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Employment Status and Quality of Life in Recently Diagnosed Breast Cancer Survivors

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Abstract

Objective—Breast cancer survivors are less likely to be employed than similar healthy women, yet effects of employment on the well-being of survivors are largely unknown. In a prospective cohort study of 2,013 women diagnosed from 2006–2011 with invasive breast cancer in Kaiser Permanente Northern California, we describe associations between hours worked per week and change in employment with quality of life (QOL) from diagnosis through active treatment.

Methods—Participants completed information on employment status and QOL approximately 2-months and 8-months post-diagnosis. QOL was assessed by the Functional Assessment of Cancer Therapy-Breast Cancer (FACT-B). Multivariable linear regression models adjusted for potential confounders including demographic, diagnostic, and medical care factors to examine associations between employment and QOL.

Results—At baseline, overall well-being was higher for women who worked at least some hours per week compared to women who were not working. Women working 1–19 hours per week at baseline also had higher functional well-being compared to women who were not working. There was a significant, positive association between hours worked per week and physical and social well-being. At the six-month follow-up, women working at least 20 hours per week had higher physical and functional well-being than those not working. Lower scores for physical and functional well-being were observed among women who stopped working during the six-month follow-up period.

Conclusions—Continuing to work after a breast cancer diagnosis may be beneficial to multiple areas of QOL. Strategies to help women continue working through treatment should be explored.

Keywords

cancer; oncology; breast cancer; employment; quality of life; FACT-B

INTRODUCTION

Nearly 2.5 million women are living after a diagnosis of breast cancer in the US today, and this number is expected to increase to 3.4 million by 2015 [1, 2]. A growing proportion of these women are living their lives similar to if they had not had breast cancer. Even so, identification of factors that can improve quality of life, especially in the active treatment phase when coping with the disease requires numerous decisions, can result in improvement

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CONFLICTS OF INTEREST: none

of the life experience for women with breast cancer. Employment status is one factor that has attracted some interest, but the current literature on its effect on well-being is sparse.

There is evidence among breast cancer survivors that unemployment is higher and work ability is lower than among similar healthy women [3–10], and that employment status can affect quality of life (QOL) [11, 12] and mortality [13] in breast cancer survivors. These observations are particularly important in light of evidence that stress and depression may affect recurrence and mortality for breast cancer survivors [14–16]. While the relation between employment and stress or depression can be complex, employment may have beneficial effects as it typically requires human interaction. This hypothesis is consistent with existing studies having found benefits of employment for other health outcomes including: overall health, physical functioning, and mental health in people without disease and in women in particular [17–22]. However, none of these prior studies have examined if these benefits exist for breast cancer survivors. If so, unemployment and reduced work ability among survivors may have consequences beyond the direct economic costs.

Given the evidence for benefits of employment in the larger population, and that the risk of unemployment is higher among breast cancer survivors than among other comparable women, we examined whether employment confers similar benefits to breast cancer survivors. We examined the relation between employment status (measured as both yes/no and the number of hours worked per week) and multiple domains of QOL around the time of diagnosis and six months later in a prospective cohort study of women with breast cancer. We also examined the relation of QOL with change in employment status during the six-month period following diagnosis. Results from this study may provide guidance on support and special needs of recently diagnosed breast cancer survivors in the workforce, especially those who continue to work while undergoing treatment.

METHODS

The Pathways Study is an ongoing, prospective cohort study recruiting women recently diagnosed with invasive breast cancer from the population membership of Kaiser Permanente Northern California (KPNC) [23]. KPNC is one of the largest integrated health care delivery systems in the US, with 3.2 million members and approximately 2,500 incident cases of invasive breast cancer annually [24]. As of July 1, 2012, 4,221 patients have been enrolled since recruitment began in January 2006. Briefly, cases are ascertained rapidly on a daily basis by automatic scanning of electronic pathology reports with subsequent verification of cancer diagnosis and patient notification by a medical record analyst. Eligibility criteria include: current KPNC membership; at least 21 years of age at diagnosis; diagnosis of first primary invasive breast cancer (all stages); no prior history of cancer other than non-melanoma skin cancer; ability to speak English, Spanish, Cantonese, or Mandarin; and residence within a 65-mile radius of a field interviewer. Passive consent is obtained from the patient's physician of record, followed by written informed consent from all participants before they are enrolled in the study. The study was approved by the Institutional Review Boards of KPNC and all collaborating institutions.

Data collection

The baseline interview is conducted in-person by a trained interviewer approximately two months after diagnosis. During the baseline interview, information is collected on demographic factors such as age at diagnosis, race/ethnicity, educational attainment, annual household income, marital status, and clinical factors including height, weight, and menopausal status. Detailed employment information is collected as described below. A 6-month follow-up questionnaire (approximately eight months post-diagnosis) is mailed to participants asking for updates on the same information obtained at baseline.

Employment—Details on employment are collected at the baseline and 6-month follow-up interviews as part of a physical activity questionnaire based on the Arizona Activity Frequency Questionnaire (AAFQ) [25, 26]. The questionnaire asks if the participant was employed or engaged in weekly volunteer activity in the past six months. If the participant answers yes to either question, they are asked how many days per week they did paid and/or volunteer activities and how many hours per day.

Health-related QOL—The Functional Assessment of Cancer Therapy-Breast Cancer (FACT-B), Version 3, is administered during the baseline interview and at the six month follow-up to assess health-related QOL. The FACT-B consists of five subscales: physical well-being (PWB), functional well-being (FWB), emotional well-being (EWB), social/family well-being (SWB), and breast cancer-specific concerns (BCS). An overall well-being score is calculated by summing the individual subscale scores. The instrument has a total of 41 statements asking respondents to rate how true each statement is for the preceding seven days. Response scales range from 0 (not at all) to 4 (very much). The instrument has been well-validated elsewhere [27, 28], and the internal validity in our study population is high (Cronbach's alpha = 0.90 for baseline and 0.91 for follow-up).

Clinical characteristics—Diagnostic characteristics are obtained from the KPNC Cancer Registry (KPNCRR) [24]. These include data on stage of disease and tumor characteristics such as estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status. Supplemental results from additional testing for equivocal HER2 expression are obtained directly from the KPNC regional cytogenetics laboratory. Information on breast surgery, chemotherapy, radiation therapy, and hormonal therapy are obtained from the KPNCRR and KPNC electronic data sources.

Data analysis

The present analysis was limited to 2,013 women enrolled in the cohort who completed baseline and 6-month follow-up employment and QOL information as of July 21, 2011. The mean (standard deviation [SD]) time from diagnosis to the baseline interview was 1.92 (0.65) months and from baseline interview to follow-up data collection was 6.11 (1.55) months.

The number of hours worked per week was categorized as follows. Participants who answered “No” to both “Were you employed in the past six months?” and “Did you do any weekly volunteer activity in the past six months?” on the AAFQ were placed in the “none” category for hours worked per week. For participants who answered “Yes” to at least one of those questions, summaries of hours worked per week were created by using the mid-point of each available category (1–3 days/week, 4–5 days/week, >5 days/week; 0–4 hours/day, 5–8 hours/day, >8 hours/day) and multiplying days worked per week by hours worked per day. They were then grouped into one of three categories of hours worked per week: 1–19 hours, 20–34 hours, and 35 hours. Thirty-five (35) hours per week is considered full-time by the United States Bureau of Labor Statistics [29].

Women who answered “Yes” to at least one of the above questions at both baseline and the 6-month follow-up were considered to have worked continuously through treatment, whereas women who answered “Yes” to doing paid work or regular volunteer activity at the baseline interview but answered “No” to both at the 6-month follow-up were considered to have stopped working during the active treatment period.

Analyses began by examining distributions of potential covariates according to QOL and employment variables. Associations of hours worked per week, change in employment, and QOL were calculated using multivariable linear regression [30]. Initial analyses adjusted for

demographic and clinical characteristics, including age at diagnosis, race, menopausal status, body mass index (BMI), clinical characteristics, and treatment type. Subsequent analyses accounted for additional sociodemographic and employment characteristics that may influence the employment-QOL association, including educational attainment, partner status, annual household income, number of people supported by household income, occupation category, difficulty taking time off from work, and job-related stress level. In order to address potential reverse causality of physical status influencing the ability to obtain and/or maintain employment, the fully-adjusted models were also adjusted for baseline FACT-B PWB scores, except where baseline PWB was the outcome of interest. Finally, for models examining follow-up FACT-B scores, baseline scores were also adjusted for, to examine effects of employment conditional on baseline QOL. We repeated analyses for the subset of women aged 65 y or younger ($n=1,262$), as these women are most likely to be employed at the time of breast cancer diagnosis. Results were largely similar, and so we present findings for the larger analytic population of 2,013 women with breast cancer.

RESULTS

The characteristics of the study population overall, by hours worked per week at baseline and the 6-month follow-up, and by employment change from baseline to the 6-month follow-up are provided in Tables 1 and 2. Over half (54%) of participants were 60 years of age or older at breast cancer diagnosis. The majority of women were diagnosed with early stage breast cancer (52% and 33% Stage I and II, respectively). Sixty-two percent of women had breast-conserving surgery only, while 37% had a mastectomy (Table 1). Forty-four percent received chemotherapy, 43% received radiation therapy, and 69% received hormonal therapy (data not shown). Participants were primarily white (70%) and highly educated, with 85% having at least some college education. More than half (60%) of the participants were married at the time of the baseline interview, and 45% reported that two people were supported by their household income (Table 1).

A substantial majority of study participants (69%) were engaged in either paid work or regular volunteer activities at the time of the baseline interview, whereas by the 6-month follow-up the proportion of participants so engaged had decreased to 49%. At baseline, 65% percent of participants reported that it was not difficult to take time off of work when they were sick or needed medical treatments, and 68% reported that they had not experienced stress from their job in the past seven days (Table 1). Forty-two percent of participants reported they were not working at either time point, 39% were working continuously, and 17% quit working (Table 2). The mean FACT-B scores for each domain overall and by number of hours worked per week at baseline and the 6-month follow-up are given in Table 3. A small increase in overall domain scores and the overall well-being score was observed for all FACT-B domains other than BCS between baseline and follow-up.

In initial cross-sectional analyses at baseline that included demographic and clinical characteristics, women working 1–19 hours per week had significantly higher FWB compared to women who were not working ($p=0.03$). Examining hours per week as a continuous variable, hours per week was positively associated with SWB ($p=0.05$), but negatively associated with BCS ($p=0.05$). In cross-sectional analyses at the 6-month follow-up, hours worked per week was related to PWB, FWB, BCS, and overall well-being. Compared with women who were not working, PWB was higher for those who reported working, with the highest scores among women working 20–34 hours per week ($p<0.0001$). Compared with women who were not working, FWB and overall well-being increased with increasing category of hours worked per week ($p<0.0001$ for both). Women who were working 1–34 hours per week had higher scores for BCS compared to women who were not working, with women working 1–19 hours having the highest scores ($p=0.02$).

When examining hours per week as a continuous variable, hours per week was positively associated with physical ($p < 0.0001$), functional ($p < 0.0001$), and overall well-being ($p = 0.0003$) (Table 4).

After accounting for additional covariates, hours worked per week at baseline continued to be associated with SWB and FWB, and additionally associated with PWB and overall well-being. Compared with women who were not working at baseline, SWB increased with each increasing category of hours worked per week ($p = 0.001$). Women who were working 1–19 hours per week had higher FWB compared to women who were not working ($p = 0.005$). Overall well-being was higher for women in all categories of hour per week compared to women who were not working, and highest for women working 1–19 hours per week ($p = 0.002$). Examining hours per week as a continuous variable, there was a positive association between hours worked per week and both PWB and SWB ($p = 0.02$ and $p = 0.001$ respectively). At the 6-month follow-up, hours worked per week remained related to PWB and FWB, but not to other domains. For both PWB and FWB, women who worked at least 20 hours per week had higher scores than those who were not working ($p = 0.002$ and $p = 0.005$ respectively). When examining hours per week as a continuous variable, hours worked per week was positively associated with PWB and FWB ($p = 0.001$ for both) (Table 5).

Additional models restricted to 1,136 women examined differences in QOL measures between women who quit working between the baseline interview and the 6-month follow-up ($n = 347$) and those who worked continuously between these two time points ($n = 789$). In the models adjusting for demographic and clinical factors, women who quit working between baseline and the 6-month follow-up had lower scores for PWB ($p = 0.004$), FWB ($p < 0.0001$), and overall well-being ($p = 0.002$), as well as for BCS ($p = 0.04$), compared to women who worked continuously (Table 4). In the fully-adjusted models, similar but attenuated differences were seen.

For all models, we also stratified by race to examine if the association between employment and quality of life differed by racial/ethnic groups. Results were virtually the same among white women ($n = 1,415$) compared with the entire cohort. Results were also similar, although attenuated, among Hispanic women ($n = 210$). Among Asian women ($n = 215$), results were attenuated in several domains, and an association was no longer seen between physical and social well-being and employment at baseline, nor between breast cancer specific concerns and employment. Among African American women ($n = 116$), the association between functional well-being and employment at follow-up was no longer observed and the association between physical well-being and employment at follow-up became attenuated. Furthermore, African American women who quit working had significantly higher social well-being compared to women who continued working after diagnosis, a pattern that was not seen in the overall cohort (data not shown).

Finally, we examined whether the association between employment and quality of life differed between women of working age and women who continue working past the normal age of retirement by excluding women age 65 y and older from all models. Results remained fundamentally unchanged after adjusting for covariates (data not shown).

DISCUSSION

Several studies have documented changes in work patterns after a breast cancer diagnosis [3, 4, 6–8, 31–33]. In our study, we were able to further examine the potential impact of the amount of time worked and changes in work status on quality of life among women with breast cancer. In this prospective cohort study of 2,013 breast cancer survivors, we found

that hours worked per week was related to specific quality of life measures at both the baseline interview and the 6-month follow-up. A primary finding was that women who worked at least some hours tended to fare better in overall well-being as measured by the FACT-B and in several of its subscales compared to women who did not work. These findings remained when analyses were limited to the 1,262 women younger than age 65 y at the time of breast cancer diagnosis.

The finding that physical well-being was positively associated with hours worked per week was not surprising; however, the relation between working and other quality of life domains may help better understand the role of employment at the time of a breast cancer diagnosis. For example, social well-being may be higher in women who are working at the time of their breast cancer diagnosis due to enhanced social support available from colleagues and friends in the workplace. While research in this area is limited, in a study of returning to work after a cancer diagnosis, Kennedy, et al. reported that all participants (n=29) told their employer about their diagnosis and 69% said they received support from coworkers [34]. Another study of 378 breast cancer patients reported that approximately half of the women disclosed their diagnosis to coworkers or their employer [35]. Functional and overall well-being may be higher in women working at the time of diagnosis because their ability to work may signify a sense of normalcy despite the cancer diagnosis. Indeed, Kennedy, et al. reported that 34% of women said that working was a distraction from their illness and helped them return to normal life [34].

Interestingly, we found that women working 1–19 hours per week had significantly higher functional well-being than women who were not working at the time of their diagnosis, while working more than 20 hours per week was not associated with higher functional well-being. It is possible that working less than 20 hours per week provided women with a higher sense of self-efficacy while coping with their diagnosis, but that working more than 20 hours per week became overwhelming when also trying to manage their personal life and cancer treatments. Overall well-being was higher for women in all categories of hours per week compared to women not working at the baseline interview; however, scores were highest in women working 1–19 hours per week. Again, being engaged in some work around the time of diagnosis may be beneficial, while working too many hours may negatively impact quality of life shortly after diagnosis.

Hours worked per week at the 6-month follow-up was related to higher physical and functional well-being at follow-up. Furthermore, women who continued working between the baseline and follow-up interview had higher physical and functional well-being compared to women who quit working during this time. Similar to baseline, we observed a positive association between hours per week and physical well-being at follow-up, and higher functional well-being in women working at least twenty hours per week compared to those who were not working. However, unlike at baseline, functional well-being was not significantly higher for women working 1–19 hours per week at follow-up compared to women who were not working. We suggest that as women with breast cancer progress further into the treatment period, the greater the therapeutic effect of working and the sense of continuing normalcy in life compared to when a women is first confronted with a breast cancer diagnosis.

Higher social well-being was observed among African American women who quit working after diagnosis compared to those who continued to work. This finding was not seen in any other racial group, nor in the overall cohort and may reflect differences between cultures in where women seek social and emotional support. Because the number of African Americans was small in this analysis, the findings are not as stable as for the overall cohort and require confirmation in other minority populations.

Our results support previous findings that continuing work after a breast cancer diagnosis is beneficial in multiple quality of life domains. In a study of 185 breast cancer survivors Bloom, et al. found greater increases in physical well-being among women working at least part time during the five years after diagnosis [12]. Another study of 369 women found lower levels of psychosocial distress and higher levels of physical and mental functioning and quality of life in women who continued working through breast cancer treatment [11]. Finally, in a study of 100 cancer survivors, greater physical and psychological symptoms and fears were reported in women who reduced work by more than four hours per week [36].

Although our findings highlight the potential importance of continuing employment on quality of life for breast cancer survivors, we did not collect reasons for change in employment status, and therefore, we do not know why some women stopped working between the baseline and follow-up interviews while others did not. For example, it is possible that women who stopped working were on sick leave and were planning to return to work. Because at study enrollment, all participants were members of Kaiser Permanente Northern California, an integrated health care delivery system, the sample is representative primarily of breast cancer patients with uniform access to health insurance at the time of their diagnosis. Although we adjusted for physical well-being and baseline quality of life scores in order to reduce the potential for reverse causality of physical well-being affecting the ability to work, we cannot definitively rule out that declines in health and functioning may have driven changes in working status. However, in our study population we were able to examine effects of type of treatment on employment, and this did not appear to explain these findings. For example, hours worked per week did not differ substantially by the type of surgery (lumpectomy/mastectomy). Furthermore, the proportion of women undergoing radiation therapy was higher in all categories of hours worked per week at follow-up than in women not working. If undergoing therapy would be expected to result in decreased employment, this is the opposite of what would be expected (data not shown). To further understand the potential role of reverse causation due to participants with low physical well-being not being able to work, we conducted a sensitivity analysis of our primary results excluding participants in the bottom 10% of physical well-being scores at baseline (n=174). Associations with follow-up FACT-B scores remained essentially unchanged (data not shown), consistent with the fact that reverse by physical functioning is not the primary driver of our findings.

Despite these potential limitations, to our knowledge, this is the largest prospective study to date examining employment and quality of life in breast cancer survivors. Furthermore, since we collected information on a number of clinical and demographic characteristics, we were able to adjust for a comprehensive set of possible confounders, such as stage of disease, treatment type, difficulty taking time off from work, etc. In addition, as data become available from further follow-up intervals, future analyses with this cohort may further examine these questions with more variation from baseline measures, allowing more detailed analysis of change in quality of life. Also of potential interest is exploring the association between employment and prognosis in the cohort, as data on recurrence and survival are being actively collected. Indeed, decreased survival time for women who stopped working after their diagnosis compared with those who continued to work was reported by Waxler-Morrison, et al. in a prospective study of 168 women with breast cancer [13]. Additionally, future analyses examining job characteristics such as the ability to take time off of work for treatment and job-related stress levels may elucidate the contributions of work characteristics versus hours worked per week to quality of life.

In summary, we found in this prospective study of women with breast cancer that working around the time of cancer diagnosis and through the active treatment phase was positively

associated with multiple areas of quality of life. For breast cancer survivors who want to continue working through treatment, strategies to help them do so, such as better management of treatment related side-effects and office place support, should be explored. Indeed, one study of 1,490 employed cancer survivors found that low workplace support was associated with lower work ability [9]. A number of government, disability, and cancer groups provide resources about employment and cancer, such as entitlements to cancer patients under the Americans with Disabilities Act [37], managing cancer related issues at work (e.g. who to tell about their diagnosis and what to share) [38], information on potential accommodations for common problems faced by cancer patients in the workplace [39], and how to access legal help for workplace discrimination [40]. Ensuring breast cancer patients are aware of and have access to this information may help them understand all of their rights and options as a working cancer survivor.

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Demographic, employment factors and clinical characteristics of Pathways participants by hours worked per week at baseline and 6-month follow-up

Table 1

	Baseline Hours Worked per Week										P -value
	All (n=2013)		0 Hours (n=601)		1–19 Hours (n=488)		20–34 Hours (n=489)		35 Hours (n=411)		
	n	%	n	%	n	%	n	%	n	%	
Demographic factors											
Age at diagnosis											
<50	384	19.08	39	6.49	52	10.66	147	30.06	141	34.31	<.0001
50–59	545	27.07	76	12.65	76	15.57	205	41.92	181	44.04	
60–69	637	31.64	238	39.60	187	38.32	126	25.77	79	19.22	
70	447	22.21	248	41.26	173	35.45	11	2.25	10	2.43	
Race/ethnicity											
White	1418	70.44	436	72.55	390	79.92	299	61.15	277	67.40	<.0001
Black	116	5.76	38	6.32	21	4.30	35	7.16	21	5.11	
Hispanic	210	10.43	57	9.48	41	8.40	64	13.09	45	10.95	
Asian	215	10.68	48	7.99	24	4.92	83	16.97	56	13.63	
Other	54	2.68	22	3.66	12	2.46	8	1.64	12	2.92	
Education											
High school or less	294	14.16	143	23.79	54	11.07	68	13.91	28	6.81	<.0001
Some college	696	34.58	250	41.60	153	31.35	164	33.54	122	29.68	
College graduate	546	27.12	117	19.47	144	29.51	148	30.27	126	30.66	
Post-graduate	476	23.65	91	15.14	136	27.87	109	22.29	135	32.85	
Annual household income											
<\$25,000	189	9.39	99	16.47	54	11.07	24	4.91	10	2.43	<.0001
\$25,000–49,999	390	19.37	123	20.47	110	22.54	99	20.25	53	12.90	
\$50,000–89,999	605	30.05	161	26.79	152	31.15	155	31.70	128	31.14	
90,000	630	31.30	110	18.30	133	27.25	174	35.58	205	49.88	
Unknown	199	9.89	108	17.97	39	7.99	37	7.57	15	3.65	

	Baseline Hours Worked per Week										P -value
	All (n=2013)		0 Hours (n=601)		1-19 Hours (n=488)		20-34 Hours (n=489)		35 Hours (n=411)		
	n	%	n	%	n	%	n	%	n	%	
Number of people supported by household income											
1	564	28.02	187	31.11	158	32.38	120	24.54	93	22.63	<.0001
2	899	44.66	299	49.75	238	48.77	195	39.88	157	38.20	
3	511	25.38	94	15.64	83	17.01	167	34.15	159	38.69	
Partner Status											
Married	1198	59.51	361	60.07	306	62.70	287	58.69	229	55.72	<.0001
Living as married	59	2.93	7	1.16	6	1.23	23	4.70	22	5.35	
Widowed	228	11.33	114	18.97	65	13.32	26	5.32	23	5.60	
Separated/Divorced	365	18.13	97	16.14	78	15.98	92	18.81	91	22.14	
Single	160	7.95	22	3.66	32	6.56	60	12.27	45	10.95	
Employment Factors											
Baseline occupation category											
Managerial/Professional	1003	49.83	241	40.10	258	52.87	229	46.83	263	63.99	<.0001
Technical/Sales/Administrative	491	24.39	148	24.63	112	22.95	153	31.29	72	17.52	
Service	205	10.18	56	9.32	41	8.40	69	14.11	37	9.00	
Operators/Laborers	41	2.04	16	2.66	7	1.43	7	1.43	10	2.43	
Homemakers	98	4.87	65	10.82	28	5.74	3	0.61	0	0.00	
Difficulty taking time off from work when sick											
Not difficult	1315	65.33	428	71.21	324	66.39	320	65.44	228	55.47	<.0001
Difficult	524	26.03	66	10.98	107	21.93	164	33.54	180	43.80	
Unknown	174	8.64	107	17.80	57	11.68	5	1.02	3	0.73	
Stress from job											
Not stressful	1376	68.36	543	90.35	379	77.66	243	49.69	196	47.69	<.0001
Stressful	596	29.61	36	5.99	96	19.67	243	49.69	213	51.82	
Unknown	41	2.04	22	3.66	13	2.66	3	0.61	2	0.49	

	Baseline Hours Worked per Week												P -value
	All (n=2013)		0 Hours (n=601)		1-19 Hours (n=488)		20-34 Hours (n=489)		35 Hours (n=411)		n	%	
	n	%	n	%	n	%	n	%	n	%			
Clinical Characteristics													
AJCC Stage													0.0004
Stage I	1038	51.56	337	56.07	278	56.97	217	44.38	193	46.96			
Stage II	665	33.04	184	30.62	133	27.25	188	38.45	153	37.23			
Stage III	196	9.74	46	7.56	48	9.84	54	11.04	45	10.95			
Stage IV	24	1.19	6	1.00	8	1.64	4	0.82	6	1.46			
Unknown	90	4.47	28	4.66	21	4.30	26	5.32	14	3.41			
Surgery													0.19
Lumpectomy	1243	61.75	373	62.06	325	66.60	283	57.87	249	60.58			
Mastectomy	751	37.31	222	36.94	158	32.38	201	41.10	159	38.69			
None	19	0.94	6	1.00	5	1.02	5	1.02	3	0.73			
Hormone therapy													0.39
Yes	1379	68.50	400	66.56	339	69.47	342	69.94	284	69.10			
No	609	30.25	199	33.11	143	29.30	140	28.63	118	28.71			
Unknown	25	1.24	2	0.33	6	1.23	7	1.43	9	2.19			
Follow-Up Hours Worked per Week (only characteristics where pattern differed from baseline shown)													
All (n=2013)		0 Hours (n=969)		1-19 Hours (n=402)		20-34 Hours (n=360)		35 Hours (n=219)		P -value			
n	%	n	%	n	%	n	%	n	%	n	%	n	%
Employment Factors													
Baseline occupation category													<.0001
Managerial/Professional	1003	49.83	410	42.31	210	52.24	208	57.78	142	64.84			
Technical/Sales/Administrative	491	24.39	242	24.97	97	24.13	96	26.67	41	18.72			
Service	205	10.18	107	11.04	37	9.20	37	10.28	19	8.68			
Operators/Laborers	41	2.04	27	2.79	7	1.74	2	0.56	3	1.37			

	Baseline Hours Worked per Week										P -value
	All (n=2013)		0 Hours (n=601)		1-19 Hours (n=488)		20-34 Hours (n=489)		35 Hours (n=411)		
	n	%	n	%	n	%	n	%	n	%	
Homemakers	98	4.87	82	8.46	15	3.73	1	0.28	0	0.00	
Clinical Characteristics											
AJCC Stage											0.01
Stage I	1038	51.56	461	47.57	226	56.22	190	52.78	130	59.36	
Stage II	665	33.04	347	35.81	110	27.36	117	32.50	70	31.96	
Stage III	196	9.74	107	11.04	40	9.95	30	8.33	12	5.48	
Stage IV	24	1.19	12	1.24	6	1.49	5	1.39	1	0.46	
Unknown	90	4.47	42	4.33	20	4.98	18	5.00	6	2.47	

Table 2

Demographic, employment factors and clinical characteristics of Pathways participants by employment change from baseline to 6-month follow-up

	All (n=2013)		Not working at baseline or follow-up (n=843)		Began working between baseline and follow-up (n=32)		Stopped working between baseline and follow-up (n=347)		Working at baseline and follow-up (n=789)		P-value
	n	%	n	%	n	%	n	%	n	%	
Demographic factors											
Age at diagnosis											
<50	384	19.08	49	5.81	7	21.88	97	27.95	231	29.28	<.0001
50–59	545	27.07	95	11.27	3	9.38	139	40.06	307	38.91	
60–69	637	31.64	321	38.08	15	46.88	88	25.36	213	27.00	
70	447	22.21	378	44.84	7	21.88	23	6.63	38	4.82	
Race/ethnicity											
White	1418	70.44	640	75.92	24	75.00	198	57.06	554	70.22	<.0001
Black	116	5.76	52	6.17	0	0.00	27	7.78	37	4.69	
Hispanic	210	10.43	72	8.54	3	9.38	50	14.41	85	10.77	
Asian	215	10.68	52	6.17	4	12.50	65	18.73	94	11.91	
Other	54	2.68	27	3.20	1	3.13	7	2.02	19	2.41	
Education											
High school or less	294	14.61	168	19.93	7	21.88	48	13.83	71	9.00	<.0001
Some college	696	34.58	327	38.79	11	34.38	113	32.56	245	31.05	
College graduate	546	27.12	194	23.01	6	18.75	109	31.41	236	29.91	
Post-graduate	476	23.65	153	18.15	8	25.00	77	22.19	237	30.04	
Annual household income											
<\$25,000	189	9.39	132	15.66	3	9.38	22	6.34	32	4.06	<.0001
\$25,000–49,999	390	19.37	185	21.95	5	15.63	58	16.71	141	17.87	
\$50,000–89,999	605	30.05	235	27.88	15	46.88	103	29.68	251	31.81	
90,000	630	31.30	165	19.57	6	18.75	135	38.90	324	41.06	
Unknown	199	9.89	126	14.95	3	9.38	29	8.36	41	5.20	

	All (n=2013)		Not working at baseline or follow-up (n=843)		Began working between baseline and follow-up (n=32)		Stopped working between baseline and follow-up (n=347)		Working at baseline and follow-up (n=789)		P-value
	n	%	n	%	n	%	n	%	n	%	
Number of people supported by household income											
1	564	28.02	271	32.15	10	31.25	65	18.73	217	27.50	<.0001
2	899	44.66	428	50.77	10	31.25	147	42.36	313	39.67	
3	511	25.38	120	14.23	10	31.25	129	37.18	252	31.94	
Partner Status											
Married	1198	59.51	509	60.38	19	59.38	221	63.69	448	56.78	<.0001
Living as married	59	2.93	9	1.07	1	3.13	14	4.03	35	4.44	
Widowed	228	11.33	161	19.10	6	18.75	14	4.03	47	5.96	
Separated/Divorced	365	18.13	129	15.30	6	18.75	67	19.31	162	20.53	
Single	160	7.95	34	4.03	0	0.00	31	8.93	95	12.04	
Employment Factors											
Baseline occupation category											
Managerial/Professional	1003	49.83	360	42.70	18	56.25	157	45.24	466	59.06	<.0001
Technical/Sales/Administrative	491	24.39	211	25.03	4	12.50	91	26.22	185	23.45	
Service	205	10.18	66	7.83	4	12.50	55	15.85	80	10.14	
Operators/Laborers	41	2.04	18	2.14	1	3.13	13	3.75	9	1.14	
Homemakers	98	4.87	92	10.97	0	0.00	4	1.15	2	0.25	
Difficulty taking time off from work when sick											
Not difficult	1315	65.33	587	69.63	24	75.00	224	64.55	478	60.58	<.0001
Difficult	524	26.03	105	12.46	6	18.75	109	31.41	304	38.53	
Unknown	174	8.64	151	17.91	2	6.25	14	4.03	7	0.89	
Stress from job											
Not stressful	1376	68.36	766	90.87	27	84.38	215	61.96	366	46.39	<.0001
Stressful	596	29.61	43	5.10	5	15.63	128	36.89	420	53.23	
Unknown	41	2.04	34	4.03	0	0.00	4	1.15	3	0.38	

	All (n=2013)		Not working at baseline or follow-up (n=843)		Began working between baseline and follow-up (n=32)		Stopped working between baseline and follow-up (n=347)		Working at baseline and follow-up (n=789)		P-value
	n	%	n	%	n	%	n	%	n	%	
Clinical Characteristics											
AJCC Stage											<.0001
Stage I	1038	51.56	484	57.41	15	46.88	111	31.99	427	54.12	
Stage II	665	33.04	254	29.06	13	40.63	157	45.24	249	31.56	
Stage III	196	9.74	64	7.59	2	6.25	60	17.29	70	8.87	
Stage IV	24	1.19	10	1.19	0	0.00	4	1.15	10	1.27	
Unknown	90	4.47	40	4.74	2	6.25	15	4.32	33	4.18	
Surgery											
Lumpectomy	1243	61.75	555	65.84	20	62.50	178	51.30	488	61.85	0.001
Mastectomy	751	37.31	280	33.21	12	37.50	164	47.26	295	37.39	
None	19	0.94	8	0.95	0	0.00	5	1.44	6	0.76	
Hormone therapy											
Yes	1379	68.50	564	66.90	22	68.75	227	65.42	564	71.48	0.06
No	609	30.25	274	32.50	10	31.25	115	33.14	210	26.62	
Unknown	25	1.24	5	0.59	0	0.00	5	1.44	15	1.90	

Table 3

Unadjusted linear regression models showing FACT-B domain scores by hours worked per week at baseline and follow-up (n=2013)

Baseline FACT-B Scores						
	Physical well-being		Social well-being		Emotional well-being	
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	22.22 (5.63)	<.0001	24.55 (4.01)	0.36	19.20 (4.03)	<.0001
Baseline hours worked per week						
None	23.07 (5.24)	-	24.29 (4.30)	-	19.71 (3.97)	-
1-19	23.02 (5.19)	0.88	24.82 (3.88)	0.03	19.61 (3.82)	0.68
20-34	21.24 (5.95)	<.0001	24.47 (3.90)	0.47	18.60 (4.05)	<.0001
35	21.22 (5.94)	<.0001	24.67 (3.90)	0.15	18.72 (4.19)	0.0001
Breast cancer specific concerns						
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	20.73 (5.49)	0.003	25.78 (5.94)	<.0001	112.22 (18.70)	<.0001
Baseline hours worked per week						
None	20.66 (5.75)	-	26.59 (5.49)	-	114.19 (18.07)	-
1-19	21.76 (5.03)	0.001	27.30 (5.49)	0.05	116.37 (17.44)	0.06
20-34	20.20 (5.25)	0.17	24.49 (5.98)	<.0001	108.79 (18.53)	<.0001
35	20.26 (5.73)	0.25	24.47 (6.38)	<.0001	108.89 (19.84)	<.0001
Overall FACT-B						
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	20.73 (5.49)	0.003	25.78 (5.94)	<.0001	112.22 (18.70)	<.0001
Baseline hours worked per week						
None	20.66 (5.75)	-	26.59 (5.49)	-	114.19 (18.07)	-
1-19	21.76 (5.03)	0.001	27.30 (5.49)	0.05	116.37 (17.44)	0.06
20-34	20.20 (5.25)	0.17	24.49 (5.98)	<.0001	108.79 (18.53)	<.0001
35	20.26 (5.73)	0.25	24.47 (6.38)	<.0001	108.89 (19.84)	<.0001
Follow-Up FACT-B Scores						
	Physical well-being		Social well-being		Emotional well-being	
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	22.69 (5.35)	0.002	25.56 (4.66)	0.89	20.23 (3.50)	0.27
Follow-up hours worked per week						
None	22.09 (5.61)	-	23.54 (4.66)	-	20.15 (3.58)	-
1-19	23.54 (5.03)	<.0001	23.88 (4.15)	0.22	20.75 (3.21)	0.004
20-34	23.18 (4.72)	0.001	23.43 (4.75)	0.69	20.21 (3.40)	0.77
35	23.23 (5.15)	0.004	23.73 (4.82)	0.59	19.91 (3.68)	0.36
Breast cancer specific concerns						
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	22.69 (5.35)	0.002	25.56 (4.66)	0.89	20.23 (3.50)	0.27
Follow-up hours worked per week						
None	22.09 (5.61)	-	23.54 (4.66)	-	20.15 (3.58)	-
1-19	23.54 (5.03)	<.0001	23.88 (4.15)	0.22	20.75 (3.21)	0.004
20-34	23.18 (4.72)	0.001	23.43 (4.75)	0.69	20.21 (3.40)	0.77
35	23.23 (5.15)	0.004	23.73 (4.82)	0.59	19.91 (3.68)	0.36
Overall FACT-B						
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Overall	22.69 (5.35)	0.002	25.56 (4.66)	0.89	20.23 (3.50)	0.27
Follow-up hours worked per week						
None	22.09 (5.61)	-	23.54 (4.66)	-	20.15 (3.58)	-
1-19	23.54 (5.03)	<.0001	23.88 (4.15)	0.22	20.75 (3.21)	0.004
20-34	23.18 (4.72)	0.001	23.43 (4.75)	0.69	20.21 (3.40)	0.77
35	23.23 (5.15)	0.004	23.73 (4.82)	0.59	19.91 (3.68)	0.36

Baseline FACT-B Scores									
	Physical well-being			Social well-being			Emotional well-being		
	Mean (SD)	P -value	P -value	Mean (SD)	P -value	P -value	Mean (SD)	P -value	P -value
Overall	21.54 (5.28)	<0001	<0001	25.73 (6.10)	0.10	0.10	113.68 (18.77)	0.04	0.04
Follow-up hours worked per week									
None	20.64 (5.68)	-	-	25.47 (6.03)	-	-	111.76 (19.29)	-	-
1-19	22.44 (4.76)	<0001	<0001	27.04 (5.85)	<0001	<0001	117.37 (17.43)	<0001	<0001
20-34	22.24 (4.74)	<0001	<0001	25.45 (6.07)	0.95	0.95	114.48 (17.58)	0.02	0.02
35	22.67 (4.52)	<0001	<0001	25.09 (6.40)	0.40	0.40	115.20 (18.39)	0.02	0.02

Table 4
Minimally-adjusted* linear regression models showing employment status predicting FACT-B scores

Baseline Employment Status (n=2013)											
Baseline hours worked per week	Physical well-being			Social well-being			Emotional well-being				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.90	Ref	-	0.12	Ref	-	0.76		
1-19	0.08	-0.61, 0.77		0.48	-0.04, 0.99		0.08	-0.43, 0.59			
20-34	0.30	-0.47, 1.08		0.45	-0.11, 1.02		0.23	-0.34, 0.80			
35	0.14	-0.67, 0.96		0.66	0.06, 1.27		0.31	-0.29, 0.92			
Hours per week (continuous)	0.004	-0.01, 0.02	0.64	0.013	-0.00, 0.03	0.05	0.004	-0.01, 0.02	0.50		
Breast cancer specific concerns											
Baseline hours worked per week	Functional well-being			Breast cancer specific concerns			Overall FACT-B				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.03	Ref	-	0.11	Ref	-	0.29		
1-19	1.01	0.32, 1.70		0.56	-0.15, 1.27		2.28	-0.05, 4.62			
20-34	0.70	-0.07, 1.46		-0.27	-1.07, 0.52		1.35	-1.27, 3.96			
35	0.62	-0.20, 1.43		-0.42	-1.26, 0.42		1.12	-1.64, 3.88			
Hours per week (continuous)	0.008	-0.01, 0.03	0.33	-0.018	-0.04, -0.00	0.05	0.004	-0.05, 0.06	0.88		
Follow-Up Employment Status (n=2013)											
Follow-up hours worked per week	Physical well-being			Social well-being			Emotional well-being				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	< .0001	Ref	-	0.70	Ref	-	0.12		
1-19	0.90	0.27, 1.52		0.21	-0.37, 0.79		0.48	0.05, 0.92			
20-34	1.61	0.92, 2.29		-0.14	-0.78, 0.50		0.38	-0.10, 0.86			
35	1.38	0.57, 2.2		0.26	-0.50, 1.02		0.14	-0.43, 0.71			
Hours per week (continuous)	0.036	0.02, 0.05	< .0001	0.001	-0.02, 0.02	0.93	0.004	-0.01, 0.02	0.47		
Breast cancer specific concerns											
Follow-up hours worked per week	Functional well-being			Breast cancer specific concerns			Overall FACT-B				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	< .0001	Ref	-	0.02	Ref	-	< .0001		
1-19	1.51	0.87, 2.15		0.99	0.28, 1.70		3.89	1.62, 6.17			

Baseline Employment Status (n=2013)									
Baseline hours worked per week	Physical well-being			Social well-being			Emotional well-being		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
20-34	1.86	1.15, 2.57	0.85	0.07, 1.63	4.63	2.15, 7.12			
35	2.15	1.31, 2.99	0.26	-0.67, 1.18	4.88	1.94, 7.82			
Hours per week (continuous)	0.048	0.03, 0.07	<.0001	-0.01, 0.03	0.38	0.05, 0.17	0.108	0.05, 0.17	0.0003
Employment Change from Baseline to Follow-up (n=1136)									
Baseline to follow-up employment pattern	Physical well-being			Social well-being			Emotional well-being		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
Worked continuously	Ref	-	0.004	Ref	-	0.37	Ref	-	0.61
Quit Working	-1.12	-1.87, -0.36	-0.31	-0.99, 0.37	-0.13	-0.65, 0.38			
Baseline to follow-up employment pattern	Functional well-being			Breast cancer specific concerns			Overall FACT-B		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
Worked continuously	Ref	-	<.0001	Ref	-	0.04	Ref	-	0.002
Quit Working	-1.45	-2.15, -0.75	-0.89	-1.75, -0.03	-4.22	-6.88, -1.56			

* Adjusted for age, race, menopausal status, AJCC stage, hormone receptor status, Her2 status, surgery type, treatment type (chemotherapy, radiation, and hormone therapy), and BMI.

Table 5
Fully-adjusted* linear regression models showing employment status predicting FACT-B scores

Baseline Employment Status (n=2013)											
Baseline hours worked per week	Physical well-being			Social well-being**			Emotional well-being**				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.17	Ref	-	0.001	Ref	-	0.20		
1-19	0.69	-0.20, 1.57		1.03	0.58, 1.67		0.38	-0.24, 0.99			
20-34	0.94	-0.05, 1.92		1.08	0.36, 1.79		0.68	-0.01, 1.37			
35	1.17	0.11, 2.22		1.47	0.70, 2.23		0.75	0.01, 1.48			
Hours per week (continuous)	0.025	0.004, 0.05	0.02	0.026	0.01, 0.04	0.001	0.009	-0.01, 0.02	0.22		
Breast cancer specific concerns**											
Baseline hours worked per week	Functional well-being**			Breast cancer specific concerns**			Overall FACT-B**				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.005	Ref	-	0.11	Ref	-	0.002		
1-19	1.38	0.63, 2.13		0.95	0.14, 1.77		3.81	1.81, 5.80			
20-34	0.76	-0.08, 1.60		0.61	-0.30, 1.53		3.33	1.10, 5.56			
35	0.75	-0.14, 1.64		0.32	-0.65, 1.29		3.35	0.98, 5.72			
Hours per week (continuous)	0.004	-0.01, 0.02	0.63	-0.007	-0.0, 0.01	0.47	0.033	-0.02, 0.08	0.18		
Follow-Up Employment Status (n=2013)											
Follow-up hours worked per week	Physical well-being**			Social well-being***			Emotional well-being***				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.002	Ref	-	0.24	Ref	-	0.25		
1-19	0.61	-0.12, 1.32		-0.30	-0.89, 0.29		0.40	-0.02, 0.82			
20-34	1.40	0.64, 2.15		-0.63	-1.26, -0.01		0.00	-0.45, 0.45			
35	1.31	0.42, 2.20		-0.21	-0.94, 0.53		0.08	-0.45, 0.60			
Hours per week (continuous)	0.031	0.01, 0.05	0.001	-0.010	-0.03, 0.01	0.20	-0.002	-0.01, 0.01	0.73		
Breast cancer specific concerns***											
Follow-up hours worked per week	Functional well-being***			Breast cancer specific concerns***			Overall FACT-B***				
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value		
None	Ref	-	0.005	Ref	-	0.55	Ref	-	0.42		

Baseline Employment Status (n=2013)									
Baseline hours worked per week	Physical well-being			Social well-being**			Emotional well-being**		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
1-19	0.47	-0.09, 1.04		0.39	-0.27, 1.06		0.84	-0.79, 2.47	
20-34	0.85	0.24, 1.45		0.23	-0.48, 0.95		-0.10	-1.82, 1.61	
35	1.21	0.49, 1.92		-0.13	-0.97, 0.71		1.28	-0.74, 3.30	
Hours per week (continuous)	0.025	0.01, 0.04	0.001	-0.004	-0.02, 0.01	0.67	0.010	-0.03, 0.05	0.65
Employment Change from Baseline to Follow-up (n=1136)									
Baseline to follow-up employment pattern	Physical well-being**			Social well-being***†			Emotional well-being***†		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
Worked continuously	Ref	-	0.02	Ref	-	0.35	Ref	-	0.75
Quit Working	-1.00	-1.81, -0.18		0.30	-0.33, 0.93		0.08	-0.39, 0.54	
Baseline to follow-up employment pattern	Functional well-being***†			Breast cancer specific concerns***†			Overall FACT-B***†		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
Worked continuously	Ref	-	0.01	Ref	-	0.54	Ref	-	0.52
Quit Working	-0.85	-1.45, -0.25		-0.23	-0.96, 0.50		-0.57	-2.29, 1.16	

* Also adjusted for education level, partner status, annual household income, number of people supported by income, occupation category, difficulty taking time off from work, and job related stress level.

** Adjusted for baseline physical well-being.

† Adjusted for baseline score.