

Predictors of resignation and sick leave after cancer diagnosis among Japanese breast cancer survivors

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Abstract

Background The number of breast cancer patients of working age is increasing in Japan . Consequently, there is a need for support for working individuals concomitantly undergoing breast cancer treatment. The present study aimed to clarify the risk factors for resignation and taking sick leave among breast cancer survivors in continued employment at the time of diagnosis.

Methods As part of a Japanese national research project (Endo-Han), the investigators conducted a web-based survey of cancer survivors (CSs) in 2018. The investigators analyzed the risk factors for post-breast cancer diagnosis resignation and sick leave using a logistic regression model, including age at diagnosis, educational level, cancer stage, surgery, pharmacotherapy, radiotherapy, employment status, and occupational type.

Results 40 of 269 breast cancer survivors (14.9%) quit their job after cancer diagnosis. Predictors of resignation included lower education level (odds ratio [OR]: 3.802; 95%CI: 1.233-11.729), taking sick leave (OR: 2.514; 95%CI: 1.202-5.261), and younger age at diagnosis (OR: 0.470; 95%CI: 0.221-0.998). Of 229 patients who continued working, sick leave was taken by 72 (31.4%); having surgery was a predictor for taking sick leave (OR: 8.311; 95%CI: 1.007-68.621).

Conclusions 14.9% of Japanese employees quit their jobs after being diagnosed with breast cancer. Being younger at breast cancer diagnosis, having lower educational attainment level, and utilizing sick leave were identified as predictors of post-cancer diagnosis resignation. Surgery was associated with the highest risk of taking sick leave. Breast cancer survivors exhibit higher risks for resignation, and may require more carefully follow-up after diagnosis by healthcare providers and employers to protect work sustainability.

Background

Both 5-year survival rates, as well as the number of breast cancer survivors (BCSs), continue to steadily rise in Japan due to advances in treatment and early detection (1). As breast cancer survival rates have increased, more attention has turned to issues surrounding BCSs' quality of life (QOL), including palliative care, mental health, and employment (2–5). In 2015, approximately 55.5% of the 83,959 breast CSs belonged to a working-age group, typically defined as 20–64 years old in Japan, representing the highest proportion of working-age individuals among all cancer types (6). As the number of working women has been increasing in Japan (7), it is expected that more working-age women will be diagnosed with breast cancer, following trends seen in Western countries (8–10). In 2019, the Japanese Ministry of Health, Labour and Welfare (MHLW) published the guidelines outlining support for individuals undergoing therapy during working life, in order to help employers to better support employees with cancer (11).

Maintaining employment after a breast cancer diagnosis remains an important issue, not only for BCSs and their families, but also for employers and society (12). Previous studies suggest that maintaining employment after a breast cancer diagnosis is affected by three primary domains: personal factors

including age, sex, education; clinical factors including cancer site and stage; and work-related factors such as company size and social support resources (9, 12, 13). While return to work after therapy is undoubtedly challenging due to a variety of factors, not least of which may be trying difficult physical symptoms (e.g., cancer-related fatigue, pain, hair loss, nausea, etc.) (14), however, unemployment after breast cancer diagnosis has also been shown to reduce QOL (2–4) and previous studies report that BCSs are more likely to be unemployed (15, 16). Contributing to this, breast cancer has shown to be associated with long return-to-work (RTW) times, as well as a lower cumulative RTW rate compared to individuals with gastric or female genital cancer (17). Moreover, predictors of work cessation (resignation) among BCSs include contract or part-time work with these types of employees demonstrating higher odds of resignation compared to regular and full-time workers (18).

The relationship between resignation and treatment modality or individual factors has not been fully clarified, with less attention focused on predictors of resignation and sick leave (SL) use among BCSs in Japan. The objective of this study was to clarify predictors for resignation and use of SL among patients in continued employment at the time of the survey. By specifying these predictors, this study will provide evidence for helping physicians, healthcare staff, and employers to establish and improve their work support system for BCSs.

Methods

Subjects in this study

This study was part of a national research project, the Work Sustainability and Return to Work among Japanese CSs (Endo-Han), commissioned by the MHLW of Japan. The project developed a questionnaire asking for information about the following factors: age at time of diagnosis; education level; cancer stage; treatments including surgery, cancer pharmacotherapy, and radiotherapy; employment status and type (permanent vs. non-permanent work); occupational type (office vs. manual labour); history of SL use and resignation. Women aged 18–65 years who had been diagnosed with breast cancer for the first time at least 1 year previously were eligible for participation. This tool, available as an online questionnaire in Japanese, was sent via e-mail on January 17–18, 2018 to 4,969 BCSs aged 18 to 69, who had registered with Macromill, a commercial cancer panel ().

515 eligible BCSs completed the questionnaire (response rate: 10.4%). As shown in Fig. 1, 138 were subsequently excluded, having been diagnosed within the previous 12 months or ≥ 121 months earlier. Respondents who were not working at the time of breast cancer diagnosis ($n = 45$), had missing data ($n = 2$), had a history of cancer other than breast ($n = 28$), or provided unclear answers regarding use of SL ($n = 33$) were excluded. As a result, study pooled analyses was performed on 269 respondents. Subgroup analyses of predictors of SL excluded 40 patients who resigned without SL use. Patients who reported continuing to work after breast cancer diagnosis without taking any time off, or those reporting return to work following diagnosis after taking time off using annual paid vacation allowance (annual leave), were classified into the *nosick* \leq *ave* group. Patients who responded that they returned to work after taking

time off for recuperation using SL, unscheduled absences, or leaves of absence due to insufficient annual paid vacation time were classified into the *sick* \leq *ave* group.

Statistical analysis

Risk factors for resignation were analyzed after classifying patients into continued employment versus resignation groups. The chi-squared test and multiple logistic regression analysis were performed with covariate independent variables comprising age at time of diagnosis (< 47 versus \geq 47 years: median), educational attainment (higher education level [university, graduate school] vs lower education level [junior college, vocational school, high school]); cancer stage (early [0, I] versus advanced [II, III, IV]); receipt of surgery (yes / no); receipt of cancer pharmacotherapy (yes / no); receipt of radiotherapy (yes / no); employment status (permanent versus nonpermanent [contract, temporary, other]); occupation type (office work versus non-office work); and taking SL (yes / no). The dependent variable was defined as continued employment versus resignation.

In subanalysis of the continued employment group, risk factors for taking SL were explored after classifying patients into no sick leave versus sick leave groups. As for analysis of risk factors for SL, chi-square test and multiple logistic regression analysis were performed with the above covariate independent variables, defining taking SL (yes / no) as the dependent variable. Data were analyzed using SPSS Statistics for Windows ver. 25 (IBM Corp. Armonk, NY, USA), with significance set at $p < 0.05$ for all tests. This study was approved by the Juntendo University Ethics Review Committee (Approval No. 2018042).

Results

Of the 269 BCSs analyzed, 40 BCSs (14.9%) resigned from their jobs after being diagnosed with cancer (Table 1). Median patient age at time of cancer diagnosis was 46.0 years (range:19–64). A total of 73 patients (27.1%) had attained a higher level of education. Cancer stage was low for 163 (60.6%) patients and high for 106 (39.4%). With regard to treatment methods, surgery, cancer pharmacotherapy, and radiotherapy were received by 250 (92.9%), 199 (74%), and 174 (64.7%) patients, respectively. Multivariate logistic regression analysis regarding risk factors for resignation identified significant odds ratios (ORs; 95% confidence intervals [CIs]) for the following three factors: lower education level (OR: 3.802; 95%CI: 1.233–11.729; $p = 0.020$), taking SL (OR: 2.514; 95%CI: 1.202–5.261; $p = 0.014$), and age \geq 47 years (OR: 0.470; 95%CI: 0.221–0.998), as shown in Table 2.

Table 1
Basic characteristics of analyzed respondents (n = 269)

Variable		Resigned (n = 40)	Not resigned (n = 229)	P- value
		n(%)	n(%)	
Age at time of diagnosis				
	< 47 years	26(65.0)	117(51.1)	0.104
	≥ 47 years	14(35.0)	112(48.9)	
Educational level				
	Higher	4(10.0)	69(30.1)	0.007*
	Lower	36(90.0)	160(69.9)	
Cancer stage				
	Early	18(45.0)	145(63.3)	0.029*
	Advanced	22(55.0)	84(36.7)	
Surgery				
	No	1(2.5)	18(7.9)	0.325
	Yes	39(97.5)	211(92.1)	
Pharmacotherapy				
	No	9(22.5)	61(26.6)	0.582
	Yes	31(77.5)	168(73.4)	
Radiotherapy				
	No	17(42.5)	78(34.1)	0.303
	Yes	23(57.5)	151(65.9)	
Type of employment				
	Permanent worker	17(42.5)	100(43.7)	0.891
	Non-permanent worker	23(57.5)	129(56.3)	
Occupation type				
	Desk work	17(42.5)	143(62.4)	0.018*
	Non-desk work	23(57.5)	86(37.6)	

Variable		Resigned (n = 40)	Not resigned (n = 229)	P- value
Sick leave				
	No	17(42.5)	157(68.6)	0.001*
	Yes	23(57.5)	72(31.4)	

Table 2

Univariate and multivariate logistic regression analysis regarding risk factors for resignation

		Univariate		Multivariate	
		OR(95%CI)	p-value	OR(95%CI)	p-value
Age at time of diagnosis	< 47	1 (ref)		1 (ref)	
	≥ 47	0.563(0.279–1.132)	0.107	0.470(0.221–0.998)	0.050*
Highest education level	Higher	1 (ref)		1 (ref)	
	Lower	3.881(1.330–11.325)	0.013*	3.802(1.233–11.729)	0.020*
Cancer stage	Early	1 (ref)		1 (ref)	
	Advanced	2.110(1.071–4.158)	0.031*	1.989(0.875–4.518)	0.101
Surgery	No	1 (ref)		1 (ref)	
	Yes	3.327(0.432–25.649)	0.249	3.115(0.357–27.154)	0.304
Pharmacotherapy	No	1 (ref)		1(ref)	
	Yes	1.251(0.563–2.777)	0.583	0.923(0.345–2.468)	0.873
Radiotherapy	N	1 (ref)		1 (ref)	
	Yes	0.699(0.353–1.385)	0.304	0.746(0.345–1.611)	0.455
Type of employment	Permanent worker	1 (ref)		1 (ref)	
	Non-permanent worker	1.049(0.532–2.068)	0.891	0.655(0.306–1.402)	0.276
Occupation type	Desk job	1 (ref)		1 (ref)	
	Non-desk job	2.250(1.138–4.447)	0.020*	1.898(0.906–3.973)	0.089
Sick leave	No	1 (ref)		1 (ref)	
	Yes	2.950(1.485–5.859)	0.002*	2.514(1.202–5.261)	0.014*

Of 229 BCSs who did not resign, 72 BCSs (31.3%) utilized SL due to cancer treatment (Table 3). Multivariate analysis regarding risk factors for taking SL demonstrated significance only for receipt of surgery, with an OR of 8.311 (95%CI: 1.007–68.621; $p = 0.049$) on multiple logistic regression analysis, as shown in Table 4.

Table 3
Patients not resigning after breast cancer diagnosis

		Sick leave	No sick leave	P-value
		n (%)	n (%)	
Age at time of diagnosis	< 47	37 (51.4)	80 (51.0)	0.951
	≥ 47	35 (48.6)	77 (49.0)	
Educational level	Higher	19 (26.4)	50 (31.8)	0.403
	Lower	53 (73.6)	107 (68.2)	
Cancer stage	Early	39 (54.2)	106 (67.5)	0.052
	Advanced	33 (45.8)	51 (32.5)	
Surgery	No	1 (1.4)	17 (10.8)	0.015*
	Yes	71 (98.6)	140 (89.2)	
Pharmacotherapy	No	16 (22.2)	45 (28.7)	0.306
	Yes	56 (77.8)	112 (68.6)	
Radiotherapy	No	25 (34.7)	53 (33.8)	0.886
	Yes	47 (65.3)	104 (66.2)	
Employment status	Permanent worker	26 (36.1)	74 (47.1)	0.118
	Nonpermanent worker	46 (63.9)	83 (52.9)	
Occupation type	Desk job	39 (54.2)	104 (66.2)	0.080
	Non-desk job	33 (45.8)	53 (33.8)	

Table 4

Univariate and multivariate logistic regression analysis regarding risk factors for taking sick leave

		Univariate		Multivariate	
		OR(95%CI)	p value	OR(95%CI)	p-value
Age at time of diagnosis	< 47	1 (ref)		1 (ref)	
	≥ 47	0.983(0.562–1.717)	0.951	0.777(0.432–1.396)	0.398
Educational level	Higher	1 (ref)		1 (ref)	
	Lower	1.303(0.700–2.429)	0.404	1.202(0.624–2.316)	0.583
Cancer stage	Early	1 (ref)		1 (ref)	
	Advanced	1.759(0.993–3.114)	0.053	1.545(0.818–2.919)	0.180
Surgery	No	1 (ref)		1 (ref)	
	Yes	8.621(1.125–66.099)	0.038*	8.311(1.007–68.621)	0.049*
Pharmacotherapy	No	1 (ref)		1 (ref)	
	Yes	1.406(0.731–2.706)	0.307	0.969(0.454–2.069)	0.935
Radiotherapy	No	1 (ref)		1 (ref)	
	Yes	0.958(0.533–1.724)	0.886	0.884(0.467–1.672)	0.704
Employment status	Permanent	1 (ref)		1 (ref)	
	Nonpermanent	1.577(0.889–2.800)	0.120	1.373(0.751–2.508)	0.303
Occupation type	Desk job	1 (ref)		1 (ref)	
	Non-desk job	1.660(0.939–2.935)	0.081	1.457(0.793–2.677)	0.225

Discussion

As far as we know, this is the first Japanese study to investigate resignation rate and SL rate in breast cancer patients by national research project of the MHLW. This study revealed that 14.9% of Japanese female breast cancer survivors quit their jobs after being diagnosed with cancer, while the post-cancer diagnosis resignation rate differed significantly according to educational level, cancer stage, and

occupational type. As Boer's systematic review reported that CSs were more likely to be unemployed compared to healthy controls (33.8% vs. 15.2%; pooled relative risk: 1.37) (19), it is important that developed countries support CSs to avoid potentially high numbers of resignations (20). This study showed that predictors for resignation after breast cancer diagnosis were age at diagnosis, lower levels of educational attainment, use of SL; predictors of taking SL were limited to having undergone surgical intervention. We speculated that highly educated or sick leaved CSs might be confounded by being able to easily access the SL scheme for workers at larger companies.

Regarding predictors of resignation after breast cancer diagnosis, the present study demonstrates that younger BCSs resigned more frequently than those in the older age group. These findings contradict those of previous studies in which older age was associated with difficulty continuing work and higher risk of unemployment (20). Our data may suggest that older people may be more reticent to resign their jobs, given typical age-associated difficulties in finding new employment. Older people may have more knowledge and technology compared to younger people [20, 22]. Further studies exploring the reasons behind resignation are warranted.

Secondly, patients with a lower educational attainment were at higher risk for resignation compared with those with higher educational attainment. Our findings are consistent with previous studies in non-Asian populations (12, 21–25). However, comparison of resignation rates with other countries studies warrants careful consideration, given important differences in socioenvironmental factors, including widely differing national systems regulating provision of medical leave, as well as availability of company-based healthcare resources (26). In addition, income correlates with levels of educational attainment, while lower income also associated with increased likelihood of resignation and unemployment among breast cancer patients (12, 22, 27–29). Furthermore, education attainment is likely related to occupation type, with less educated individuals more likely to be working in physically demanding jobs such as manual labor (30). A MHLW survey in Japan showed that people with lower levels of education were more likely to work in physically demanding jobs such as hospitality and wholesale and retail trades (31). Employees in more physically demanding jobs such as manual labor and blue-collar work are more susceptible to resignation (12, 22, 25, 32, 33). The findings from the present univariate logistic regression analysis also demonstrated a higher risk of resignation among patients in non-desk jobs. Petersson et al. reported that a higher education level was related to greater dedication to work, while RTW was earlier in patients who valued their work more highly (34, 35).

Thirdly, our study showed that the risk of resignation among BCSs who utilized SL after breast cancer diagnosis was substantially higher than those who did not. These findings are consistent with previous studies showing a correlation between length of SL and RTW, with longer SL making RTW and continued employment more difficult (36, 37). Conversely, Azarkish et al. reported no relationship between taking SL and job loss (24). Longer SL is reported to be associated with more invasive treatment, advanced breast cancer, and economic deprivation, all of which are factors related to unemployment (22, 37, 38).

Regarding predictors of SL utilization, our findings showed that BCSs who underwent surgery took SL more frequently than those who underwent non-surgical interventions. The distinction between BCSs who underwent surgery and who do not mean those who have advanced stage or not, because, except for stage IV where distant metastasis is apparent, almost all BCSs experience surgery in general. Previous studies reported that breast cancer surgery was associated with SL lasting 1 month or longer (39, 40), while median duration of hospitalization among BCSs were reported to be about 6.79–10.37 days in Japan (41). Surgical treatment may result in challenging sequelae including scar pain and reduced range of motion, particularly in the arm and chest region, fatigue, and lymphedema; these symptoms increase the time to RTW and are related to unemployment(41). Wennman-Larsen et al. reported that arm morbidity shortly after surgery affected 10% of BCSs, and that 60% of those patients were on SL; SL was linked to arm morbidity, axillary clearance, and strenuous work posture (42). More invasive surgery is related to more advanced breast cancer, which caused longer SL (38). Petersson et al. proposed that various side effects due to surgery influenced impaired work capacity and lead to longer SL in occupations requiring strenuous work postures (43). Our study revealed no statistically significant association between occupation type and SL.

Our study has some limitations that warrant note. First, recall bias is possible given the nature of the self-reported questionnaire tool. In particular, as the cognitive function may be adversely affected by some forms of treatment, some respondents were unable to remember when they were diagnosed with breast cancer, and were unable to report how their work changed after cancer diagnosis. Second, this study was affected by survivorship bias, a form of selection bias, as BCSs who died before completing the questionnaire were not included. We speculate that the resignation rate among BCSs is underestimated due to the death of a breast cancer patients who left their jobs soon after breast cancer, especially in cases of advanced-stage disease. In addition, younger patients may feel more comfortable than older patients given the online delivery and design of the survey. Finally, our sample size was small, with a large number of respondents ultimately excluded from analysis; large scale further investigation is required to corroborate our results.

Conclusion

To our knowledge, this was the first study to investigate the risk factors for resignation and taking SL after breast cancer diagnosis in Japan. 14.9% of Japanese employees quit their jobs after being diagnosed with breast cancer. Being younger at breast cancer diagnosis, having lower educational attainment level, and utilizing SL were identified as predictors of post-cancer diagnosis resignation. Surgery was associated with the highest risk of taking SL. Those BCSs with higher risks for resignation after breast cancer diagnosis warrant particular attention regarding an appropriate and realistic balance between cancer treatment and professional duties and require more careful follow-up by healthcare providers and employers with regards to their work sustainability.

Abbreviations

BCSs
Breast cancer survivors
QOL
Quality of life
RTW
Return to work
SL
Sick leave

Declarations

Ethics approval :

The medical ethics committee of Juntendo University informed us that ethical approval and consent was not required and because the data were existing data that were anonymous and impossible to concatenate, and no associated correspondence table exists, according to national guidelines(44).

Competing interests:

The authors declare that they have no conflicts of interest.

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Authors' contributions:

KM contributed to the conception, analyzing data, drafting manuscript. ME designed the work, obtained funding, acquired the data, drafted manuscript, and revised critically. YI, YU, HO, GM, YY, GD, YT, ST, TT, KN, MS, and AK made the questionnaire, collected the data, and reviewed the manuscript critically. All authors have read and approved the manuscript, and ensure that this is the case.

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Availability of data and material: It is not possible to share data of this study publicly. The datasets analyzed during the current study are not publicly available. We had this study data supporting the results reported in the article.

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Figures

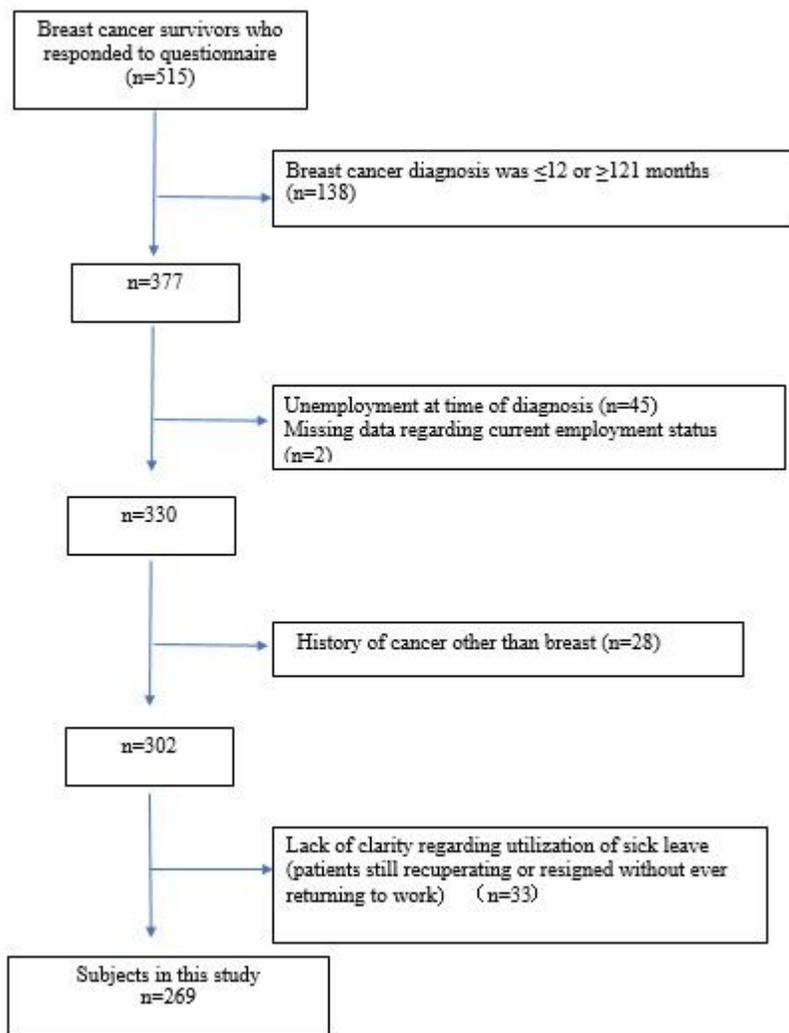


Figure 1

Flowchart of participant selection