

ORIGINAL ARTICLE

Factors associated with return to work after breast cancer treatment

AINA JOHNSSON^{1,2,4}, TOMMY FORNANDER¹, MARIANN OLSSON^{2,3},
MARIANNE NYSTEDT⁵, HEMMING JOHANSSON¹ & LARS ERIK RUTQVIST³

¹Department of Oncology, Karolinska University Hospital, Stockholm, Sweden, ²Department of Social Work, Karolinska University Hospital, Stockholm, Sweden, ³Department of Medicine, Karolinska Institutet, Karolinska University Hospital, Stockholm, Sweden, ⁴Department of Oncology-Pathology, Karolinska Institutet, Karolinska University Hospital, Stockholm, Sweden, and ⁵Psychosocial Unit, Department of Oncology, Radiumhemmet, Karolinska University Hospital, Stockholm, Sweden

Abstract

Relatively few studies have addressed problems regarding return to work after primary treatment for early-stage breast cancer. The purpose of this study was to investigate whether socio-economic and treatment-related factors were associated with problems of returning to work among pre-menopausal women included in a randomized trial of adjuvant endocrine therapy. The duration of all endocrine treatments in the trial was two years. At 24 months after randomization 35 of the 222 recurrence-free patients (16%) had not returned to work. The use of adjuvant endocrine therapy was associated with a twofold increase in the odds ratio of not having returned to work, although the confidence interval of this ratio was wide and included unity. Tumour stage was negatively associated with work status, possibly because of its association with adjuvant chemotherapy and radiotherapy to the regional nodes. Age and investigated social factors (educational level, matrimonial status and presence of under-age children) were not significantly associated with return to work. Determining the significance of other social factors such as vocational motivation, level of income and vocational rehabilitation merits further research.

Breast cancer is the most common cancer among women in western countries. In Sweden breast cancer constitutes about 30% of all female cancer cases. The incidence has increased over the past few decades. The relative survival has likewise increased continuously, probably owing to earlier diagnosis, particularly since the introduction of mammography screening, and adjuvant systemic treatments [1]. These improvements have resulted in an increasing number of survivors.

Breast cancer treatment today may involve not only surgery but also, multiple postoperative treatments such as irradiation, chemotherapy and endocrine therapy, often administered in combination or sequentially [1,2]. Each of these treatments may have significant side effects that may influence the ability to return to work [2]. Axillary lymph node dissection and irradiation may cause arm morbidity, such as oedema, pain, numbness, loss of strength and restriction of shoulder function [3,4]. A frequent

consequence of breast cancer therapy for pre-menopausal women is premature menopause [5,6]. Some of the women in the present study were treated with adjuvant chemotherapy (cyclophosphamide, methotrexate and fluorouracil (CMF)), which is a risk factor for vasomotor symptoms and weight gain. [7].

Quantitative reports on the work status of breast cancer patients are scarce [8]. Previous studies have shown that the ability of cancer survivors to continue their employment appears optimistic. In a recently published article the authors stated that more than 80% of patients returned to work during a period of 18 months after diagnosis [9]. Slightly more survivors were not working three years after diagnosis compared with women never diagnosed with cancer [10]. However, in a mail survey about the effect of the illness on their vocational status, answered by 378 women who had survived breast cancer without recurrence for at least two years, over 40% stated that cancer had altered their priorities or progress at

work [11]. Women treated for breast cancer are also reported to experience an excess of job loss, demotion, unwanted changes in tasks, problems with the employer and co-workers, personal changes in attitudes towards work, and diminished physical capacity [2]. Though several studies have been conducted about the need for social support of cancer patients, the importance of support from their work life has just recently been pointed out [9,12].

The aim of the present study was to investigate whether factors such as tumour stage, type of treatment, age, educational level, matrimonial status and presence of under-age children were associated with long-term problems in returning to work in breast cancer patients. By identifying risk factors, methods of reducing exclusion from the labour market may be found.

Material and methods

From 1990 to 1994 a prospective, multi-centre, randomized trial of different types of adjuvant endocrine therapy was conducted in pre-menopausal women with invasive breast cancer. Four European breast cancer trial groups were involved in the study, the Cancer Research Campaign Breast Cancer Trials Group (CRC BCTG) in the UK, the Stockholm Breast Cancer Study Group and the South-East Sweden Breast Cancer Group, both in Sweden, and the Gruppo Interdisciplinare Valutazione Interventi in Oncologia, in Italy. The design of the Stockholm part of the study has been reported elsewhere in detail [13,14]. A total of 927 patients were included in the Swedish part of the trial.

The inclusion criteria for the trial were histologically verified invasive breast cancer, pre-menopausal status (last menstruation <6 months previously), primary surgery consisting of a modified radical mastectomy or sector resection plus axillary dissection, node-positive axillary nodes or node-negative disease provided the histopathological tumour size was ≥ 10 mm, and no clinical evidence of distant metastases. Exclusion criteria were inoperable breast cancer, prior radiotherapy, prior neo-adjuvant chemotherapy and/or prior endocrine therapy, and current endocrine therapy.

About four weeks after primary surgery the patients were randomly allocated to treatment with tamoxifen, tamoxifen plus the luteinizing hormone-releasing hormone (LHRH) analogue goserelin (Zoladex), goserelin alone or no adjuvant endocrine therapy. The duration of all endocrine treatments was two years. All patients with axillary nodal involvement were offered six courses of adjuvant chemotherapy (CMF). Patients with con-

servative breast surgery received irradiation of the breast parenchyma (50 Gy/5 weeks). Patients with four or more positive axillary lymph nodes were offered radiation therapy to the chest wall and regional lymph nodes (46 Gy/4.5 weeks).

Between 1990 and 1994 patients in five hospitals in the Stockholm area who agreed to participate in the randomized clinical trial were asked to also participate in a study assessing self-reported social factors. The questionnaire included questions related to e.g. sick leave, occupational status, matrimonial status and presence of under-age children. Data concerning medical factors were collected from the regional oncological centre and checked against patient records. The women were also asked to indicate why they had not returned to work. They could choose one or more alternatives among four statements.

A total of 270 of the eligible trial patients participated in the present study. Reasons for non-participation were administrative problems ($n = 27$), language difficulties ($n = 20$) and concurrent disease ($n = 7$). A number of women were excluded because they were not active in the labour market at baseline ($n = 23$). The reasons for not being active in the labour market were early retirement, having been sick-listed or unemployed for a long time, being a housewife or studying. Only 21 women (7% of the 314 women invited) declined to participate.

In conjunction with information about the clinical trial, a nurse informed the women both orally and in writing about the present study. The voluntary aspect of the study was stressed and confidentiality was guaranteed. The study was approved by the Regional Ethics Committee of the Karolinska Institute.

On seven occasions, assessments were made. A pre-assessment was performed 3–4 weeks after surgery – before randomization and therefore prior to any decision about adjuvant systemic treatment. Follow-up assessments were carried out 3–4 months, 12 months, 18 months, 24 months, 30 months and 36 months after randomization. In the present study we used the assessments at 12, 18, 24 and 36 months although the focus will be on the follow-up at 24 months.

In the present study we defined a “return to full-time work” as working at least 75% of the reported rate of employment at baseline. The reason for this was that it was impossible at every assessment to establish exactly what percentage of women worked full-time. Several of the women had schedules that varied over time. We estimated the educational level, basing our estimates on the occupational titles of the women.

The distribution of the independent variables of the women across the randomized groups is shown in Table I (treatment characteristics) and Table II (demographic and social characteristics).

Statistical methods

We used unconditional logistic regression to determine whether the work status for women still alive and free from recurrence 24 months after start of treatment was associated with the type of endocrine treatment. The same procedure was used to analyse the impact of the tumour stage, chemotherapy and radiation, age, educational level, matrimonial status and presence of under-age children on work status. Results are presented as odds ratios supplemented with 95% confidence intervals. Distributional comparisons of the categorical factors and work status were made using the χ^2 test for independence. All data were analysed using SPSS, version 14.0.

Missing values

We assumed that women who had not completed a questionnaire confirming their return to work had in fact not returned to work. Missing values were replaced by the nearest previous value for each woman.

Results

A total of 270 women were eligible for this study. At 12 months 245 were still alive and recurrence-free. Fifty-two of these patients (21%) had not yet returned to work. At 24 months the number of recurrence-free patients was 222 and 35 of these women (16%) had still not returned to work. The number of recurrence-free women at 36 months was 204. Twenty-nine of these patients (14%) had not returned to work. The women participating in the present study had stayed out of the labour market for a total of 1 044 months in the period between 12 and 36 months after baseline. Among the women who

had not returned to work after 24 months a total of 30 were still sick-listed, four were early retired and one had begun to study.

Use of adjuvant endocrine therapy was associated with a twofold increase in the odds ratio of not having returned to work after two years, although the confidence interval for this ratio was wide and included unity (Table III). The result is adjusted for age and treatment factors which were found to covariate. The other factors were not included since they did not influence the result.

Treatment with chemotherapy/nodal status was negatively associated with work status. Neither adjuvant radiotherapy (Table IV) nor age matrimonial status nor presence of under-age children (Table V) was associated with work status. There was a numerical, though not statistically significant, working frequency in favour of patients with more than nine years' schooling (Table V). The results are adjusted for age and treatment.

The women were also asked to indicate why they had not returned to work. The most frequent answer among 35 women who had not returned to work after 24 months was that they were not able to work to the same extent as previously because of the working environment and/or the nature of the work. The second most common reason was physical exhaustion and deterioration after the illness and its treatment (Table VI). Four women, not working at 24 months, stated that environment and/or the nature of the work was the only reason why they had not returned to work.

Discussion

The purpose of this study was to investigate whether factors such as endocrine therapy, tumour stage, treatment with chemotherapy and radiotherapy, age, educational level, matrimonial status and presence of under-age children were associated with long-term problems in returning to work in women randomized to different types of adjuvant endocrine therapy. Special attention was given to the work status

Table I. Treatment characteristics by allocated endocrine treatment among 222 recurrence-free women two years after randomization.

	Control group (n = 50), n (%)	Tamoxifen group (n = 53), n (%)	Goserelin group (n = 55), n (%)	Goserelin + tamoxifen group (n = 64), n (%)
1. Chemotherapy/ nodal status				
No chemotherapy pN0/pT > 10	26 (52)	28 (53)	30 (55)	33 (52)
Chemotherapy (CMF)/pN1-4+	24 (48)	25 (47)	25 (45)	31 (48)
2. Radiotherapy (RT)				
No RT	15 (30)	21 (40)	22 (40)	30 (47)
RT to breast parenchyma	28 (56)	23 (43)	26 (47)	26 (41)
RT to breast/chest wall and regional nodes	7 (14)	9 (17)	7 (13)	8 (12)

CMF - cyclophosphamide, methotrexate and fluorouracil.

Table II. Demographic and social characteristics by allocated endocrine treatment among 222 recurrence-free women two years after randomization.

	Control group (n = 50), n (%)	Tamoxifen group (n = 53), n (%)	Goserelin group (n = 55), n (%)	Goserelin + tamoxifen group (n = 64), n (%)
1. Age at randomization				
Median age 45 yrs, range 29–54 yrs				
<45 yrs	21 (42)	25 (47)	22 (40)	25 (39)
≥45 yrs	29 (58)	28 (53)	33 (60)	39 (61)
2. Educational level				
Nine years of schooling	3 (6)	6 (11)	3 (5)	6 (9)
Upper secondary school	25 (50)	26 (49)	33 (60)	35 (55)
University education	22 (44)	19 (36)	17 (31)	23 (36)
Data missing	0 (0)	2 (4)	2 (4)	0 (0)
3. Matrimonial status				
Single	14 (28)	11 (21)	16 (29)	8 (12)
With husband/partner	35 (70)	40 (75)	38 (69)	55 (86)
Data missing	1 (2)	2 (4)	1 (2)	1 (2)
4. Presence of children <18 years of age				
No child	11 (22)	17 (32)	28 (51)	30 (47)
One or more children	36 (72)	30 (57)	23 (42)	33 (51)
Data missing	3 (6)	6 (11)	4 (7)	1 (2)

after 24 months. The “cut-off-time” for return to work – 24 months after surgery – was chosen since after 24 months all active cancer treatment had been completed and most of the side effects of medical therapies had subsided.

Regarding the finding that adjuvant endocrine therapy was associated with a twofold increase in the odds ratio of not having returned to work after two years. This may be interpreted as a consequence of findings in a study on physical symptoms and perception of anxiety and depressive symptoms, which may be of importance for sick leave, such as mixed physical symptoms and muscle weakness [14].

We also found that nodal status was negatively associated with return to work, possibly because of its association with adjuvant chemotherapy and radiotherapy to the regional nodes. In this material there was 100% correlation between axillary nodal involvement and treatment with CMF owing to

the design of the study. Adjuvant radiotherapy was probably not negatively associated with return to work because patients given radiotherapy only to the breast parenchyma most likely had smaller tumours and were younger.

Patients treated with CMF have reported ongoing problems that may have an effect on work status, such as vasomotor symptoms and weight gain as late as three years after primary therapy [7].

Both surgery and radiotherapy to the regional nodes may cause arm morbidity [3]; while adjuvant radiotherapy to the regional nodes significantly increases arm morbidity [3,15]. Arm morbidity after breast cancer treatment also causes psychological problems and has consequences for daily living as a whole [3,4,15–18].

The treatment received was probably not the only reason why the nodal status was significantly associated with the work status. The knowledge of the greater risk of recurrence because of axillary nodal

Table III. Association between allocated endocrine treatment and work status.

Factor	Not working/Total, n (%)	Odds ratio ¹ (95% CI)	p-value
Allocated treatment			
Control	5/50 (10)	Ref	
Endocrine	30/172 (17)	1.8 (0.7–5.1)	0.24
Tamoxifen	9/53 (17)	1.8 (0.6–6.0)	
Goserelin	8/55 (15)	1.5 (0.5–5.1)	
Tamoxifen + goserelin	13/64 (20)	2.2 (0.7–6.7)	0.60
Total	35/222 (16)		

CI - confidence interval.

¹Adjusted for chemotherapy (CT+, CT–), radiotherapy (RT+, RT–) and age (<45, ≥45).

Table IV. Association between treatments and work status.

Factor	Not working/Total, n (%)	Odds ratio ¹ (95% CI)	p-value
Chemotherapy/nodal status			
No chemotherapy/pN0	12/117 (10)	Ref	
Chemotherapy (CMF)/pN+	23/105 (22)	2.6 (1.2–5.5)	0.017
Total	35/222 (16)		
Radiotherapy (RT)			
No RT	19/88 (22)	Ref	
RT to breast parenchyma	10/103 (10)	0.5 (0.2–1.1)	
RT to breast/chest wall and regional nodes	6/31 (19)	0.6 (0.2–1.8)	0.16
Total	35/222 (16)		

CI - confidence interval; CMF = cyclophosphamide, methotrexate and fluorouracil.

¹Adjusted for other listed factor as well as for (E+, E-) and age (<45, ≥45).

involvement may have had a psychological impact that affected the return to work. However, it was not possible to detect such an association with the design used in this study.

Patients in the present study treated with conservative breast surgery, and with fewer than four positive axillary lymph nodes, received radiotherapy only to the breast parenchyma. These patients seemed to have had a better chance of returning to work within two years of randomization. Factors behind this finding may include lower frequency of treatment with chemotherapy, smaller tumours and fewer arm problems.

We found no association between age and work status. One reason for this may have been the limited age range. Neither matrimonial status nor presence of under-age children was statistically associated with return to work. Since the median age of the

women included was 45 years, the women's children were probably not infants, which may have influenced the result. In an overview of the few studies examining factors that have an impact on return to work, no clear association with sociographic characteristics such as age, education and marital status was found, although it is generally assumed that increased age is an important hindrance to return to work [19].

A limitation of the present study is the small sample size and the fortunate fact that the number of patients who had not returned to work was small. The study may therefore have failed to detect a possible association between the studied factors and the ability to return to work [20]. Another limitation of the study may have been the choice of social factors. For example, low income or physical demands at work (manual work) may be

Table V. Association between demographic/social factors and work status.

	Not working/Total, n (%)	Odds ratio (95% CI) ¹	p-value
Age			
<45 yrs	14/93 (15)	Ref	
≥45 yrs	21/129 (16)	1.0 (0.5–2.2)	0.93
Education			
Nine years' schooling	4/18 (22)	Ref	
Upper secondary school	16/119 (14)	0.6 (0.2–2.1)	
University education	14/81 (17)	0.8 (0.2–2.8)	0.67
Matrimonial status			
Single	6/49 (12)	Ref	
Husband/partner	28/168 (17)	1.3 (0.5–3.4)	0.59
Presence of children <18 yrs old			
No children	15/86 (17)	Ref	
At least one child	17/122 (14)	0.7 (0.3–1.6)	0.44
Total	35/222 (16)		

CI - confidence interval.

Owing to missing information regarding social factors, subgroups in the table do not add up to the total of 222 recurrence-free women.

¹Adjusted for chemotherapy (CT+, CT-), radiotherapy (RT+, RT-) and endocrine treatment (E+, E-).

Table VI. Self-reported reason why the women had not returned to work among women still sick-listed after 24 months.¹

	n = 35	%
I am physically exhausted and deteriorated after the illness and its treatment		
Yes	21	60
No	9	26
Missing	5	14
It is mentally stressful for me to work as much as previously		
Yes	17	49
No	13	37
Missing	5	14
Since my illness I do not regard work as so important for my sense of well-being		
Yes	13	37
No	17	49
Missing	5	14
I am not able to work to the same extent as previously because of the working environment and/or the nature of the work		
Yes	25	72
No	5	14
Missing	5	14

¹Data from eight participants was missing at 24 months and was replaced by the same participants data at 18 month (n = 5) respectively 12 (n = 3).

better associated with an increasing number of problems among respondents of working age than may the respondents' educational level. The level of income probably indicates the participants' vocational motivation and also, the support at their place of work.

Manual work has been reported as being negatively associated with return to work [21,22]. Women treated for breast cancer have reported experiences such as job loss, demotion, changes in tasks, problems with the employer and co-workers, and personal changes in attitudes towards work [2]. These social factors, which have not been examined in the present study, are probably worth further research. The reason why these factors have not been examined in the present study is that all data had already been collected for the study on physical symptoms and perception of anxiety and depressive symptoms when the design of the present study was decided.

The most frequent answer among the women who were still on sick leave after 24 months was that they were not able to work to the same extent as previously due to problems in the working environment and/or the nature of the work. The importance of a supportive working environment has emerged from a Finnish study. Additional emotional and practical support was needed among cancer survi-

vors both from the workplace and from the company health service [12].

Although only 270 patients were included, there are few studies concerning work status in women treated for breast cancer with even such a small number of subjects. Another advantage of the study is that the medical study from which the patients were selected was randomized; also, that this study was based on a full clinical population. The clinical study includes nearly all eligible women treated for breast cancer in the region of Stockholm during the full trial period.

Conclusion

In this randomized trial of pre-menopausal women treated for breast cancer, only chemotherapy/nodal status was significantly associated with return to work.

Relatively few studies have addressed problems with return to work after primary treatment for early-stage breast cancer. More, systematic research using a longitudinal design to also assess other social factors such as vocational motivation, level of income and vocational rehabilitation is needed. Through such research, it will be possible to better distinguish between factors that are and factors that are not associated with problems in returning to work in breast cancer patients. This information could be used to find methods of reducing exclusion from the labour market.

Acknowledgements

We are grateful to the patients for providing important information during their breast cancer treatment. Many thanks go to the nurses involved, for their skilful help with the data collection. We would also like to thank Violet Dahlgren, the employment officer, for her help in estimating the participants' educational levels. The study on physical symptoms and perception of anxiety and depressive symptoms was supported by the Stockholm Cancer Society and the King Gustav V Jubilee Fund, Radiumhemmet, Karolinska Hospital, Stockholm.

References

- [1] Talbäck M, Stenbeck M, Rosén M, Barlow L, Glimelius B. Cancer survival in Sweden, 1960–1998. *Acta Oncol* 2003; 42:637–59.
- [2] Maunsell E, Brisson C, Dubois L, Lauzier S, Fraser A. Work problems after breast cancer: An exploratory qualitative study. *Psychooncology* 1999;8:467–73.
- [3] Nagel PH, Bruggink ED, Wobbles T, Strobbe LJ. Arm morbidity after complete axillary lymph node dissection for breast cancer. *Acta Chir Belg* 2003;103:212–6.

- [4] Lauridsen MC, Christiansen P, Hessov I. The effect of physiotherapy on shoulder function in patients surgically treated for breast cancer: A randomized study. *Acta Oncol* 2005;44:449–57.
- [5] Fenlon D. Menopause: A problem for breast cancer patients. *Eur J Cancer Care (Engl)* 1995;4:166–72.
- [6] Knobf MT. Natural menopause and ovarian toxicity associated with breast cancer therapy. *Oncol Nurs Forum* 1998;25:1519–30. Quiz 1531–2.
- [7] Nystedt M, Berglund G, Bolund C, Fornander T, Rutqvist LE. Side effects of adjuvant endocrine treatment in premenopausal breast cancer patients: A prospective randomized study. *J Clin Oncol* 2003;21:1836–44.
- [8] Maunsell E, Drolet M, Brisson J, Brisson C, Masse B, Deschenes L. Work situation after breast cancer: results from a population-based study. *J Natl Cancer Inst* 2004;96:1813–22.
- [9] Bouknight RR, Bradley CJ, Luo Z. Correlates of return to work for breast cancer survivors. *J Clin Oncol* 2006;24:345–53.
- [10] Drolet M, Maunsell E, Brisson J, Brisson C, Masse B, Deschenes L. Not working 3 years after breast cancer: Predictors in a population-based study. *J Clin Oncol* 2005;23:8305–12.
- [11] Stewart DE, Cheung AM, Duff S, Wong F, McQuestion M, Cheng T, et al. Long-term breast cancer survivors: Confidentiality, disclosure, effects on work and insurance. *Psychooncology* 2001;10:259–63.
- [12] Taskila T, Lindbohm ML, Martikainen R, Lehto US, Hakanen J, Hietanen P. Cancer survivors' received and needed social support from their work place and the occupational health services. *Support Care Cancer* 2006;14:427–35.
- [13] Berglund G, Nystedt M, Bolund C, Sjoden PO, Rutqvist LE. Effect of endocrine treatment on sexuality in premenopausal breast cancer patients: A prospective randomized study. *J Clin Oncol* 2001;19:2788–96.
- [14] Nystedt M, Berglund G, Bolund C, Brandberg Y, Fornander T, Rutqvist LE. Randomized trial of adjuvant tamoxifen and/or goserelin in premenopausal breast cancer – self-rated physiological effects and symptoms. *Acta Oncol* 2000;39:959–68.
- [15] Ververs JM, Roumen RM, Vingerhoets AJ, Vreugdenhil G, Coebergh JW, Crommelin MA, et al. Risk, severity and predictors of physical and psychological morbidity after axillary lymph node dissection for breast cancer. *Eur J Cancer* 2001;37:991–9.
- [16] Maunsell E, Brisson J, Deschenes L. Arm problems and psychological distress after surgery for breast cancer. *Can J Surg* 1993;36:315–20.
- [17] Tobin MB, Lacey HJ, Meyer L, Mortimer PS. The psychological morbidity of breast cancer-related arm swelling. Psychological morbidity of lymphoedema. *Cancer* 1993;72:3248–52.
- [18] Woods M, Tobin M, Mortimer P. The psychosocial morbidity of breast cancer patients with lymphoedema. *Cancer Nurs* 1995;18:467–71.
- [19] Spelten ER, Sprangers MA, Verbeek JH. Factors reported to influence the return to work of cancer survivors: A literature review. *Psychooncology* 2002;11:124–31.
- [20] Bland M. *An introduction to medical statistics*, 3rd ed. New York: Oxford University Press; 2000.
- [21] Satariano WA, DeLorenze GN. The likelihood of returning to work after breast cancer. *Public Health Rep* 1996;111:236–41.
- [22] Weis J, Koch U, Geldsetzer M. Changes in occupational status following cancer. An empirical study on occupational rehabilitation. *Soz Praventivmed* 1992;37:85–95.