data. CBCL internalizing and externalizing broad band scores were used for data analyses.

Children's Posttraumatic Stress Disorder Symptoms of posttraumatic stress disorder in children were assessed using the Child Posttraumatic Stress Symptom Scale (CPSS) (Foa, Johnson, Feeny, & Treadwell, 2001). The CPSS is a 24-item self-report questionnaire reflecting PTSD symptoms according to *DSM-IV* (American Psychiatric Association, 1994). The CPSS is a child version of the PDS and yields similar subscales (total severity, reexperiencing, avoidance, and arousal severity scores and a functional impairment score). The CPSS has high internal consistency and test-retest reliability. In the present investigation, internal consistency for the CPSS was .73 for the children of the mothers in the breast cancer group and .78 for the children of the mothers in the community control group. Only the total score was used in the analysis.

Coping and Illness Uncertainty

For the cancer cohort, mothers completed an assessment of active and passive coping strategies. This was assessed using the Coping Strategies Inventory (CSI) (Tobin, Holroyd, Reynolds, & Wigal, 1989), a 72-item self-report questionnaire used to assess coping thoughts and behaviors occurring in response to a specific stressor. Participants rate statements depicting various ways of dealing with illness. The CSI has eight components: problem-solving, cognitive restructuring, expressed emotions, social support, problem-avoidance, wishful thinking, self-criticism, and social withdrawal that are designated as either engagement- (e.g., problem-solving, cognitive restructuring, expressed emotions, and social support) or disengagement-coping strategies (e.g., problem-avoidance, wishful thinking, self-criticism, and social withdrawal). Only the general domain of engagement- and disengagement-coping strategies was employed in the data analyses. The measure has been demonstrated to have high reliability and validity. For the present sample, the coping engagement scale was found to have an internal reliability of .94 for the

breast cancer group and .87 for the community control group. For the coping disengagement scale, internal consistency reliability was .88 for both the breast cancer group and the community control group.

In addition, the mothers with cancer and their children completed an assessment of perception of illness uncertainty. This was assessed using the patient and patient-child versions of the Mishel Uncertainty Illness Scale (MUIS) (Mishel, 1981). The patient version is a 31-item self-report scale that asks respondents to rate on a 5-point range the degree to which they agree or disagree with a variety of illness uncertainty statements in the areas of symptoms, diagnosis, treatment, relationships with professionals caring for the patient, and plans. The patient-child version is similar but asks about the child's perception of the parent's illness. Both instruments yield a composite score of illness uncertainty as reported by the mother and the child. Higher scores on both the child and parent measures reflect greater uncertainty about illness. The MUIS has a moderate to high internal consistency reliability, with Chronbach's $\alpha = .74-.92$ (Mishel, 1997). Internal consistency reliability for the present sample was .95 for the mothers with breast cancer, whereas for the children internal consistency reliability was .72. Other data show that the MUIS is a reliable and valid measure for both adults (Mishel, 1981) and children (Steele, Tripp, Kotchick, Summers, & Forehand, 1997).

Data Analyses

Data analyses included an examination of differences between the breast cancer group and the comparison control group for all dependent measures for both mothers and their children.

First, for the purpose of determining sufficient power for the sample, given our sample size of 80 (40 in each of the two groups), it was determined that we have a power ($\alpha = .05$, two tailed) of .99, .86, and .60 to detect effect sizes of 1.0, 0.7, and 0.5 standard deviations unit differences between groups (Lipsey, 1989). Thus, to detect a medium effect size difference between groups ($d = \text{mean } 1 - \text{mean } 2 / SD = 0.5$) (Cohen, 1998), we would require a total sample size of 84 participants. Thus, given our sample size of 80, it was determined that we should have sufficient power to detect a medium or larger effect should one exist in the data.

For the maternal data, multivariate analyses of variance (MANOVA) were computed on the LISRES-A measures using group as the independent variable. A significant MANOVA was followed by univariate tests. For other measures of adjustment for the mothers (POMS, PDS, BSI-GSI), separate analyses of variance (ANOVAs) were

performed with Bonferroni correction procedures for type 1 error. For the child measures (MASC, CDI, CBCL, and CPSS), separate ANOVAs were performed with Bonferroni correction procedures. Finally, effect sizes were computed for each of the dependent measures.

To assess potential correlates of child adjustment, we computed Pearson correlations between child measures of adjustment and other variables, including disease parameters (time since diagnosis and severity of side effect ratings), demographic variables (e.g., children's chronological age, mothers' age, and SES), maternal distress (BSI-GSI, PDS, and POMS), and measures of maternal coping (CSI) and illness uncertainty (MUIS-parent, MUIS-child). On the basis of these bivariate associations and theoretical grounds, a series of regression equations were computed. For the child variables, a series of 2 (child gender) \times 2 (group membership) ANOVAs was performed for each of the child adjustment measures. Of interest in this analysis was the gender-by-group interaction for each of the dependent measures.

Results

The MANOVA examining group differences for the mothers on the LISRES-A stressors scales revealed a significant main effect, $F(7, 70) = 3.19, p < .01$. Follow-up ANOVAs revealed significant effects for the scale measuring physical health, $F(1, 78) = 7.47, p < .01$, and the scale measuring negative life events, $F(1, 78) = 6.88, p < .05$. Effect sizes for maternal physical health (1.07) and recent negative life events (1.52) were both in the large range. Effect sizes for each of the other LISRES-stressors scales were in the small range. The MANOVA examining group differences for the LISRES-A resources scale was not significant. Again, effect sizes were all in the small range ranging from .00 to .30. ANOVAs with Bonferroni correction (family-wise test) performed on the three maternal adjustment measures yielded a significant main effect for the BSI-GSI, $F(1, 78) = 6.06, p < .05$, with an effect size in the moderate range (.55). No significant effects were found for the other maternal measures. Small to moderate effect sizes were obtained for the other measures ranging from .25 to .49.

None of the one-way ANOVAs performed for child measures of adjustment with Bonferroni corrections was significant. Small to medium effect sizes were found for the MASC (.43) and the CBCL internalizing (.37) scores respectively, whereas generally small effect sizes were found for the other child measures of adjustment ranging from .04 to .27. The means and standard deviations

for the breast cancer group and the community control group are summarized in Table III.

A series of 2 (child gender) \times 2 (group membership) analyses of variance were performed for each of the child-dependent measures and no significant gender-by-group interactions were obtained. The gender-by-group interaction for the CDI approached significance, $F = 3.29, p < .075$. An examination of the means for each of the groups suggested that daughters of mothers with breast cancer endorsed more symptoms of depression ($M = 49.8, SD = 15.20$) than did sons ($M = 39.8, SD = 13.4$). By contrast, the means between sons ($M = 43.6, SD = 7.2$) and daughters ($M = 42.8, SD = 8.5$) in the community control group were closer in value.

A series of bivariate correlation coefficients was performed among demographic variables (children's chronological age, mothers' chronological age, and SES), illness-related variables (months since diagnosis and severity of side effects questionnaire), the LISRES-A, measures of maternal distress (BSI-GSI, PDS symptom severity, and POMS total), and children's measures of adjustment (CBCL total, CDI, MASC, and CPSS). Because of the number of analyses performed, Bonferroni correction procedures were employed for each domain of variables (e.g., demographics, illness related-variables, LISRES-A stressors, LISRES-A resources, and maternal distress and coping and illness uncertainty), and each of the dependent measures (e.g., CBCL total, CDI, MASC, and child PDS) using .05 as the family-wise alpha.

Results of these correlation coefficients revealed significant associations between the CBCL-total score and mothers' severity of side effects associated with breast cancer (.44, $p < .05$), LISRES-A relationship with children (.72, $p < .05$), LISRES-A relationship with extended family (.60, $p < .05$), the BSI-GSI (.67, $p < .05$), the CPSS (.54, $p < .05$), the POMS (.49, $p < .05$), and mothers' ratings of their illness uncertainty (.46, $p < .05$). Thus, more severity of side effects associated with cancer treatment, better relationships with extended family members, maternal ratings of adjustment, symptoms of posttraumatic stress disorder, and maternal mood were positively associated with children's overall adjustment as rated by mothers. A significant association also was revealed between the CDI and the LISRES-A support from friends (-.45, $p < .01$). Thus, greater support from friends as reported by mothers with breast cancer was associated with fewer depressive symptoms as reported by the children. No significant bivariate correlation coefficients were found for time since diagnosis and any of the dependent variables. These correlation coefficients are summarized in Table IV.

Table III. Means and Standard Deviations for Psychological Adjustment Measures

Measures	Mothers with cancer		Controls		Effect size
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Mothers					
LISRES-A stressors ^a					
Physical health status*	47.2	9.6	42.6	4.3	1.07
Housing and neighborhood	48.4	9.6	48.1	10.0	0.03
Finances	50.3	9.2	49.0	8.7	0.15
Relationship with children	63.2	11.0	63.7	11.3	0.04
Relationship with extended family	51.6	10.8	53.3	10.5	0.16
Relationship with friends	50.1	10.0	49.8	9.8	0.03
Recent negative life events**	59.5	12.4	42.5	11.2	1.52
LISRES-A resources					
Finances	54.6	7.7	54.6	8.4	0.00
Relationship with children	50.3	9.1	47.8	8.3	0.30
Relationship with extended family	52.0	8.5	50.4	9.9	0.16
Relationship with friends	58.2	7.5	58.0	10.8	0.02
Recent positive life events	58.9	12.8	57.3	13.8	0.12
POMS total mood disturbance	26.4	36.3	14.3	24.9	0.49
PDS severity score	9.6	8.6	6.8	11.3	0.25
BSI Global Symptom Index**	57.0	11.2	50.9	11.1	0.55
Children					
MASC	49.4	11.0	45.6	8.8	0.43
CDI7	45.3	15.1	43.2	7.8	0.27
CBCL					
Internalizing	52.7	10.6	49.0	10.1	0.37
Externalizing	49.6	10.6	47.4	8.7	0.25
CPSS	10.7	7.6	10.4	8.6	0.04

BSI, Brief Symptom Inventory; CBCL, Child Behavior Checklist; CDI, Children's Depression Inventory; CPSS, Child Posttraumatic Stress Symptom Scale; LISRES-A, Life Stress and Social Resources Inventory; MASC, Multidimensional Anxiety Scale for Children; PDS, Posttraumatic Stress Diagnostic Scale; POMS, Profile of Mood States.

^aThe "relationship with spouse" and "work" subscales were not included in analyses because some mothers were single and unemployed or retired.

* $p < .01$. ** $p < .05$.

On the basis of the significant bivariate correlation coefficients and the data reported above, two separate regression equations were computed assessing correlates of child adjustment (CBCL) on children's reports of depressive symptoms. The order of entry was based on the Transactional Stress and Coping model (Thompson et al., 1993), where demographic variables and illness parameters are considered first, followed by adaptational processes. Thus, adjustment was examined as it was predicted by adaptational processes (e.g., social support). A regression equation was computed with the CDI as the dependent variable, given the significant bivariate association between the CDI and the LISRES-A relationship with friends. Gender was entered on the first step given the trend for an interaction between gender and group (i.e., mothers with cancer and community control), and maternal relationship with friends on the LISRES-A resources scale was entered on the second step. We

found a significant overall regression equation, $F(2, 36) = 6.47, p < .01$, explaining 28% of the variance for the CDI. The LISRES-A resources friends scale was significant after controlling for children's gender, $R^2_{\text{change}} = .14$ ($t = -2.55, p < .01$). Thus, after controlling for gender, greater support and empathy from friends, as reported by mothers, was associated with less self-reported depressive symptoms among children. In addition, a regression equation was computed with the CBCL total score as the dependent measure. To account for maternal distress and child gender, BSI-GSI and gender were entered on the first step. Subsequently, disease severity (severity of side effects) and mothers' uncertainty about disease were added on the second step. Finally, the LISRES-A stressor relationship with children and relationship with family were added on the final step. Results of this regression equation yielded a significant effect, $F(6, 29) = 8.18, p < .01$, accounting for 68% of the

Table IV. Bivariate Correlates of Child Measures of Distress in Children of Mothers with Cancer

Variable	CBCL total	CDI	MASC	Child PDS
Demographics				
Child's chronological age	.21	-.01	-.04	-.03
Mother's chronological age	.05	.05	-.003	.09
Hollingshead SES	-.11	.05	-.29	-.37
Illness-related variables				
Months since diagnosis	.22	-.08	-.05	.12
Severity of side effects rating	.44*	.07	.07	.04
LISRES-A stressors				
Physical health status	.40	.14	-.22	.26
Housing and neighborhood	-.03	.15	-.16	.06
Finances	.25	.25	-.01	.07
Relationship with children	.72*	-.06	-.02	-.01
Relationship with extended family	.60*	-.08	-.14	-.04
Relationship with friends	.38	-.18	.03	-.10
Recent negative life events	.17	.00	-.25	-.06
LISRES-A resources				
Finances	-.11	-.35	.12	-.22
Relationship with children	-.36	-.12	-.03	-.27
Relationship with extended family	-.08	-.09	.10	-.02
Relationship with friends	-.28	-.45*	-.25	-.33
Recent positive events	.43*	-.03	.02	.04
Maternal distress				
BSI-GSI	.67*	-.002	-.06	.05
PDS symptoms severity	.54*	-.03	.03	.03
POMS total	.49*	-.10	-.05	.03
Coping and illness uncertainty				
Illness uncertainty, mother	.46*	.14	-.02	.14
Illness uncertainty, child	.13	.07	.23	.12
Mother CSI engagement	.32	-.04	.08	-.01
Mother CSI disengagement	-.01	-.06	.08	-.16

BSI, Brief Symptom Inventory; CBCL, Child Behavior Checklist; CDI, Children's Depression Inventory; CSI, Coping Strategies Inventory; GSI, Global Symptom Index; LISRES-A, Life Stress and Social Resources Inventory; MASC, Multi-dimensional Anxiety Scale for Children; PDS, Posttraumatic Stress Diagnostic Scale; SES, socioeconomic status; POMS, Profile of Mood States.

* $p < .05$, with Bonferroni correction.

variance. On the first step, measures of maternal distress ($t = 4.71, p < .01$) and child gender accounted for 47% of the variance, with maternal distress accounting for this significant relationship. Gender did not contribute to the variance on this step. After controlling for maternal distress and gender, ratings of illness uncertainty and severity of side effects did not contribute significantly to the model. However, on the third and final step, the LISRES-A relationship with children and relationship with extended family contributed an additional 19.6% of the variance in overall child adjustment with relationship with children being significant ($t = 3.40, p < .01$).

Finally, we were interested in determining whether the index group of mothers who were at least 5 years from diagnosis ($n = 20, 50\%$) differed from those who were not yet 5 years from their initial diagnosis ($n = 20,$

50%). No differences were found for any of the measures of distress for either the mothers or the children.

Discussion

The purpose of our investigation was to examine the adjustment and predictors of adjustment of children of mothers with breast cancer. It was predicted that children of mothers who survived breast cancer would evidence a higher frequency of adjustment difficulties across numerous areas including anxiety, depression, and symptoms of posttraumatic stress disorder relative to their peers in a comparison community control group. Furthermore, it was hypothesized that child gender would be associated with adjustment and, more specifically, that daughters of women with breast cancer would

exhibit greater adjustment difficulties than daughters of women from the community group. Our study is unique as it included mothers who had been recently diagnosed with breast cancer as well as mothers who were diagnosed with breast cancer many years ago.

Contrary to our expectation, we found few differences between the breast cancer group and their children with the exception that mothers with breast cancer endorsed poorer physical health, a higher frequency of negative life events, and greater general distress relative to healthy mothers. Effects sizes were in the moderate to large range. This is not surprising given the history of stressors experienced by these women. Even though no differences were found for the children in the sample, there was an interesting trend in an interaction indicating that daughters of mothers with breast cancer endorsed more depressive symptoms than sons did in either the breast cancer group or the community control group or daughters and sons from the community comparison control group. Furthermore, findings revealed that after controlling for gender, greater empathy and support from friends as reported by mothers was associated with fewer symptoms of depression as endorsed by children. In addition, mothers' reports of their relationships with their children and with the extended family were predictive of adjustment in their children, after controlling for gender and maternal adjustment.

As noted and contrary to our hypothesis, few differences were found between children's adjustment and adaptation of mothers with cancer and comparison controls. These data are in accord with studies suggesting overall normative behavioral functioning and generally minimal adjustment difficulties among children of parents with cancer (Armsden & Lewis, 1994; Compas et al., 1994). The data do not support the findings of other studies suggesting symptoms of anxiety and depressed mood and general adjustment difficulties among children of parents with cancer (Hoke, 1996; Lichtman et al., 1984; Siegal et al., 1992). Nonetheless, an examination of effect sizes for measures of internalizing functioning (i.e., children's reports of their own anxiety [MASC] and caregivers' reports of symptoms associated with internalizing behavior) revealed generally moderate effect sizes. Effect sizes for the other child measures were generally in the small range.

Of interest are the effect sizes reported in Table III. Findings reveal small to moderate effect sizes for the measure of negative affectivity or mood disturbance completed by the mothers (POMS), the anxiety measure (MASC) completed by the child, and the internalizing (symptoms of anxiety and depression) broad band score of the CBCL that were reported by mothers based on general observations of their children's behavior. Thus,

if our investigation was replicated with a larger number of participants and these findings were in fact significant, the data would suggest that negative affectivity and depression are symptoms experienced by mothers with breast cancer and that similar symptoms of anxiety and depression also are reported by their children and observed by their mothers. Although these data must be interpreted judiciously, they do suggest that intervention targets for these children and their mothers would likely be symptoms of anxiety, depression, and disturbances of mood. However, it must again be emphasized that before definitively targeting specific areas of intervention based on these data, replication of this investigation is necessary with a larger sample. Nonetheless, target areas for intervention for both mothers with breast cancer and their children are likely to be in the domains of mood and affect (i.e., depression and anxiety). One advantage of calculating effect sizes in this manner is that we may be encouraged by the potential for significance with a larger sample size. Nonetheless, a disadvantage in calculating effect sizes in this way is that it clearly demonstrates that this investigation suffers from type II error (low power).

Interesting data from this investigation is the trend for only daughters of mothers with breast cancer to endorse a greater frequency of depressive symptoms than sons in either the breast cancer or comparison control group, although these findings must be interpreted judiciously and require replication before making any definitive conclusions. It should be noted that in our investigation, all of the means for both daughters and sons within the cancer group and the control group were well within the normative range.

Of particular interest in our investigation is the finding that mothers who reported receiving greater social support from friends were associated with fewer depressive symptoms reported by their children, even after controlling for gender. In fact, mothers' perceived social support from friends explained nearly one third of the variance in children's self-reported depressive symptoms. These findings are in accord with emerging research in the field of health psychology suggesting a significant relationship between optimal amounts of social support and psychological adaptation among individuals with chronic illness (Brown, 2005; Fuemmeler, Mullins, & Carpentier, 2006). Our findings extend that literature even further to suggest that social supports from friends of caregivers to mothers of children with breast cancer also are associated with better psychological adjustment (i.e., fewer endorsed depressive symptoms) among their children. This indicates that

social support is important in predicting overall adaptation among individuals diagnosed with a chronic illness, and more specifically with cancer. It also underscores the importance of perceived social support among caregivers in predicting their children's adjustment to their disease.

Contrary to our expectation that mothers' coping, ratings of illness uncertainty, and severity of disease would contribute significantly to ratings of overall adjustment among the children, we failed to confirm any association between coping, illness severity, and children's general adjustment. In fact, most studies in the pediatric psychology literature have not supported a significant relationship between disease severity and overall adjustment and adaptation (for review see Brown, 2005). Our findings, however, failed to confirm another study by Compas and fellow researchers 1996, who found that prognosis of the parents' disease and cognitive appraisals both were associated with symptoms of anxiety and depression in children. Of interest in our study is the finding that mothers' relationships with their children and extended family contributed significantly and accounted for nearly 20% of the variance in children's overall psychological adjustment. Again, the data underscore the importance of support, and family relationships specifically, in negotiating the general stressors when a mother has breast cancer. More important, our findings underscore the role of the family in predicting overall adjustment and adaptation among individual family members with a chronic illness, including the children within the family (Kazak et al., 1997).

Our findings must be interpreted within the limitations of this particular investigation. First, the relatively small number of participants in both the group of mothers with breast cancer and the community control group may have mitigated power and subsequently diminished significant effects that otherwise could have occurred with a larger sample of participants. For example, the trend for an interaction for symptoms of depression between gender and group (breast cancer group or control group) is certainly provocative, but these findings must be replicated with larger cohorts to add to the veracity of this effect. Nonetheless, effect sizes for some of the measures were in the moderate to large range, thereby suggesting specific targets for intervention. Furthermore, there is wide age variance for children participating in this investigation, ranging from 8 to 19 years. Thus, children and adolescents were assessed across an array of measures so we are unfortunately unable to identify specific critical developmental periods whereby children may be more affected by having a mother with breast cancer. Additional research will need to be

conducted examining specific developmental periods that may pose yet additional risk factors for children and adolescents of mothers with breast cancer.

Another limitation is that the measure designed to assess children's overall adjustment (CBCL) was completed only by mothers and not by the children themselves. In addition, although most of the instruments used to assess adjustment were independent of maternal ratings, teacher data were not available in this investigation. Such data would have provided additional information about the children's adjustment.

Although maternal distress was controlled for in the analyses with the CBCL, the fact that mothers completed this instrument as well as endorsed their own levels of social supports and relationships with their children and their families requires that these data be interpreted judiciously. Clearly, additional studies are needed that assess behaviors and adjustment among the children across informants like mothers, teachers, peers, and the children themselves.

Finally, whether mothers who had completed 5 years post treatment (a time in which many patients are assumed to be free for risk of reoccurrence) and their children differed from the group who had not yet completed 5 years post treatment on any of the measures of distress is unclear. We did examine mothers who completed 5 years post diagnosis versus those mothers who did not yet complete 5 years post treatment and their children and did not find any differences on measures of adjustment. However, the cohort of mothers with breast cancer did vary on length of treatment regimens. Thus, further research is necessary to examine adjustment among cancer survivors and their children 5 years following completion of treatment so as to determine the adjustment of this group versus those who are not yet designated to be risk-free from cancer reoccurrence. Another limitation of this investigation is that there were insufficient number of participants ($n = 5$) who had been recently diagnosed (i.e., 1 year following initial diagnosis). Thus, we were not able to examine adjustment of the children immediately following the diagnosis which may have otherwise yielded interesting results. In part, the reason for this is that the children had to be at least 8 years of age to complete the assessment instruments in this investigation. The chronological age of the mothers ranged from 33 to 61 years reflecting the most frequent ages at which breast cancer occurs. Thus, there were few opportunities to sample younger mothers who may have recently been diagnosed with breast cancer.

Notwithstanding the aforementioned limitations, our data warrant replication with additional samples and

across informants. Our findings underscore the role of perceived supports from friends and family members in negotiating the stressors of the cancer experience and show how such supports serve as a protective factor even for children in their overall adjustment to their mothers' cancer experience. Again, the findings are important in our clinical efforts with women living longer after a diagnosis of breast cancer because they suggest that enhancing the social ecologies of these mothers is likely to lead to optimizing overall family adjustment and adaptation.

Acknowledgments

This research was supported in full by a grant awarded by the Department of Defense to R.T.B.

Received October 1, 2005; revisions received March 7, 2006 and June 2, 2006; accepted June 3, 2006

References

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist 4–18 and 1991 profile*. Burlington: Department of Psychiatry, University of Vermont.
- American Cancer Society. (2000). *Statistics, breast cancer, facts and figures*. Atlanta, GA: American Cancer Society.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Andrykowski, M. A., Cordova, M. J., McGrath, P. C., Sloan, D. A., & Kenady, D. E. (2000). Stability and change in PTSD-like symptoms following breast cancer treatment: A one-year follow-up. *Psycho-Oncology*, 9, 69–78.
- Armistead, L., Klein, K., & Forehand, R. (1995). Parental physical illness and child functioning. *Clinical Psychology Review*, 15, 409–422.
- Armsden, G. C., & Lewis, F. M. (1994). Behavioral adjustment and self-esteem of school-age children of women with breast cancer. *Oncology Nursing Forum*, 21, 39–45.
- Ashing-Giwa, K. (1999). Quality of life and psychosocial outcomes in long-term survivors of breast cancer: a focus on African-American women. *Journal of Psychosocial Oncology*, 17, 47–62.
- Beardslee, W. R., & Hoke, L. A. (1997). Children of parents with chronic illness: The effects of parental depression and parental cancer. In J. D. Noshitz (Series Ed.) & N. E. Alessi (Vol. Ed.), *Handbook of child and adolescent psychiatry: Vol. 4. Varieties of development* (pp. 64–76). New York: John Wiley and Sons.
- Bleiker, E. M. A., Pouwer, F., van der Ploeg, H. M., Leer, J. W. H., & Ader, H. J. (2000). Psychological distress two years after diagnosis of breast cancer: Frequency and prediction. *Patient Education and Counseling*, 40, 209–217.
- Brown, R. T. (2005). Functional risk factors in neurological disorders and chronic illness. In J. Farmer, J. Donders, & S. Warchausky (Eds.), *Neurodevelopmental disabilities: Clinical research and practice* (pp. 98–118). New York: Guilford Publications.
- Carver, C., Hars, S., Noriega, V., Scheir, M., Robinson, D., Ketcham, A., et al. (1994). Optimism versus pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer*, 73, 1213–1220.
- Cohen J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Compas, B. E., Worsham, N. L., Epping-Jordan, J. E., Grant, K. E., Mireault, G., Howell, D. C., et al. (1994). When mom or dad has cancer: Markers of psychological distress in cancer patients, spouses, and children. *Health Psychology*, 13, 507–515.
- Compas, B. E., Worsham, N. L., Ey, S., & Howell, D. C. (1996). When mom or dad has cancer: II. Coping, cognitive appraisals, and psychological distress in children of cancer patients. *Health Psychology*, 13, 167–175.
- Derogotis, L. R. (1993). *The Brief Symptom Inventory: Administration, scoring and procedure manual*. Minneapolis, MN: National Computer Systems.
- Foa, E. B. (1996). *Posttraumatic Stress Diagnostic Scale (PDS)*. Minneapolis, MN: National Computer Systems.
- Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1987). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*, 9, 445–451.
- Foa, E. B., Johnson, K. M., Feeny, N. C., & Treadwell, K. R. H. (2001). The Child PTSD Symptom Scale: A preliminary examination of its psychometric properties. *Journal of Clinical Child Psychology*, 30, 376–384.
- Fuemmeler, B. F., Mullins, L. L., & Carpentier, M. (2006). Peer friendship issues and emotional well-being. In R. T. Brown (Ed.), *Pediatric hematology/oncology: A biopsychosocial approach* (pp. 100–108). New York: Oxford University Press.
- Hoke, L. A. (1996). When a mother has breast cancer: Parenting concerns and psychosocial adjustment in

- young children and adolescents. In D. K. Hassey (Ed.), *Contemporary issues in breast cancer* (pp. 171–181). Boston: Jones and Bartlett Publishers.
- Hoke, L. A. (2001). Psychosocial adjustment in children of mothers with breast cancer. *Psycho-Oncology*, *10*, 361–369.
- Hollingshead, A. B. (1975). *Four factor index of social status*. Unpublished manuscript, Department of Sociology, Yale University at New Haven.
- Howes, M. J., Hoke, L. A., Winterbottom, M., & Delafield, D. (1994). Psychosocial effects of breast cancer on the patient's children. *Journal of Psychosocial Oncology*, *12*, 1–21.
- Kazak, A. E., Barakat, L. P., Meeske, K., Christakis, D., Meadows, A. T., Penati, B., et al. (1997). Posttraumatic stress, family functioning, and social support in survivors of childhood leukemia and their mothers and fathers. *Journal of Consulting and Clinical Psychology*, *65*, 120–129.
- Kazdin, A. E. (1981). Assessment techniques for childhood depression: A critical appraisal. *Journal of the American Academy of Child Psychiatry*, *20*, 358–375.
- Kovacs, M. (1981). Rating scales to assess depression in school-aged children. *Acta Paedopsychiatrica*, *46*, 305–315.
- Leventhal, H., Easterling, D. V., Coons, H. L., Luchterhand, C. M., & Love, R. R. (1986). Adaptation to chemotherapy treatments. In B. Anderson (Ed.), *Women with cancer* (pp. 172–203). New York: Springer-Verlag.
- Lewis, F. M. (1986). The impact of cancer on the family: A critical analysis of the research literature. *Patient Education and Counseling*, *8*, 269–289.
- Lewis, F. M. (1990). Strengthening family supports: Cancer and the family. *Cancer*, *65*, 752–759.
- Lichtman, R. R., Taylor, S. E., Wood, J. V., Bluming, A. Z., Dosik, G. M., & Leibowitz, R. L. (1984). Relationships with children after breast cancer: The mother-daughter relationship at risk. *Journal of Psychosocial Oncology*, *2*, 1–19.
- Lipsey, M. W. (1989). *Design sensitivity: Statistical power for experimental research*. Thousand Oaks, CA: Sage.
- March, J. S., Parker, J. D. A., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The Multidimensional Anxiety Scale for Children (MASC): Factor structure, reliability, and validity. *Journal of the American Academy of Child and Adolescent Psychiatry*, *16*, 554–565.
- McNair, D. M., Lorr, M., & Droppleman, I. F. (1971). *Profile of mood states*. San Diego, CA: Educational and Industrial Testing Services.
- Mishel, M. H. (1981). The measurement of uncertainty in illness. *Nursing Research*, *30*, 258–263.
- Mishel, M. H. (1997). *Uncertainty in illness scales manual*. Unpublished manuscript, University of North Carolina at Chapel Hill.
- Moos, R. H., Fenn, C. B., & Billings, A. G. (1988). Life stressor and social resources: An integrated assessment approach. *Social Science Medicine*, *27*, 999–1002.
- Siegel, K., Mesagno, F. P., Karus, D., Christ, G., Banks, K., & Moynihan, R. (1992). Psychosocial adjustment of children with a terminally ill parent. *Journal of the American Academy of Child and Adolescent Psychiatry*, *31*, 327–333.
- Steele, R. C., Tripp, G., Kotchick, B. A., Summers, P., & Forehand, R. (1997). Family members' uncertainty about parental chronic illness: The relationship of hemophilia and HIV infection to child functioning. *Journal of Pediatric Psychology*, *22*, 577–591.
- Thompson, R. J., Gil, K. M., Burbach, D. J., Keith, B. R., & Kinney, T. R. (1993). Role of maternal and child processing the psychological adjustment of children with sickle cell disease. *Journal of Consulting and Clinical Psychology*, *61*, 468–474.
- Tobin, D., Holroyd, K., Reynolds, R., & Wigal, J. (1989). The hierarchical factor structure of the Coping Strategies Inventory. *Cognitive Therapy and Research*, *13*, 343–361.