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EPIDEMIOLOGY

Trends in return to work of breast cancer survivors

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Abstract Most women interrupt their work activities during the treatment of cancer. This study investigated return to work (RTW) after treatment of breast cancer in the period from January 2002 to December 2008. ArboNed Occupational Health Service records the sickness absence and RTW data of more than one million workers of whom approximately 40% are women. Incident cases of sickness absence due to breast cancer (ICD-10 code C50) were selected from the ArboNed register. Proportions of partial RTW, with 50% of the earnings before sickness absence, and full RTW were determined 1 year after diagnosis. Trends in partial RTW and full RTW were examined by Chi-square trend analysis. The time to partial RTW and full RTW was analysed by Cox regression and stratified by age (<40 years, 40–50 years and >50 years). The proportion of partial RTW was stable around 70% from 2002 to 2008. The proportion of full RTW decreased from 52% in 2002 to 43% in 2008 and showed a linear decline in women of all ages. The time to partial RTW and full RTW in the years 2003–2008 did not change significantly compared with 2002. In the Netherlands, the proportion of employed women who fully resumed working after breast cancer within 1 year of diagnosis has decreased since 2002. These results warrant more epidemiological research to examine the trends in RTW of breast cancer survivors across countries.

Keywords Sick leave · Breast cancer · Return to work · Epidemiology

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Introduction

Breast cancer is the most common malignancy in women of working ages. The majority of women survive because they are diagnosed with early stage disease and receive a treatment that is focused on curing breast cancer and preventing relapse of disease. The age-adjusted 5-year survival varies between European countries from 70% in the Czech Republic and Poland to more than 80% in the Scandinavian countries and the survival rates are increasing [1]. In the Netherlands, the 5-year survival after breast cancer was 77% in 1998, 81% in 2003 and 85% in 2008 [2, 3]. Employed women usually interrupt their work for the treatment of breast cancer. Prolonged sickness absence often generates loss of income and social exclusion. Therefore, return to work (RTW) during or after breast cancer treatment is important, all the more because RTW restores social relations and participation, which adds to the patient's quality of life [4–6].

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The RTW after breast cancer has been studied in different countries with different jurisdictions. In a prospective multicentre study from 1990 to 1994 including research groups from the UK, Sweden and Italy, it was reported that 79% of premenopausal women had returned to work 12 months after the diagnosis of breast cancer and 86% within 36 months of diagnosis [7]. In a Canadian study, 71% of women diagnosed with breast cancer in 1996–1997 resumed work within 12 months of diagnosis and 89% within 36 months [8]. In 2001–2002, 82% of American women had returned to work 18 months after the diagnosis of breast cancer [9]. Recent European studies reported lower percentages of women resuming work after breast cancer. For example, Johnsson et al. [10] found that 59% of 102 Swedish women had returned to work within 10 months of surgery for primary early stage breast cancer. Fantoni et al. [11] found that 54% of 379 women diagnosed with breast cancer in 2004–2005 in France resumed work within 12 months after starting cancer treatment. The different RTW rates may be explained by differences in health care systems and social insurances across countries [12, 13]. In the Netherlands, for example, sickness absence is usually fully compensated by the employer in the first year and up to 70% in the second year, irrespective of the cause of sickness absence. Thus, not only work-related injuries are compensated, but also non work-related disorders such as breast cancer.

Whilst between 2001 and 2005, 63% of employed Dutch women diagnosed with breast cancer returned to work within 12 months of diagnosis [14], 54% resumed work within 12 months of diagnosis between 2004 and 2007 [15]. This may indicate a decrease in RTW of breast cancer survivors. Therefore, the present descriptive epidemiological study investigated the trends in the proportions and time to RTW of women diagnosed with breast cancer in the period from 2002 to 2008.

Method

Study setting and population

ArboNed Occupational Health Service contracts more than 33,000 companies of different economic sectors in the Netherlands to provide employees with occupational health care. ArboNed registers the sickness absence and RTW data of more than one million employees working in these contracted companies. Sickness absence is medically certified by an occupational physician (OP) within 6 weeks of reporting sick. The cause of sickness absence is recorded by the OP according to the World Health Organization's 10th International Classification of Diseases (ICD-10). For this study, incident cases of sickness absence due to OP-certified breast cancer (ICD-10 C50) were selected from the ArboNed register in the period from January 2002 to December 2008. Men who were diagnosed with breast cancer and women with recurrent breast cancer were excluded from analysis as RTW trends in these cases may differ from the trends in primary breast cancer amongst women.

Ethical considerations

Ethical approval was not required because the Act on Scientific Medical Research does not apply to the analysis of register data without involving the employees themselves [16]. All employees consented to the analysis of their sickness absence data when data were registered.

Data analysis

The sickness absence data were retrieved from the ArboNed sickness absence register. Partial RTW was defined as RTW with 50% of the earnings before sickness absence for at least 28 consecutive days. Full RTW was defined as RTW with 100% of the earnings before sickness absence for $\geq$28 consecutive days. Proportions of women with partial RTW and full RTW were analysed 1 year after reporting sick with breast cancer. Trends in the proportions of partial and full RTW were investigated by Chi-square analysis for linear trends stratified by age (<40 years, 40–50 years and >50 years).

The time to partial RTW was examined by Cox proportional hazards regression analysis stratifying for age <40 years, 40–50 years and >50 years. Likewise, the time to full RTW was investigated in a separate Cox regression model. Hazard ratios (HRs) relative to RTW in 2002 and their 95% confidence intervals (CIs) were calculated with HR $<$ 1.0 reflecting a longer time to RTW relative to 2002 and HR $>$ 1.0 a shorter time to RTW relative to 2002.

All statistical analyses were performed in SPSS for Windows version 16, and statistical significance was set at the 5% level ($\alpha = 0.05$).

Results

The incidence of primary breast cancer increased from 101 per 100,000 employed women in 2002 to 124 per 100,000 employed women in 2008, which is in line with the Dutch population incidence of 129 per 100,000 women in 2008. The numbers and age distribution of all employed women and the selected breast cancer cases are presented in Table 1.

Table 1 Study population stratified by age

	2002	2003	2004	2005	2006	2007	2008
Total number of employees	1,011,555	986,340	1,091,578	1,010,686	1,024,100	972,758	1,012,345
Number of women	395,275	391,239	438,115	410,528	419,253	379,175	397,731
<40 years	221,722	214,146	234,755	216,659	215,707	200,967	207,031
40–50 years	108,992	111,299	125,108	117,753	121,751	101,814	108,644
>50 years	64,561	65,794	78,252	76,116	81,795	76,394	82,056
Incident breast cancer cases	398 (1.0‰)	499 (1.3‰)	532 (1.2‰)	494 (1.2‰)	507 (1.2‰)	435 (1.1‰)	492 (1.2‰)
<40 years	88	89	99	102	70	60	76
40–50 years	175	235	234	211	252	211	212
>50 years	135	175	199	181	185	164	204

Proportion of RTW

In the period from 2002 to 2008, the proportion of partial RTW was 65–76% in women aged <40 years, 66–75% in women aged 40–50 years and 68–79% in women aged >50 years. Amongst women aged >50 years at diagnosis there was a declining trend (χ^2 for linear trends $P = 0.037$) in the proportion of partial RTW from 79% in 2003 to 68% in 2008 (Fig. 1). The proportion of partial RTW increased non-significantly ($P = 0.074$) from 66% in 2002 to 74% in 2008 amongst women who were diagnosed with breast cancer between 40 and 50 years of age.

In 2002, 52% of women had full RTW within 1 year of reporting sick with breast cancer as compared to 43% in 2008. Figure 1 shows linear declining trends in the proportion of full RTW in women of all ages. Full RTW in women <40 years decreased from 55% in 2002 to 40% in 2008 (χ^2 for linear trends $P = 0.003$). In women aged 40–50 years, full RTW decreased from 46% in 2002 to 41% in 2008 ($P = 0.042$), and in women >50 years from 59 to 46% ($P = 0.001$).

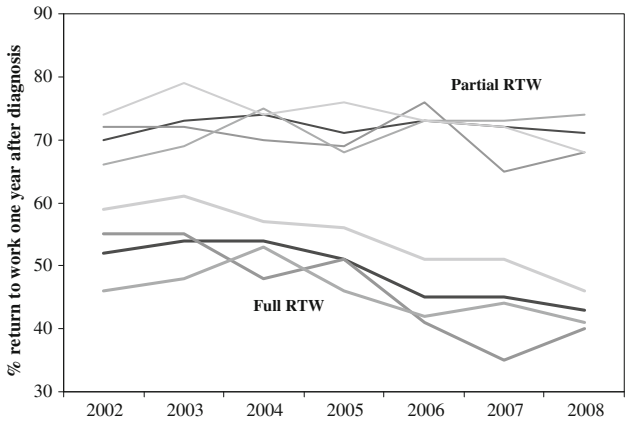

Fig. 1 Trends in return to work (RTW) after the diagnosis of breast cancer from 2002 to 2008**.** The figure shows the percentages of RTW within 1 year of diagnosis of breast cancer in women aged <40 years (*dark grey lines*), 40–50 years (*medium grey lines*) and >50 years (*light grey lines*); the *black lines* reflect the overall RTW percentages 1 year after diagnosis

Time to RTW

The median time to partial RTW was 294 days in 2002 and 282 days in 2008. The time to partial RTW did not change significantly over the years compared with 2002 (Table 2). As shown in Table 3, the median time to full RTW did not change over the years either, although the overall median time to full RTW was borderline significantly ($P = 0.05$) longer in 2008 compared with 2002.

Discussion

Partial RTW 1 year after the diagnosis of breast cancer was more or less stable around 70% in the period from 2002 to 2008, whereas full RTW showed a decreasing trend in women of all ages.

The strength of our study is that it covered a large population of employees working in different economic sectors. Studying registered sickness absence eliminates the recall bias that affects self-reported sickness absence [17, 18]. The sickness absence register study could be performed quickly and inexpensively without the need to involve the employees themselves. The main limitation, however, was that the number of variables available from the sickness absence register was limited. For example, information about work accommodations or placement in another job was not recorded in the register. Furthermore, we had no access to the medical files of the patients. Hence, information on the stage of breast cancer (local, regional or metastatic), type of treatment and persisting limitations and symptoms such as fatigue [19–22], distress [23, 24] and depressive symptoms [21, 25] was not available.

The fact that the sickness absence register contained a limited number of variables impeded the interpretation of the results. Therefore, the decreasing proportions of full

Table 2 Partial return to work with 50% of the earnings before sickness absence within 1 year of breast cancer diagnosis

	2002	2003	2004	2005	2006	2007	2008
Duration to partial RTW							
Median (95% CI) days	294 (261–327)	259 (235–283)	269 (244–294)	274 (241–307)	290 (258–322)	280 (252–308)	282 (247–317)
<40 years	295 (228–362)	283 (231–335)	286 (226–346)	249 (123–375)	298 (170–426)	287 (206–368)	321 (282–360)
40–50 years	329 (283–375)	301 (256–346)	276 (241–311)	312 (264–360)	290 (257–323)	294 (261–327)	280 (241–319)
>50 years	256 (218–294)	215 (184–246)	257 (218–296)	250 (208–292)	277 (219–335)	252 (197–307)	287 (224–350)
Time to partial RTW							
HR (95% CI) Total	1.00	1.10 (0.94–1.29)	1.13 (0.97–1.32)	1.09 (0.93–1.27)	1.09 (0.93–1.27)	1.08 (0.92–1.27)	1.08 (0.92–1.26)
<40 years	1.00	1.04 (0.73–1.47)	1.01 (0.72–1.42)	1.04 (0.74–1.46)	0.97 (0.67–1.40)	0.93 (0.62–1.39)	0.93 (0.65–1.35)
40–50 years	1.00	1.07 (0.84–1.36)	1.30 (1.03–1.65)	1.08 (0.84–1.37)	1.22 (0.97–1.54)	1.19 (0.93–1.51)	1.31 (1.03–1.67)
>50 years	1.00	1.22 (0.94–1.58)	1.00 (0.78–1.30)	1.11 (0.85–1.43)	1.01 (0.78–1.31)	1.03 (0.79–1.34)	0.91 (0.71–1.18)

CI confidence interval; HR hazard ratio

a HR < 1.0 reflects a longer time to RTW relative to 2002 and a HR > 1.0 indicates a shorter time to RTW relative to 2002

Table 3 Full return to work with 100% of the earnings before sickness absence within 1 year of breast cancer diagnosis

	2002	2003	2004	2005	2006	2007	2008
Duration to full RTW							
Median (95% CI) days	351 (338–364)	340 (318–362)	334 (311–357)	353 (332–374)	373 (346–400)	371 (345–397)	390 (358–422)
<40 years	350 (303–397)	340 (306–374)	364 (289–439)	351 (252–450)	430 (318–542)	424 (358–490)	460 (367–553)
40–50 years	365 (358–372)	364 (357–371)	338 (301–375)	382 (340–424)	398 (361–435)	378 (341–415)	393 (362–424)
>50 years	323 (269–377)	281 (244–318)	322 (285–359)	324 (289–359)	341 (310–372)	348 (303–393)	365 (308–422)
Time to full RTW							
HR (95% CI) Total	1.00	1.07 (0.89–1.28)	1.10 (0.92–1.32)	1.01 (0.84–1.22)	0.88 (0.73–1.06)	0.87 (0.71–1.05)	0.83 (0.68–1.00)
<40 years	1.00	1.00 (0.67–1.49)	0.88 (0.59–1.32)	1.02 (0.69–1.51)	0.72 (0.45–1.14)	0.61 (0.37–1.02)	0.67 (0.42–1.06)
40–50 years	1.00	1.08 (0.81–1.43)	1.33 (1.00–1.76)	1.02 (0.76–1.37)	0.95 (0.71–1.27)	0.96 (0.71–1.29)	0.93 (0.69–1.26)
>50 years	1.00	1.14 (0.85–1.52)	0.99 (0.75–1.32)	0.99 (0.74–1.33)	0.89 (0.66–1.20)	0.88 (0.65–1.20)	0.79 (0.59–1.07)

CI confidence interval; HR hazard ratio

a HR < 1.0 reflects a longer time to RTW relative to 2002 and a HR > 1.0 indicates a shorter time to RTW relative to 2002

RTW can not be explained robustly. It is possible that the decreasing proportion of RTW is the result of a change in Dutch disability policies in 2004. Before 2004, sickness absence was compensated by employers for a period of 1 year, and since 2004 sickness absence compensation is granted for a period of 2 year. However, if policy changes were responsible for the decrease in full RTW, then one would also expect a decline in partial RTW, which was not found.

An alternative explanation for the decreasing proportions of RTW 1 year after the diagnosis of breast cancer may be the broadened indication for chemotherapy in the Netherlands amongst young breast cancer survivors [26]. It has been recognized that women who are treated with chemotherapy are less likely to resume their work [7, 9–11, 22, 27, 28]. As chemotherapy delays RTW, one would expect a longer time to partial RTW if the decreasing proportion of full RTW after breast cancer is the result of a more sophisticated adjuvant treatment. The study showed, however, that the time to RTW did not change significantly over the years. Thus, women resume work initially, but it is possible that full RTW is impeded by symptoms persisting after the treatment of breast cancer. Hansen et al. [21] reported that fatigue was most strongly related to work limitations and explained 71% of the symptom burden of employees after the diagnosis of breast cancer. Calvio et al. [24] reported that the symptom burden reduced the performance-based work output of breast cancer survivors. They also showed that breast cancer survivors experienced cognitive difficulties, particularly, due to deficits in memory and executive function [24], whilst work is becoming more and more mentally demanding [29]. Although the

level of job control in the Netherlands is relatively high, work pace and work pressure are increasing, and cancer survivors may feel distressed that they are not able to perform at their pre-diagnosis level [5]. Therefore, women experiencing fatigue, distress and cognitive difficulties may be uncertain to fully resume their work.

Another explanation for the decline in full RTW after breast cancer may be that attitudes towards work have changed after cancer. Breast cancer survivors may put less value on work, and for half of them financial pressure was the primary reason for resuming work [5]. Tiedtke et al. [30] reviewed articles published between 1995 and 2008 on the experiences of breast cancer survivors with RTW. The authors found that women altered their work priorities and ambitions, which was reported by Maunsell et al. [31] as one of the reasons for stopping work after breast cancer.

Finally, it is important to notice that breast cancer survivors receive little advice about returning to work [30]. Work issues were scarcely discussed with treating physicians and in many cases company physicians or insurance physicians followed the patient's wishes, letting them decide for themselves about resuming work [5]. Uncertainty about work ability after treatment and mixed feelings about the work environment may be barriers in the RTW process. A guideline has been developed for Dutch OPs to support cancer survivors in RTW [32]. This guideline accentuates the importance of advising cancer patients about their RTW, taking the influence of physical and psychological limitations on the patient's work ability into account. Implementation of this guideline in daily occupational health practice may improve RTW of cancer survivors in the years to come.

In conclusion, the proportion of women who resume working after breast cancer has decreased in the Netherlands over the period from 2002 to 2008. This warrants more epidemiological research on the trends in RTW in breast cancer survivors across countries. In this study, follow-up of breast cancer survivors was restricted to 1 year, and longer follow-up is needed to provide insight in sustained work beyond 1 year of diagnosis.

Conflict of interest All authors state that they have no financial or other conflicts of interest that might bias their study and contribution to this article.

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