The Impact of Breast Cancer on the Lives of Middle-Aged Women: Results From the Australian Longitudinal Study of Women's Health

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This article investigated the impact of breast cancer (BC) in middle-aged Australian women (45–50 years). Two waves of data collected 2 years apart from a longitudinal survey of 12,177 women identified 3 groups: (a) 11,933 (98%) who reported never having had BC, (b) 181 (1.5%) who reported a diagnosis of BC at Time 1, and (c) 63 (0.5%) who reported onset of BC between Time 1 and Time 2. Repeated measures analysis of variance was used to compare the 3 groups. Women with recent onset of BC experienced significant changes across a range of functioning compared with the other 2 groups. Compared with women with no BC, women with longer established onset of BC had significantly worse health and social outcomes, but these were associated with small effect sizes. Both groups of women with BC reported less impact on mental and emotional health than on other areas of functioning.

Keywords: breast cancer, longitudinal, mental health, social functioning, physical health

Approximately 10,000 Australian women are diagnosed with breast cancer each year, and 1 in 12 Australian women will be diagnosed with breast cancer by the time they are 74. Breast cancer is the third most common cause of death among Australian women (Australian Institute of Health and Welfare [AIHW], 1999). Increasing age is one risk factor for breast cancer, with the incidence of cancer per 100,000 women at 17.8 for those aged 15–39, 146.3 for those aged 40–49, and 264.8 for those aged 50–69 (AIHW, 1999). Higher socioeconomic status (SES), family history of breast cancer, early menarche, late menopause, lengthy exposure to postmenopausal estrogens, childlessness, and first childbirth at a late age are also associated with increased risk of breast cancer (Anderson, 1998; AIHW, 1999).

The majority of women diagnosed with breast cancer cope well psychologically (Baker, Marcellus, Zabora, Polland, & Jodrey, 1997), with reports of a renewed vigor for life and stronger interpersonal relationships (Petrie, Buick, Weinman, & Booth, 1999). Whereas myocardial infarction patients report beneficial changes in terms of healthy lifestyle change, women with breast cancer are more likely to report improved close relationships and improved empathy with others, and both groups report greater appreciation of health and life and a change in personal life priorities (Petrie et al., 1999).

However, negative psychosocial consequences have also been identified. Dimensions of life commonly negatively affected include physical, psychological and emotional, vocational, and social issues affecting intimacy with spouse, family, and friends (Feigen et al., 2000). Treatment of breast cancer necessarily affects physical well-being, as it typically involves surgical removal of the tumor (involving either lumpectomy or mastectomy) and lymph nodes, followed by chemotherapy and/or hormonal therapy, with or without radiotherapy (Anderson, 1998). The effects of treatment can lead to premature menopause, sexual dysfunction, loss of fertility, pain, fatigue, and lymphedema (National Health and Medical Research Council [NHMRC], 2000). Greater levels of physical impairment have been associated with greater levels of distress in early stage cancers (Manne, Glassman, & Du Hamel, 2001). While treatment can prove curative for 66% of women (AIHW, 1999), it will only prolong survival for others who experience increased disease spread and undergo further palliative treatment to reduce disease activity and symptoms. It can be expected that there will be a difference in the impact of early stage versus late stage disease, not only physically, but also psychologically.

The psychological and emotional consequences of breast cancer have received considerable attention in the literature, especially with regard to increased levels of depression (NHMRC, 2000; Shapiro et al., 2001). Between 5% and 20% of women with breast cancer experience major depression 12–24 months postdiagnosis (Hughson, Cooper, McArdle, & Smith, 1988). In addition, between 25% and 33% of women report moderate stress and adjustment problems (Kissane et al., 1998), with younger women being more likely to experience traumatic stress symptoms (Koopman et al., 2002). Almost 2 years after breast cancer diagnosis, 16% of women continue to report a high level of psychological distress (Bleiker, Pouwer, van der Ploeg, Leer, & Ader, 2000).

Vocational issues arise for women with breast cancer because of the disruption of work, and consequent financial problems have also been identified as issues (NHMRC, 2000). In addition, social

networks can be affected. The demands and consequences of breast cancer can place stress on marriage or significant relationships and are associated with communication and sexual problems (Shapiro et al., 2001). Emotional distress after breast cancer can lead to an erosion of social support (Alferi, Carver, Antoni, Weiss, & Duran, 2001).

Follow up of women at 3 and 12 months after surgery for early stage breast cancer showed that quality of life improved over time, with improvements in functioning in the sexual, social, and emotional arenas (King, Shiell, Hall, & Boyages, 2000). However, there was no improvement in physical function or menopausal symptoms. Younger women, single women, and those with less education tended to fare worse on a number of indicators. Although there has been an increase in longitudinal research examining the course of adjustment after breast cancer in recent years, it has been recognized that there is still insufficient longitudinal research that examines the impact of breast cancer and the long-term course of adjustment after breast cancer, especially in the context of examining the relative impact on multiple domains (NHMRC, 2000).

The purpose of the current report is therefore to investigate the impact of breast cancer on physical, mental, and social functioning in a large, population-based, longitudinal survey of Australian women. These women, aged 45–50 years when first surveyed in 1996, were followed up 2 years later. Three nonoverlapping groups were identified: those women who reported having had breast cancer at Time 1 (T1), those women who reported developing breast cancer between T1 and T2, and those who reported no breast cancer at T1 or T2. Thus, a further focus of the current report is to investigate the differential impact of breast cancer on women who have been living with the diagnosis for a few years and those who have been more recently diagnosed.

Method

Overview

The Australian Longitudinal Study of Women's Health, a longitudinal survey of the health and well-being of three cohorts of Australian women, has been described in detail elsewhere (Brown et al., 1998; Lee, 2001). The project uses mailed surveys to collect self-report data on health and related variables from three cohorts of Australian women, who were aged 18–23 years, 45–50 years, and 70–75 years when the project began in 1996. The project is designed to run for 20 years, with the overall goal of conducting a series of interlocking data analyses that would aid in developing an understanding of factors that affect the health and well-being of women, in order to inform Australian government health policy (Lee, 2001).

Over 40,000 women across the three age groups were recruited on a random basis from the Australian population, with the Australian comprehensive national health insurance database (Medicare) as the sampling frame and with systematic oversampling of women living in rural and remote areas. Privacy legislation required that the initial approach to these women be undertaken by Medicare and that the research team not attempt to contact nonrespondents. Initial response rate for the middle-aged groups was 54%, and comparisons with national census data for the same year indicated that they were demographically representative of Australian women in that age group, with a slight bias toward higher SES (Brown et al., 1998).

Participants

Women in the 45–50 cohort were the focus of the current study. This group of women is of interest as they are seven times more likely to develop breast cancer than the younger group, and yet are relatively young and can therefore be expected to suffer more adverse impact with respect to their physical, mental, and social functioning than older women. At T1, 14,200 women participated in Survey 1, a self-report questionnaire addressing a range of social and environmental aspects of the women's lives, as well as issues related to health and health service use. A second survey was sent to these women, then aged 47–52, in 1998. The response rate at T2 was 92%. The University of Newcastle Human Research Ethics Committee approved all aspects of the study.

Of the 14,015 women at T1 who answered the question "Have you ever been told by a doctor that you have breast cancer?" 13,726 (97.9%) replied in the negative and 289 (2.1%) answered in the affirmative. Those women who did not reply to this question were not included in the study. When this same question was asked at T2, 12,338 women answered it. Of these, 12,059 (97.7%) answered "never," 82 (0.7%) reported onset of breast cancer in the last 2-year period, 192 (1.6%) reported having had breast cancer more than 2 years ago, and 5 had breast cancer both more than 2 years ago and within the last 2-year period. This latter group of women was removed from the analysis. Three nonoverlapping groups were identified. First, *noncases* included women who reported never having had breast cancer at both T1 and T2 ($n = 11,933$; 98%). Second, *existing cases* were those women who reported having breast cancer at T1 and having had breast cancer more than 2 years ago at T2 ($N = 181$; 1.5%). Third, *new cases* included those women who reported at T1 never having had breast cancer but at T2 reported breast cancer being diagnosed in the last 2 years ($n = 63$; 0.5%). As there was no information about time since diagnosis, disease stage, and timing of treatment, it should be recognized that there will be a mix of these variables within each identified breast cancer group.

Measures

SES. On the basis of recommendations for the measurement of SES for this age group (Mishra, Ball, Dobson, Byles, & Warner-Smith, 2001), a principal components factor analysis of T1 data, including employment status, hours worked per week, language spoken at home, ability to speak English, time lived in Australia, and occupation (partner and self), was carried out. After direct oblimin rotation, three factors were identified, accounting for 59% of the variance. The first factor contained language spoken at home, ability to speak English, and time lived in Australia. The second factor contained employment status and hours worked, and the third factor contained the items pertaining to occupation. Factor scores of these three factors were added together to form an SES indicator.

The following measures were collected at both T1 and T2, representing six domains of functioning. Measures were selected in an effort to maximize both validity and brevity; in cases where brief, valid scales were not available, measures were developed for the purposes of the study.

Medical outcomes. The eight subscales of the Medical Outcomes Study 36-item Short-Form Health Survey (Ware & Sherbourne, 1992) were used: Physical Functioning, Role–Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role–Emotional and Mental Health. Higher scores indicated better health.

Health service use. Questions relating to health service use in the last 12 months were modified from questions used by the Australian Bureau of Statistics (1991). Five questions were contained in this section, assessing number of visits to the family doctor, a hospital doctor, a specialist doctor, an allied health professional, and an alternative health practitioner. Each answer was scored on a 5-point scale ranging from *none* to *seven or more times*, with a higher score indicating higher use of health services. The items were added together, and the mean item score was used in analyses.

Medications. This question was devised for the purpose of the current study and asked, "During the past 4 weeks have you taken any medications (a) for your nerves, (b) to help you sleep, (c) for any chronic condition?" The answer category was "no" (coded 0) or "yes" (coded 1). The mean item score was used in analyses.

Stress. This 9-item scale assessed the degree of stress attached to nine specific areas (e.g., health, relationships) in the last 12 months. The 6-point response scale included the following categories: *not applicable* (0), *not at all stressed* (0), *somewhat stressed* (1), *moderately stressed* (2), *very stressed* (3), and *extremely stressed* (4); a higher score indicated higher levels of stress. Reliability and validity of this scale have been established (Bell & Lee, 2002, 2003). The mean item score was used in analyses.

Life events. The 28 items in this section assessed the presence (coded 1) or absence (coded 0) of life events in the last 12 months (Norbeck, 1984). Two life events were removed from the list as they were indicative of breast cancer status: experience of major personal illness and major surgery. Life events were added together to form one score for analysis.

Life dissatisfaction. Because of the difficulty of locating an existing measure of life satisfaction that was appropriate for this study, five items were specifically designed. These assessed degree of satisfaction with five areas: work/career/study, family relationships, partner relationship, friendships, and social activities. The answers were recorded on a 4-point scale ranging from *very satisfied* to *very dissatisfied*; higher scores indicated higher levels of dissatisfaction. The mean item score for the whole scale was used in the analyses.

The following measures were only collected at T2 and were therefore used only in the cross-sectional analyses with Survey 2 data.

Social support. The 19-item Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991) was used to assess social support, with a stem question that asks, "How often is each of the following kinds of support available to you if you need it?" Each item was answered on a 5-point scale, ranging from *none of the time* to *all of the time*, with higher scores indicating greater levels of social support.

Depression. Depression was assessed with a 10-item version (Andresen, Carter, Malmgren, & Patrick, 1994) of the Center for Epidemiological Studies—Depression Scale (Radloff, 1977). Each item assessed how often the respondent felt depressed over the past week, on a 4-point scale ranging from *rarely* to *most of the time*. Items were summed to form a total score, and higher scores indicated a greater level of depressive symptoms.

Design and Statistical Analyses

The main analyses were repeated measures analysis of variance, for which the between-subjects variable was group membership (existing cases, new cases, or noncases) and the within-subjects variable was time (T1 and T2). In the case of the medical outcome variables, significant main effects for group or time or for interactions were adjusted for multiple testing ($p \leq .006$). Post hoc analyses of differences between the three groups used Bonferroni-adjusted alphas. The effect sizes (*d*) of group differences were examined by using the difference between the mean T2 scores divided by the standard deviation of the noncases group. Effect sizes of 0.2 are considered to be small, 0.5 moderate, and 0.8 large. Post hoc within group differences over time were tested with paired-samples *t* tests.

Simple comparisons between existing cases and noncases were carried out by means of logistic regressions, reporting odds ratios (OR) and 95% confidence intervals (CI). Generalized linear modeling was used to compare outcomes at T2 for the new cases and noncases, with the corresponding T1 variable as the covariate (analysis of covariance).

Results

Validation of Breast Cancer Status

Given the reliance on self-report of breast cancer status, other variables that might indicate the validity of the breast cancer status were examined. Of women who reported having developed breast cancer in the last 2 years, 36.5% also reported having had a mastectomy in the last 2 years, and 62% reported having a lumpectomy in the last 2 years; the remaining women did not specify the procedure. Of the women who reported having breast cancer at T1, 54.7% reported having had a mastectomy over 2 years ago and 55.2% reported having had a lumpectomy over 2 years ago. Some women had had both procedures.

At T1, existing cases were 6 times more likely than noncases to report a major personal illness in the previous 12 months (OR = 6.55, 95% CI: 4.82–8.91), but there was no significant difference between the two groups at T2. Compared with noncases, existing cases were significantly more likely to report major surgery in the previous 12 months at both T1 and T2, with odds ratios of 7.13 (95% CI: 5.17–9.84) and 2.38 (95% CI: 1.48–3.81), respectively. Existing cases were also more likely than noncases to report symptoms consistent with menopause at both T1 and T2, with significantly lower occurrence of premenstrual tension (OR = 0.62, 95% CI: 0.53–0.73; and OR = 0.62, 95% CI: 0.51–0.75), and higher occurrence of both hot flashes (OR = 1.45, 95% CI: 1.28–1.65; and OR = 1.37, 95% CI: 1.20–1.56) and night sweats (OR = 1.45, 95% CI: 1.28–1.65; and OR = 1.30, 95% CI: 1.14–1.48).

Compared with noncases, new cases reported no increased likelihood of experiencing a major personal illness at T1 but did report higher occurrence of this event at T2 (OR = 2.15, 95% CI: 1.02–4.52). They were also more likely to report major surgery at T2 (OR = 24.30, 95% CI: 14.53–40.63). New cases reported being significantly more likely than noncases to experience menopausal symptoms at T2, including irregular monthly periods, hot flashes, and night sweats (all $ps \leq .001$).

SES

SES did not have a significant relationship with breast cancer status at T1, $t(7979) = 0.02$, $p = .99$, nor was it associated with breast cancer status for women who developed breast cancer between T1 and T2, $t(7908) = 0.60$, $p = .55$. SES was therefore not investigated in further analyses.

Differences Between and Within Groups

All results from the repeated measures analyses of variance are summarized in Table 1. With respect to medical outcomes, women who had developed breast cancer between T1 and T2 had significantly worse outcomes than the noncases with respect to Bodily Pain, General Health, Mental Health, Physical Functioning, Role–Physical, and Social Functioning. In addition, these women had a significantly worse outcome with respect to Bodily Pain than the existing cases, but there was no difference between these two groups on the measures relating to General Health, Physical Functioning, Role–Physical, and Social Functioning. On all of these measures, existing cases reported significantly worse outcomes than the noncases.

Women who had breast cancer had significantly higher usage of health services than the women without breast cancer, even though existing cases had decreased their use of health services between T1 and T2. Post hoc analyses of T2 data indicated that both groups of women with breast cancer had significantly more consultations with hospital doctors and medical specialists than noncases. New cases also had more appointments with the family doctor, whereas existing cases had 1.18 (95% CI: 1.05–1.33) times more appointments with alternative health practitioners.

Table 1

Mixed Between–Within Analysis of Variance Examining Mean (SD) Change in Continuous Independent Variables Over Time, and Effect Size (d), Across the Three Study Cohorts

Variable	Never had BC				BC before Time 1 only				BC developed between Time 1 and Time 2			
	Time 1	Time 2	M Δ (SD)	d	Time 1	Time 2	M Δ (SD)	d	Time 1	Time 2	M Δ (SD)	d
Medical outcomes												
Bodily pain[a,b,c]	71.34 (23.32)	71.09$_a$ (24.00)	0.25 (22.89)	0.01	70.51 (25.73)	68.37$_a$ (26.00)	2.14 (26.10)	0.08	66.43 (27.14)	55.67$_b$ (29.63)	10.76 (26.11)	0.41
General health[a,b,c]	72.90 (19.95)	73.21$_a$ (20.13)	−0.30 (15.20)	0.02	65.52 (21.84)	67.87$_b$ (22.30)	−2.36 (17.68)	0.13	71.48 (18.81)	60.18$_b$ (24.22)	11.31 (20.49)	0.55
Mental health[b]	73.52 (17.47)	73.89$_a$ (18.37)	−0.36 (16.39)	0.02	71.06 (17.61)	70.82 (17.62)	0.24 (17.50)	0.01	70.21 (19.82)	67.56$_b$ (22.49)	2.65 (17.69)	0.15
Physical functioning[a,b]	86.09 (17.62)	84.15$_a$ (18.79)	1.94 (16.32)	0.12	82.98 (19.26)	80.87$_b$ (19.86)	2.10 (20.21)	0.10	83.38 (21.76)	75.42$_b$ (21.61)	7.95 (17.64)	0.45
Role–emotional	78.73 (35.01)	80.04 (34.45)	−1.31 (38.60)	0.03	74.58 (37.27)	72.60 (38.82)	1.98 (48.04)	0.04	75.13 (34.89)	73.54 (40.23)	1.59 (39.00)	0.04
Role–physical[a,b,c]	81.15 (34.06)	77.91$_a$ (35.20)	3.23 (38.20)	0.08	71.00 (40.85)	72.58$_b$ (38.56)	−1.58 (44.03)	0.04	78.57 (35.60)	56.35$_b$ (43.06)	22.22 (47.33)	0.47
Social functioning[b]	82.84 (22.92)	82.35$_a$ (23.42)	0.48 (23.94)	0.02	78.94 (25.60)	78.25$_b$ (25.22)	0.69 (28.10)	0.02	77.78 (22.16)	70.44$_b$ (30.23)	7.34 (26.24)	0.28
Vitality[a]	59.08 (20.71)	57.95 (21.99)	1.13 (18.67)	0.06	55.38 (21.70)	54.03 (22.36)	1.35 (20.84)	0.07	57.62 (22.56)	51.35 (25.92)	6.27 (21.00)	0.30
Other variables												
Health service use[a,b,c]	1.88 (0.61)	1.78$_a$ (0.57)	0.10 (0.56)	0.18	2.32 (0.73)	2.03$_b$ (0.67)	0.29 (0.73)	0.40	1.91 (0.63)	2.76$_b$ (0.82)	−0.86 (0.79)	1.09
Medications[a,b,c]	0.32 (0.60)	0.36$_a$ (0.59)	−0.04 (0.57)	0.07	0.46 (0.64)	0.51$_b$ (0.72)	−0.05 (0.69)	0.07	0.36 (0.69)	0.68$_b$ (0.84)	−0.32 (0.73)	0.44
Stress[b,c]	0.66 (0.51)	0.62$_a$ (0.50)	0.04 (0.42)	0.10	0.74 (0.51)	0.66 (0.47)	0.08 (0.43)	0.19	0.73 (0.60)	0.89$_b$ (0.63)	−0.16 (0.57)	0.28
Life events[a,c]	2.90 (2.30)	2.04 (1.83)	0.87 (2.54)	0.34	3.23 (2.29)	1.85 (1.63)	1.38 (2.44)	0.56	3.03 (2.27)	2.31 (1.79)	0.72 (2.53)	0.29
Life dissatisfaction[a,c]	3.16 (0.50)	3.03 (0.49)	0.13 (0.41)	0.32	3.09 (0.58)	2.97 (0.54)	0.13 (0.44)	0.30	3.18 (0.52)	3.19 (0.42)	−0.01 (0.51)	0.02

Note. Estimated marginal means at Time 2 within the same row with different subscript letters were significantly different ($p < .05$), controlling for Time 1 scores (Bonferroni adjusted). BC = breast cancer.
[a] Significant main effect for time. [b] Significant main effect for group. [c] Significant Group × Time interaction.

Although all three groups of women reported some increase in medication use over the 2-year period, medication use was significantly higher for the women who had breast cancer than for the noncases, and the new cases experienced a large increase in medication use. Post hoc analyses of T2 data indicated that existing cases were 1.6 (95% CI: 1.00–2.57) times more likely to use medications for sleep, and that new cases used significantly more medication for both sleep ($p < .001$) and nerves ($p = .001$).

Stress was significantly higher for the new cases compared with the noncases, with only a small increase in stress for the new cases. Post hoc analysis of covariance analyses indicated that the stress for the new cases was related to health ($d = 1.50, p < .0005$), and money ($d = 0.41, p < .0005$). Women who had developed breast cancer between T1 and T2 had decreased their hours of paid employment over this time, $t(55) = 1.92, p = .06$.

Life events decreased from T1 to T2 for all women. Post hoc analyses showed that women who had developed breast cancer before T1 were more likely to report being forced into unwanted sexual activity than the women without breast cancer (OR = 2.81, 95% CI: 1.36–5.79). Both groups of women with breast cancer were more likely to experience menopause than were the other women.

Finally, there were no significant differences between the groups with respect to life dissatisfaction. Post hoc analyses suggested that existing cases experienced greater dissatisfaction with their partner at T1 than noncases, and that new cases experienced greater satisfaction at T2 with friendships and social activities than noncases.

T2 Measures

While longitudinal analyses could not be used with the social support and depression measures, cross-sectional analyses showed that there were no significant differences between the noncases and new cases with respect to perceived social support. Women with breast cancer scored marginally higher on the Center for Epidemiological Studies—Depression Scale, with an OR of 1.05 (95% CI: 1.01–1.09).

Discussion

The current study investigated the impact of breast cancer across multiple dimensions of functioning in a large population of middle-aged Australian women. Given that a major weakness of the current study is reliance on a single self-report item in the context of a comprehensive health survey to diagnose the absence or presence of breast cancer, it is important to examine the validity of the breast cancer diagnosis. One such indicator of validity is that

women reporting a diagnosis of breast cancer also reported increased surgery in the previous 12 months, particularly specific surgical procedures consistent with this diagnosis, namely, mastectomy and lumpectomy. Women with breast cancer were also more likely to report experiencing a health crisis in the previous 12 months. Further, they also reported being more likely to be going through menopause, a well-recognized side effect of breast cancer treatment, which was also associated with increased hot flashes and night sweats.

In neither group of women with breast cancer was the diagnosis associated with SES, as previously found in other research (Anderson, 1998). This is likely to reflect a difference in the significance of SES in Australia compared with the United States or the United Kingdom. Class differences within Australia may be smaller and more modifiable than in some countries, partly as a result of relatively high-quality public health and education services.

Women diagnosed with breast cancer in the 2 years prior to our second wave of data collection (new cases) underwent many changes relative to the other two groups of women, those with breast cancer prior to the first wave of data collection and those without breast cancer. They experienced significant increases in bodily pain, and decreases in general health and physical role, with comparative effect sizes in the moderate range from 0.41 to 0.55. In addition, these women experienced increased levels of health service use, medication use (for sleep and nerves), and stress, relative to the other two groups of women, with the health service change being associated with a large effect size. Apart from stress related to health, stress related to money is of particular relevance at this early stage, associated with a decrease in hours in paid employment, although it may also arise from the financial burden of health care.

Between T1 and T2, the new cases experienced significant but small (with $d < 0.5$) decreases in vitality and physical functioning. At T2, compared with the noncases, the new cases experienced significantly lower levels of mental health, though the effect size is small (0.34), as well as moderately significantly lower levels of social functioning ($d = 0.51$). Unlike the other two groups of women, who experienced significantly decreased dissatisfaction with their lives, the new cases experienced no change in satisfaction. Consistent with previous findings (Petrie et al., 1999), however, these women did report greater satisfaction with friendships and social activities than the women without breast cancer. After diagnosis with breast cancer, mental health was significantly worse and depression was significantly higher for the new cases than for noncases. In both cases, the effect sizes for these differences are small. Social functioning at T2 for new cases was also significantly worse than for noncases, with a moderate effect size. In summary, these women experienced a number of adverse consequences across a variety of life domains.

The existing cases showed no significant differences from noncases with respect to bodily pain, mental health, emotional role, vitality, stress, or life dissatisfaction. Indeed, these women experienced a significant improvement with life satisfaction over time. However, women who have had breast cancer for at least 2 years continued to experience significantly lower general health, physical functioning, and role–physical and social functioning than women without breast cancer. While the effect sizes of these differences are small, ranging from 0.15 to 0.26, indicating that adjustment after breast cancer is a long-term process, these effect sizes are relatively small compared with those experienced by the new cases, suggesting that improvement was occurring over time. With respect to social functioning it is of particular concern that, at the first survey, these women experienced lower levels of satisfaction with partners, perhaps associated with the finding that a sizable minority also reported being forced to take part in unwanted sexual activity. Sexual dysfunction can continue up to 2 years postsurgery (NHMRC, 2000), but partners may assume that life will return to normal once active treatment is over, and become impatient with continuing sexual problems. Partners of women with breast cancer may require further support or information than they currently typically receive, in order that they can offer better support to their partner over a long-term course.

These women who had been living with breast cancer for longer also reported using more medications for sleep than noncases, and also significantly greater use of health services. At Time 2 these women were more likely to be seeing alternative health practitioners such as a chiropractor, naturopath, acupuncturist, or herbalist. This may indicate some anxiety in remaining well, and searching for options to increase the chances of doing so. It may also reflect an increased dissatisfaction with the traditional Western medical care that was available to them once active treatment was completed.

There is some indication of mental health being impacted, but mental health appears to be more robust (less impacted by breast cancer) than other areas of functioning such as physical and social functioning. new cases report higher levels of depression than noncases, albeit a weak cross-sectional relationship. Mental health is significantly poorer for new cases than noncases, but this effect size (0.34) is far smaller than those for other domains of functioning.

The limitations of this study center mainly on the self-report nature of the breast cancer diagnosis. Given that reporting of life events retrospectively is associated with some degree of error (Henry, Moffitt, Caspi, Langley, & Silva, 1994), there are likely to be some false positive or false negative cases identified in our current sample. This effect was countered somewhat by using both T1 and Time 2 reports to cross-check the reliability of the reports in the current data set. Because breast cancer was only one of a large number of health-related variables assessed in a comprehensive survey, and because the survey was designed for an entire population, most of whom had never had breast cancer, information with respect to tumor grades and cancer stage, and details pertaining to treatment, were not obtained. Therefore, we have no way of examining the differential impact of early and late stage breast cancer within each group of women with breast cancer.

Results should also be interpreted with an emphasis on the effect sizes rather than statistical significance. In some cases, particularly with respect to changes over time for the large number of noncases, small effect sizes are statistically significant but not clinically significant. Whereas the differences between the existing cases and noncases generally had small effect sizes, differences in the Medical Outcomes Study 36-item Short-Form Health Survey subscales (Ware & Sherbourne, 1992) are equivalent to those found in a British study that compared community-living individuals with major chronic diseases and those without (Jenkinson, Coulter, & Wright, 1993). The changes experienced in time by the new cases are typically associated with moderate to large effect sizes (0.51 to 1.72) and therefore are not trivial.

The results of this study are consistent with previous literature that suggests that breast cancer can severely impact on a variety of domains, including health, social, mental, vocational, financial, and spousal intimacy (Feigen et al., 2000). It is heartening to note that, over time, women with breast cancer are less likely to be differentiated from women without breast cancer in terms of health indicators. However, at least 2 years after the diagnosis and medical treatment of breast cancer, the women continue to experience poorer functioning with respect to general health, physical functioning, and social functioning. Further attention needs to be paid to these areas of functioning once active medical treatment for breast cancer ceases, and issues concerning ongoing long-term functioning need to be addressed.

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