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A comparative study of cancer patients with short and long sick-leave after primary treatment

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Abstract

Background. Sick-leave after primary cancer treatment has hardly been studied. This study compares Norwegian cancer patients (CPs) with shorter (≤8 months) and longer (≥9 months) sick-leave after primary cancer treatment. Our aim was to characterize factors associated with these two types of sick-leave in order to identify possible factors for interventions by which long-term sick-leaves may be avoided. *Methods.* A mailed questionnaire was completed by a sample of Norwegian CPs 15 to 39 months after primary treatment of the ten most common invasive types of cancer. The groups with shorter (n=359) and longer (n=481) sick-leaves (SSL vs LSL) were compared with each other by self-reported information as to socio-demographic and cancer-related variables, health, quality of life, work ability, work situation and supportive interventions. *Results.* The LSL consisted of 78% females, and 76% of them had breast or gynaecological cancer. A higher proportion of patients with low level of education, economical problems, treated with chemotherapy, hormones and multimodal treatment belonged to LSL compared to SSL. Significantly more LSL had recurrences of cancer, co-morbidity, regular use of medication, and poorer self-rated health, quality of life and work ability. Compared to SSL, more LSL reported needs for and offers of supportive care such as physiotherapy, physical activities and psychosocial support. A multivariate regression analysis showed that reduced work ability, changes in employment due to cancer, lack of support from supervisors at work, and having had combined treatment were significantly associated with being LSL. *Conclusions.* Longer sick-leave after primary cancer treatment is associated with combined cancer treatment, lack of support from supervisors and reduced overall work ability. Interventions and counselling related to the work place and reduced work ability could be of value for prevention of long-term sick-leaves.

The population of surviving cancer patients (CPs) is increasing due to improved diagnostic and treatment procedures of cancer. Although cancer primarily is a disease of the elderly, a considerable proportion of CPs is members of the work force when they are diagnosed [1,2]. Being able to work after treatment is important both for getting back to optimal patterns of daily life, and for self-respect, identity, and living conditions. Employment is also important for society due to both economical and social reasons [3–5]. Studies indicate that 60 to 85% of CPs goes back to work when their work ability has recovered [6–10]. *Work ability* is defined as the combination of a person's mental and somatic health, plus the social skills needed for doing any kind of paid work or self-employment, and the ability is usually self-rated in relation to current demands at the workplace [11–13].

A recent study of CPs with mixed cancer diagnoses from the Netherlands found that self-assessed work ability after six months on sick-leave was a strong predictor of return to work even after correction for age and treatment types [10]. In the Netherlands, Roelen et al. [14] found that 37% of women treated for breast cancer had sick-leave for longer than one year, and 12% longer than two years. In a recent study from France high rates of sick-leave were associated with excess mortality among employees with chronic conditions such as cancer, depression, asthma and hypertension, [15]. A Norwegian register study from 2003 reported that after nine months of sick-leave the

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risk for future disability pension increased with 40% compared to a shorter sick-leave period [16]. However, in general there seem to be relatively few studies which have investigate the time period on sick-leave as stated in a recent review of employment and work-related issues in cancer survivors [17].

In Norway sick-leave is granted when the following criteria are fulfilled: 1) Holding paid work or self-employment before the diagnosis. 2) Reduced work ability caused by a person's diseases, illnesses or injuries. The sick-leave compensation benefit is identical to the ordinary salary with an upper limit of six times the basis of Norwegian national insurance amount [from May 2009 NOK 437 286 (EUR 49 997) for 52 weeks (300 working days)]. This benefit implies that most individuals do not get their wages reduced when they are on sick-leave. To qualify for another 52 week period of sick-leave, the person must be working continuously for a period of ≥26 weeks after termination of the previous sick leave period. The sick-leave benefit can be graded from 20 to 100% [18,19].

The present study is part of a Norwegian project examining the living conditions of cancer patients within working age using registry data, qualitative interviews, and mailed questionnaires [20]. The study was commissioned by the Norwegian Cancer Society, and practically the project was carried out by the Fafo Institute for Labour and Social Research and the Faculty of Health Science at Vestfold University College. The aim of the present questionnaire study was to examine the living conditions of cancer patients within working age in a sample diagnosed and treated in 2005 and 2006 and followed-up in April 2008 (follow-up time 15 to 39 months from diagnosis).

The aim of this study was to identify factors associated with long-term sick-leave after diagnosis of cancer in patients who were employed at the time when they started treatment. Long total sick-leave times was defined ≥9 months total sick leave time (the long-term sick leave group, LSL), while short sick-leave time defined as ≤8 months total sick leave time (the short-term sick-leave group, SSL) was used as contrast group. The separation at ≥9 months was chosen of two reasons: 1) the response alternatives in our questionnaire were categorical (≤1 month, 2–4 months, 5–8 months, 9–12 months or >12 months), and 2) As documented by previous research [16] the risk for disability pension increases considerably after nine months of sick-leave. Based on 1) and 2), we decided to use a cut-off at nine months, particularly since we did not find a generally accepted definition of long-term sick-leave in the literature [16].

Based on our definitions of LSL and SSL we compared these groups concerning: a) socio-demographic and cancer-related variables; b) current self-rated health and overall quality of life; c) self-rated work ability, change in work situation, and social support at work. Our hypothesis was that LSL would be associated with worse situation in a) – c) compared to SSL.

Material and methods

Patient sampling

In cooperation with the Cancer Registry of Norway a sample of to 2 848 CPs who had been treated at four hospitals (Ullevaal University Hospital, Oslo, Haukeland University Hospital, Bergen, St. Olav's University Hospital, Trondheim, and Vestfold Hospital, Tønsberg) were eligible for the survey. The eligibility criteria were: 1) Age between 25 and 60 years at the time of cancer diagnosis; 2) Diagnosed with first ever cancer between January 1, 2005 and December 31, 2006; 3) Their diagnosis belonged to one of the ten most common invasive cancer types among males and females in Norway (in total 15 types of cancer) (Table I).

In order to omit CPs considered ethically inappropriate to address or not accountable, the following exclusion criteria were applied by the patient-responsible doctors at the four hospitals: 1) Recent death; 2) Not informed about their cancer diagnosis; 3) Too ill to receive the questionnaire; 4) Mental retardation or severe mental disorders; and 5) Lack of sufficient knowledge of Norwegian language. Three hundred and twenty six CPs were excluded by the doctors during the autumn of 2007, and the questionnaire was then sent to the 2 522 eligible CPs in February and March 2008, and the survey was terminated in April 2008. Thirty-six questionnaires were returned due to unknown address (n=29), or for other reasons such as a statement of not having cancer (n=7). Among the remaining 2 486 CPs, 1 343 (54%) returned completed questionnaires. No reminder was send to CPs who did not return the questionnaire.

This sub-study therefore started with 1 343 CPs, and among them 228 (17%) were not employed at diagnosis, and therefore excluded, while 1 115 (83%) were employed. Further, we excluded 275 (25%) CPs employed at diagnosis, but not at survey. The reasons termination of employment were: unemployment (n=18); disability pension (n=65); rehabilitation benefit (n=98), homemakers (n=16), being student (n=10), various other reasons (n=15) and missing data (n=53) (Figure 1). The sample of this sub-study therefore consists of 840 (63%) CPs reporting full or part time employment or self-employment both at the time of diagnosis and at the time of survey. Separately we also investigated the subgroup of 640

(76%) CPs, who at survey reported on changes at their workplace from diagnosis to survey.

Questionnaire variables

The questionnaire used in the survey was developed Fafo and the Faculty of Health Science at Vestfold University College. Some of the questions have been used in other surveys by Fafo, Statistics Norway, or by the Nordic Study Group of Cancer and Work Life (NOCWO) [19–21] while other parts were newly designed for this survey. The questions on sick-leave time, socio-demographic, rehabilitation issues and changes at work place due to cancer were among the new questions.

Duration of sick-leave. Long and short sick leave time was based on self-reported total time of sick leave periods between diagnosis and the survey according to four time categories. We dichotomized the accumulated time on sick-leave into the SSL and LSL groups, with 359 (43%) CPs in the SSL group, and 481 (57%) CPs in the LSL group respectively.

Socio-demographic and cancer-related variables. Level of basic education was rated at four levels and dichotomized into lower level (≤12 years) and higher level (>12 years), and *civil status* was dichotomized into paired (married, cohabiting) and non-paired [single, separated, divorced, widow(er)]. *Children present in the household* was dichotomized into children <18 years (yes or no), since 18 years being the legal age for termination of official parental responsibilities in Norway. *Economic problems* were present if the patients often/sometimes had experienced problems to pay for regular expenses during the last 12 months (versus seldom/never).

Fifteen *cancer types* were self-reported, and they were grouped into breast, gynecological, prostate and testicular, colo-rectal, lymphomas, melanomas, and other types of cancer. *Time since diagnosis* until return of the questionnaire was given in months, and *recurrence of cancer* as yes or no. *Types of treatment* were self-reported, and the response alternatives were surgery, radiotherapy, chemotherapy, hormone treatment, and other medical treatment. Report of two or more treatment alternatives were classified as *combined treatment.*

Health and quality of life related variables. *Self-rated health status* was based on a Likert scale with five response alternatives ranging from "very good" (1) to "very bad" (5) which was dichotomized into "very good/good" versus "moderate/bad/very bad". *Overall quality of life* was based on the response to the question: "Taking everything into consideration, how do you feel your life is?" rated on a Likert scale with five response alternatives ranging from "very good" (1) to "very bad" (5), which was dichotomized into two categories good ("very good/good") versus not so good ("moderate/bad/very bad"). The numbers of co-morbid diseases was based on the response alternatives of the Work Ability Index [12,21] and concerned: injuries, musculoskeletal diseases, cardiovascular diseases, respiratory diseases, mental disorders or several mental health problems, metabolic diseases, neurological or sensory diseases, or other severe diseases. The total number of co-morbid diseases was dichotomized into none or *≥1 co-morbid diseases*. *Use of medication* was dichotomized into regular ("yes every day" and "not regular use") versus "no use" concerning: analgesics, psychotropics (hypnotics, sedatives, and/or anti-depressants), antihypertensives, cholesterol-reducers, anti-allergic medication, or other drugs.

The question *"How much need did you have for rehabilitation services due to cancer"* had seven alternatives: need of physiotherapy, staying at recreation institution, psychological counselling, occupational therapy, group based patient support, physical activity (not physiotherapy), and counselling by social worker. For each alternative there were three rating alternatives: "not needed", "somewhat

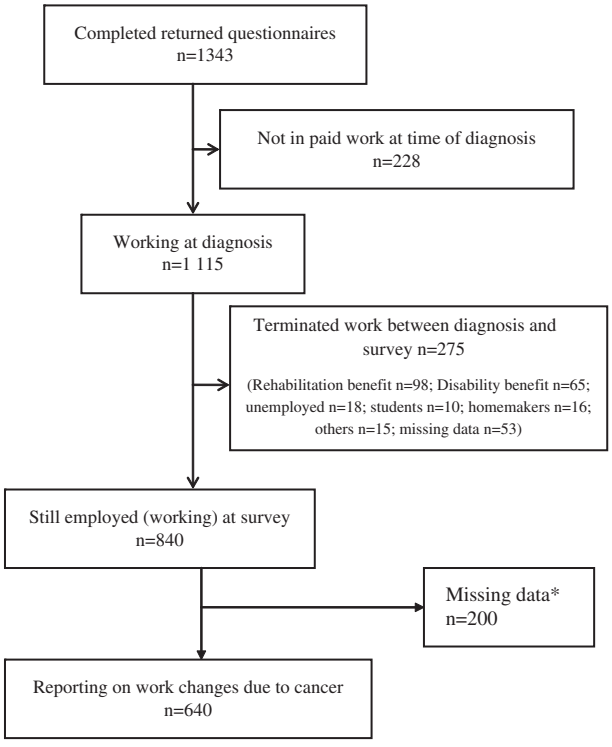

Figure 1. Flowchart of procedures and response rates. *Cancer survivors not responding on questions concerning change at work due to cancer. Most probably they did not respond to these questions as their work situation has not changed due to cancer.

needed", and "absolutely needed", which were recoded into "not needed" versus "somewhat or absolutely needed". These service alternatives were reclassified into *physiotherapy and physical activities* (stay at recreation institution, occupational therapy, and physical restorative activities) and *psychosocial support* (psychological counselling, group based patient support and counselling by social worker), and dichotomized into yes versus no for needed service.

O*ffered and used rehabilitation* was based on the question if and to what extent the patients had used the same types of supportive activities with the following response alternatives: "not offered", "offered, but not used", "used a little", and "used very much". The alternatives were dichotomized into "not offered/ offered, but not used" versus "used a little/used very much".

Work ability and work-related issues. Work ability issues were measured by the Work Ability Index, a self evaluating instrument where employees evaluate their own subjective experience of their work ability [12,21,22]. We used the following questions: *Overall current work ability* (OCWA) concerned the survivors' evaluation of their current work ability compared to their lifetime best from 0 ("completely unable to work") to 10 ("work ability at its best in *my lifetime"*). *Current physical and mental work ability* were rated on 5-point Likert scales based on two statements, if they were able to cope either with the physical or mental work demands as 1 ("agree a lot") to 5 ("disagree a lot"). These ratings were dichotomized into "very good/rather good" versus "moderate/rather poor/very poor" [12].

The participants were also asked if their *reduced physical or mental work ability was caused by cancer* which was rated on 5-point Likert scales and dichotomized in the same way. The number of *working hours each week at the time of diagnosis and at survey* was reported. We also asked if the cancer disease had an impact on the survivors' work ability, and the responses were dichotomized as yes or no.

Social support at work was measured by The Structural-Functional Social Support Scale (SFSS), a multidimensional instrument especially addressing the structural (social network) and functional aspects of social relationships of people with severe diseases [13,20,23,24]. The SFSS measures the amount of perceived social support at work given by supervisors and colleagues scored on 5 point Likert scales from "agree a lot" (1) to "disagree a lot" (5). Support from supervisors concerned: 1) "kept contact while ill", 2) "showed care and understanding", 3) "gave good advice", 4) "took the illness into consideration", and support from colleagues: 1) "kept contact during illness" and 2) "showed care and understanding". Higher score indicated lack of support (more disagreement to the statement).

The participants were asked about changes at the work place due to the cancer such as "change of works tasks or less work tasks to reduce physical demands", and "changes of work tasks or less work tasks to reduce mental demands". The response alternatives were: "no change", "some changes", and "considerable changes". Changes of employment due to cancer had two response alternatives: "no changes or changes not due to cancer", and "changes limited or very much due to cancer".

Statistical analysis

The SPSS for PC version 15.0 were used for the statistical analyses. Continuous variables were analyzed by t-tests, and in case of skewed distributions, non-parametric tests were applied. Categorical variables were analyzed by χ^2 tests. Differences between groups were also calculated as effect sizes (ESs), as Cohen's d on continuous variables, and as the differences between arcsine transformed proportions for 2×2 contingency tables [26,27]. By using the arcsine transformation the effect size of 2×2 contingency tables become comparable with the effect size of continuous measures as calculated by Cohen's coefficient d. Thereby for both categorical and continuous comparison we can apply the classification of effect size recommended, and ESs$\geq$0.30 was considered as clinical significant based on recommendations of Cohen [28]. ESs was only given for statistically significant differences in the tables, and the sign of operation is omitted due to lack of relevance. Variables that were significantly different between SSL and LSL in univariate analyses were entered into multivariate logistic regression analyses with LSL versus SSL (reference) as dependent variable. The strength of associations was given as odds ratio (OR) with 95% confidence intervals (CI). The significance level was set at $p<0.05$ and all tests were two-sided.

Ethics

The study was approved by the Regional Committee for Medical Research Ethics of South-East Norway, and the Norwegian Data Inspectorate. All invited participants received written information about the study from the responsible hospital, and they accepted to participate by returning the questionnaire with

Table I. Socio-demographic and cancer-related characteristics of the sick leave groups.

Variables	Short term sick leave group (n=359)	Long term sick leave group (n=481)	p	Effect Size
Socio-demographic at survey	*Mean (SD)*	*Mean (SD)*		
Age	51.7 (9.3)	50.8 (8.0)	0.13	
	n (%)	*N (%)*		
Sex			**<0.001**	0.27
Male	121 (34)	105 (22)		
Female	238 (66)	376 (78)		
Level of education			**0.03**	0.16
≤12 years	156 (43)	245 (51)		
>12 years	203 (57)	234 (49)		
Civil status			0.60	
Paired	280 (78)	366 (77)		
Non-paired	77 (22)	110 (23)		
Children ≤17 years at home	99 (29)	154 (33)	0.19	
Annual household income			0.11	
<57 000 - EUR	306 (85)	390 (81)		
≥57 000 - EUR	53 (15)	91 (19)		
Economic problems			**<0.001**	**0.37**
Seldom/never	327 (92)	385 (80)		
Often/sometimes	29 (8)	94 (20)		
Cancer-related				
Cancer type				
Breast	136 (38)	264 (55)	**<0.001**	**0.34**
Gynaecological	41 (11)	21 (4)	**<0.001**	0.27
Prostate and testis	68 (19)	26 (6)	**<0.001**	**0.41**
Colorectal	29 (8)	47 (10)	0.47	
Lymphomas	16 (5)	35 (7)	0.12	
Melanomas	26 (7)	5 (1)	**<0.001**	**0.34**
Other types	43 (12)	83 (17)	**0.03**	0.14
Cancer treatment types				
Surgery	310 (86)	402 (84)	0.27	
Radiotherapy	160 (45)	322 (67)	**<0.001**	**0.45**
Chemotherapy	122 (34)	395 (82)	**<0.001**	**1.01**
Hormone treatment	68 (19)	204 (42)	**<0.001**	**0.51**
Other medical treatment	17 (5)	61 (13)	**<0.001**	**0.29**
Combinations of treatment	197 (55)	414 (86)	**<0.001**	**0.61**
Recurrence of cancer	29 (8)	106 (22)	**<0.001**	**0.40**
Work-related at diagnosis	*Mean (SD)*	*Mean (SD)*		
Supervisors social support at work	9.0 (4.1)	10.7 (4.3)	**0.03**	**0.40**
Colleagues social support at work	6.9 (1.6)	6.9 (1.8)	0.87	
Working hours per week	37.3 (9.8)	36.0 (10.1)	0.07	

informed consent. Since the questionnaire was anonymous, reminders were not sent.

Results

Socio-demographic and cancer-related characteristics

Female patients constituted 78% of LSL and the female cancer types (breast- and gynecological cancer) comprised 76% of that group. LSL had a significantly higher proportion of females (ES=0.27), of individuals with lower level of education (ES=0.16), and with economical problems (ES=0.37) when compared to SSL (Table I). Significantly higher proportion of females with breast cancer belonged to the LSL (ES=0.34) compared to SSL, while there were lower proportions of patients with gynecological cancer (ES=0.27), melanoma (ES=0.34), and testicular and prostate cancer (ES=0.41) among LSL compared to SSL.

A significantly higher proportion of LSL than SSL experienced recurrence of cancer (ES=0.40). As for treatment, the LSL group had got more chemotherapy (ES=1.01), radiotherapy (ES=0.45) hormone treatment (ES=0.51), and other medical treatments (ES=0.29), while no significant difference was observed for surgery, which was the most common treatment (85%). Combinations of treatments were significantly more common among LSL

Table II. Self-rated health, overall quality of life and work issues of the sick-leave groups at the time of survey.

Variables	Shorter term sick leave (n=359)	Longer term sick leave (n=481)	p	Effect Size
Health and quality of life	n (%)	n (%)		
Self-rated health status			**<0.001**	**0.50**
Very good/Good	308 (86)	308 (65)		
Moderate/Bad/Very bad	48 (14)	169 (35)		
≥ 1 co-morbid diseases	128 (36)	217 (45)	**0.006**	0.18
Regular use of medication	240 (67)	365 (76)	**0.004**	0.20
Offered physiotherapy, physical activity and/or psychosocial supportive care	10 (3)	38 (8)	**0.001**	0.23
Self-rated needs for physiotherapy, physical activity and/or psychosocial supportive care	32 (10)	85 (19)	**<0.001**	0.26
Overall quality of life			**<0.001**	**0.36**
Very good/Good	231 (90)	367 (77)		
Moderate/Bad/Very bad	36 (10)	112 (23)		
Work-related				
Physical work ability			**<0.001**	**0.55**
Very good/Rather good	326 (97)	271 (81)		
Moderate/Rather poor/Poor	11 (3)	64 (19)		
Physical work ability reduced due to cancer	87 (26)	223 (66)	**<0.001**	**0.83**
Mental work ability			**<0.001**	**0.30**
Very good/Rather good	314 (93)	281 (84)		
Moderate/Rather poor/Poor	22 (26)	54 (16)		
Mental work ability reduced due to cancer	81 (24)	189 (56)	**<0.001**	**0.67**
	Mean (SD)	*Mean (SD)*		
Overall current work ability	8.8 (1.8)	6.0 (3.1)	**<0.001**	**1.10**
Working hours per week	36.4 (8.8)	30.0 (12.8)	**<0.001**	**0.57**
Changes at workplace and employment after treatment	n (%)	n (%)		
Changes of physical demands	26 (8)	88 (28)	**<0.001**	**0.54**
Changes of mental demands	23 (8)	76 (24)	**<0.001**	**0.69**
Changed employment due to cancer	33 (9)	193 (41)	**<0.001**	**0.78**

than SLS (ES=0.61). In the combination group, 220 (36) CPs had two treatment types, 186 (30%) had three, 186 (30%) had four, and 19 (4%) had all five treatment types.

Current health and overall quality of life at time of survey

A significantly lower proportion of LSL had very good/good self-rated health status (ES=0.50) and good overall quality of life (ES=0.36) compared to SSL. The proportions of patients with co-morbidity and regular use of medication were significantly higher among LSL (ES=0.18 and ES=0.20, respectively) compared to SSL (Table II).

Significantly more of LSL than SSL had been offered physiotherapy, physical activity, or psychosocial support during the time from diagnosis to time of survey (ES=0.23). LSL members showed a higher proportion with needs for these types of supportive measures without having been offered them (ES=0.26). However, all these proportions were relatively low with a maximum of 19% among LSL members with self-rated unmet need for these types of care.

Current work ability, work situation, and work change at time of survey

LSL had significantly poorer OCWA as well as physical and mental work ability both in general and due to cancer compared to SSL (all ES≥0.30) (Table II). At the time of survey LSL worked significantly fewer hours than SSL (ES=0.57). LSL had been through significantly more changes at the workplace and changes of employment status from diagnosis to survey compared to SSL (all ESs≥0.54).

Only 640 of 840 CSs had reported on work changes due to cancer, and we presume, but do not know for sure that the 200 not reporting, had made no changes, A significantly higher proportion of LSL compared to SSL had made changes in order to reduce the physical or mental demands (ES=0.54

and ES=0.69, respectively). A significantly higher proportion of LSL also had changed employment due to cancer (ES=0.56) (data not shown).

Factors associated with LSL

The univariate regression confirmed the significant differences between LSL and SSL shown in Tables I and II (Table III). In the multivariate analysis combined cancer treatment, lower OCWA, reduced mental WA, and less support from supervisors were significantly associated with belonging to LSL.

A univariate regression analyses of the subgroup of 640 CSs reporting on changes at work and employment, showed similar significant findings as the total group (n=840) except for level of education and comorbidity. The multivariate analysis of this group gave similar results, but change of employment due to cancer also showed a significant association with LSL (OR 2.85, 95% CI 1.34–6.07, p=0.007) (data not shown).

Discussion

In this cross-sectional, follow-up study we compared LSL and SSL in CPs who had been diagnosed with cancer up to 39 months previously and were in paid work both at diagnosis and at the time of survey. The multivariate analyses showed that LSL was associated with combined treatment, reduced OCWA and lack of social support from supervisor, while most sociodemographic, cancer and health as well as current work situation variables showed significantly association with LSL in univariate analyses. Our hypothesis that these variables were significantly associated with LSL compared to SSL was therefore supported.

The current study provides information on shorter and longer accumulated sick-leave in a sample of Norwegian CPs with different types of cancer with a maximum observation time of 39 months. In contrast, other studies of sick leave/absenteeism focus mainly on one [29,30] or a few cancer diagnoses [31]. New research on sick-leave in general indicates that frequent and long-term absence is a risk factor for more permanent work disability and pensioning [16,29]. This is also relevant for cancer patients, and therefore it is of importance to increase our knowledge of factors associated with LSL after a malignant disease [1,19,20].

Our findings support previous observations that chemotherapy is negatively associated with work ability [10,30–32], but we also found that radiotherapy, hormone treatment, other medical treatments as well as treatment combinations were significantly associated with LSL indicating more multimodal cancer treatment is associated with risk of LSL. This result is in line with the study of Taskila et al. [31] who reported that multimodal therapy and recurrence of cancer were positively associated with LSL, and indicate that such CPs should be monitored closely. Previous studies have shown [7–10,31–33] that both chemotherapy and multimodal treatment increased the risk of reduced work ability in CPs.

LSL reported significantly poorer experiences on most of the work-related variables compared to SSL. However, in the multivariate analyzes only OCWA, mental WA and supervisors support at work showed significant associations with LSL. This should be taken into consideration since the OCWA score may be taken as useful predictor for the future work ability of LSL, as reported by de Boer et al. [10].

Concerning the workplace we found an association between lack of support from supervisors and being LSL. Support from supervisors may therefore be of importance for shortening of sick-leaves as it has been established that adequate support at work is associated with better well-being and productivity [24,25], and supervisors' support and understanding may be of importance for CSs feelings of acceptance at the workplace.

As shown by Bekker et al. [34] sick-leaves were more common among females than males, which were confirmed in our comparative analysis. Our results also indicate higher proportions with low level of education among LSL compared to SSL. CSs with low education often have heavy manual work, and that fact can explain the longer time on sick-leave after cancer. Heavy manual work and low level of education were negatively associated with return to work as reported by Spelten et al. 2002 and Taskila et al. 2007 [29,30].

The cancer types showed significant differences between SSL and LSL, and 59% of the individuals from LSL belonged to breast and gynaecological cancer. So in our sample, to be a female CPs is associated with LSL.

LSL reported more use and needs of physical and psychosocial support services than SSL, which are in line with previous studies such as Short et al. 2006 [35]. However, the proportion of unmet needs is rather low with 19% among LSL. Eventually keeping focus on vocational rehabilitation programs for patients treated with multimodal treatment could increase their return to work, and particularly so if interventions started early in the treatment period as indicated by Mols et al. [33]. Our findings imply that CPs who go back to work and stay at work, hardly are in need of rehabilitation activities.

In our study 63% of CPs returned completed questionnaires, and that proportion is suboptimal.

Table III. Univariate and multivariate logistic regression analyses of various independent variables and long-term versus short term (reference) sick leave as dependent variable at the time of survey (n=840).

	Univariate			Multivariate		
Independent variables	OR	95% CI	p	OR	95% CI	P
Social demographic						
Sex (male = reference)	1.82	1.34–2.48	**<0.001**	1.33	0.67–2.66	0.42
Level of education (high = ref)	0.73	0.56–0.97	**0.03**	1.04	0.67–1.61	0.85
Economic problems (no = ref)	2.75	1.77–4.28	**<0.001**	2.08	0.97–4.48	0.06
Cancer and health						
Breast/gyn cancer (others = ref)	1.50	1.14–1.97	**0.004**	1.22	0.66–2.25	0.52
Recurrence	3.24	2.09–5.02	**<0.001**	1.14	0.54–2.38	0.73
Combined treatment	5.98	4.43–8.09	**<0.001**	5.23	3.36–8.14	**<0.001**
Poor self-rated health (good = ref)	3.52	2.46–5.03	**<0.001**	0.85	0.43–1.71	0.65
Overall quality of life	2.72	1.82–4.08	**<0.001**	1.01	0.45–2.26	0.98
≥1 co-morbid disease(s) (0 = ref)	1.48	1.12 –1.96	**0.006**	0.76	0.48–1.21	0.25
Current work situation						
Working hours per week	0.94	0.93–0.96	**<0.001**	0.99	0.97–1.02	0.47
Physical work ability	7.00	3.62–13.54	**<0.001**	1.56	0.57–4.29	0.39
Mental work ability	2.74	1.63–4.62	**<0.001**	0.62	0.27–1.43	**0.03**
Overall current work ability	0.60	0.55–0.65	**<0.001**	0.58	0.49–0.69	**<0.001**
Support at work at survey						
Supervisor support at work	1.04	1.01–1.08	**0.03**	1.06	1.00–1.12	**0.04**

Our results demonstrate that 25% (275/1 115) CPs who were employed at the time of diagnosis, were unemployed at the time of the survey. We focused on sick-leave by CPs who was working at both time points. We were unable to consider the duration of sick-leave in relation to time since diagnosis, since the time on sick-leave were rated by pre-fixed categories rather than as a continuous variable, and the time of diagnosis is given with approximately exact date. We therefore had to study sick-leave duration in absolute rather than in relative terms, which is a major limitation of our study.

Only 640/840 (76%) CSs reported on changes at work and employment, and we think that the missing ratings meant "no change". However, we do not have substantial evidence for this presumption, and we therefore only examined these issues in CPs who had delivered data.

Strength of our study is the inclusion of all the most common cancer diagnoses since most studies of sick-leave focus only on one type of cancer like breast cancer from one institution. We pooled data on CPs from four different geographical regions hospitals, rather than concentrating on a single hospital.

The decision of the cut-off point at nine months between LSL and SSL could be considered as lacking good foundation, but we considered the increased risk of disability pension for longer sick-leaves as an argument of some merit [16]. Another limitation is that we only have accumulated time on sick-leave, rather than a proportion of time on sick-leave/time from diagnosis to survey. These limitations should be considered in the light of a newly published review, in which the average proportion of CPs returning to work after six month sick-leave post diagnosis is about 40%, and after 12 months on sick leave approximately 62% has returned to work [10].

Conclusions

Our study supports previous knowledge concerning long-term sick-leave in CPs. We found that both being female CPs, several cancer-related and work situation variables were associated with long-term sick-leave in univariate analyses. However, in multivariate analysis combined cancer treatment showed the strongest association with LSL, but reduced overall working ability, mental work ability and lack of supervisor's support at work were also associated with LSL. Our study also identified several variables in univariate analysis associated with long-term sick-leave that could be amenable to interventions by health care personnel who do the follow-up of CPs.

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