

Review

Physical and psychosocial problems in cancer survivors beyond return to work: a systematic review

Saskia F. A. Duijts^{1,2,3*}, Martine P. van Egmond^{1,3}, Evelien Spelten², Peter van Muijen^{1,3}, Johannes R. Anema^{1,3} and Allard J. van der Beek^{1,3}

¹Department of Public and Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands

²Dutch Organisation of Psychosocial Oncology, Amsterdam, the Netherlands

³Research Center for Insurance Medicine, AMC-UMCG-UWW-VUmc, Amsterdam, the Netherlands

*Correspondence to:

Department of Public and Occupational Health, VU University Medical Center, Amsterdam, the Netherlands.
E-mail: s.duijts@vumc.nl

Abstract

Objective: Attention for the expanding group of cancer survivors at work, and the late effects they are confronted with while working, has been limited. The objective of this systematic review is to identify and summarize studies, exploring ongoing physical and/or psychosocial problems related to functioning of employees with a history of cancer, beyond their return to work.

Methods: Publications were identified through computerized Medline, Psychinfo, Embase, and Cinahl searches (January 2000–March 2013). Studies had to be directed at cancer survivors, who were employed during the study. Both qualitative and quantitative studies were included. Quality assessment of these studies was performed. Two reviewers independently extracted data from each publication, e.g., physical and/or psychosocial problems (e.g., fatigue and cognitive limitations), outcome measures (e.g., work productivity), and qualitative and quantitative results.

Results: The search identified 8979 articles. After exclusion on title and abstract, 64 were retrieved for full text screening, of which 30 met the inclusion criteria. A total of 20 studies reported quantitative and 10 studies reported qualitative results. The majority of studies assessed psychosocial problems in cancer survivors at work. Cognitive limitations, coping issues, fatigue, depression, and anxiety were reported to influence work ability. Physical problems, such as difficulties with lifting and treatment-induced menopausal symptoms, were frequently described to affect functioning at work.

Conclusions: Ongoing physical and/or psychosocial problems are present in occupationally active cancer survivors, which may cause serious difficulties at work. The results of this study may be used as input for developing supportive interventions for these survivors.

Copyright © 2013 John Wiley & Sons, Ltd.

Received: 8 May 2013

Revised: 28 November 2013

Accepted: 1 December 2013

Introduction

In Europe, 3.2 million people are diagnosed with cancer each year, of whom, about 50% is part of the working population [1]. An increasing part of the cancer survivors is able to return to work (RTW), or (partly) stay at work during treatment, because of continuing developments in treatment [2,3]. Specifically, about 62% (range 30 to 93%) of the cancer patients re-enters the workplace within one to two years after diagnosis [4,5].

Many survivors are doing well in general terms. However, a significant proportion of those occupationally active, with percentages up to 100%, experiences work-related physical and/or psychosocial problems [6]. For example, in a study by Munir (2011) in breast cancer patients, all women reported that cognitive problems negatively affected their work performance [7]. Notwithstanding the fact that treatment burden may vary between cancer stages, ongoing symptoms, such as these cognitive problems, should not stay unrecognized [8,9]. That is, fatigue,

depressive or anxious mood, pain, menopausal complaints, and changes in cognitive function, for example, working memory, organization, and multitasking, can persist for years after primary treatment ends, and do not only affect cancer survivors not at work, but also those at work [10–13]. Consequently, impairments may develop that influence in their work performance, in terms of productivity loss or diminished work ability. This may lead to presenteeism, recurrent sickness absence, or even work disability in the long run.

For several years, studies have documented the impact of cancer on employment, and specifically on RTW [4,14]. Cancer survivors re-enter the workplace, because they are often motivated to RTW as they perceive their ability to work as a symbol of recovery, and a vital aspect of re-establishing normality [15]. To some extent, this may be supported by interventions for RTW, but also changes at work, such as accommodations in tasks, hours, or function by the employer may have supported their RTW process [16]. And improved cancer treatment,

which enables the patient to perform work-related tasks, during and/or after treatment, may have contributed to (earlier) RTW. Up to now, attention for this expanding group of cancer survivors at work, and the late effects and difficulties they are confronted with while working, has been limited.

A few, mostly cross-sectional, studies have specifically described these functional difficulties cancer survivors experience at work. In a recent qualitative study of breast cancer survivors at work, for example, women stated that cognitive limitations were their most problematic post-treatment symptom [17]. The slightest deterioration in cognitive function was described, in an additional study, as devastating for their quality of working life [18]. Another example was given by Engel (2003), reporting that 38% of 5-year breast cancer survivors experienced arm morbidity, such as movement limitations and swelling, influencing their quality of life [19], and having a restraining effect on those still working. Fenlon (2007) described in a study on treatment-induced menopausal symptoms that the necessity to deal with the physical, emotional, and social consequences of hot flushes at work made some of the women alter their daily work patterns [20]. Furthermore, Steiner (2007) showed in a study of cancer survivors that more than half of the sample changed their occupational role after RTW, because of cancer-related physical and psychological symptoms, such as lack of energy, nausea, or feelings of uselessness or depression [21].

Evidence suggests that trying to manage both these ongoing symptoms resulting from cancer and the demands of being (partly) at work can lead to poorer physical and psychological health outcomes [22]. Moreover, work-related difficulties because of deteriorated health may cause additional distress [23]. Consequently, these difficulties may contribute to serious problems with functioning in the workplace [24]. Better understanding of how persistent physical and psychosocial problems impact cancer survivors at work, for example, in terms of productivity loss, may be an important step towards supportive interventions for survivors at work and potentially towards prevention of work disability [25].

Although previous studies have explored the association between symptom burden and RTW or have evaluated the effectiveness of interventions on RTW, no overview of studies on late effects in cancer survivors beyond RTW has been conducted so far. Therefore, the aim of this systematic review is to identify and summarize studies exploring ongoing physical and/or psychosocial problems related to functioning of employees with a history of cancer, beyond their RTW. As this study merely consists of an overview of the literature and no data gathering of cancer survivors is involved, approval of the Institutional Review Board was not necessary.

Methods

Search strategy

Publications were identified by the first author (S. D.) through computerized Medline, Psychinfo, Embase, and Cinahl searches for studies published from January 2000 until March 2013, with no language restrictions. We identified studies for this review using search strategies based on the Medline (via OVID) strategy, which uses a combination of MeSH and free text terms. The terms used were related to cancer, physical and psychosocial problems, employment, and functioning at work. To be included in this review, papers had to explore physical and/or psychosocial problems, for example, fatigue, cognitive problems, menopausal symptoms, related to functioning at work, for example, experienced work limitations, presenteeism, or reduced capacity to perform tasks, in employees with a history of cancer, after their RTW. Further, studies had to be directed at working-aged adults, who were employed during the study. Both qualitative and quantitative studies were included in the review. Studies were excluded if their focus was on factors predictive for RTW in cancer survivors. Also, if they studied psychosocial needs in employed cancer survivors, ethnic differences between employed cancer survivors, or if changes in hours, position, or wages was the main outcome measure.

All titles and abstracts were screened by the first author (S. D.), and those clearly not relevant to this review were eliminated. If title and abstract did not provide all the information needed to enable selection, full paper copies were retrieved and screened. Two authors (S. D., M. v. E.) assessed the remaining studies for their eligibility and discussed inclusion and appropriateness based on the inclusion criteria. In case of disagreement about the selection, the article was discussed until consensus was reached. Reference lists of relevant articles retrieved as full papers were checked for additional studies.

Quality assessment

All included publications were subject to a global assessment of study quality. Criteria derived from Critical Appraisal Skills Programme [26] (for qualitative, case-control and cohort studies), and Strengthening the Reporting of Observational Studies in Epidemiology [27] (for cross-sectional studies) were used, such as a clear statement of the aims of the research, appropriate research design, appropriate recruitment strategy, description of the method of analysis, and a clear description of the data. The quality of the studies (indicated as low, medium, and high) was assessed independently by two authors (S. D., M. v. E.), and differences were resolved by consensus.

Data extraction

Two reviewers (S. D., M. v. E.) independently extracted a range of data from each publication, including: (1) general

information (e.g., geographic area of the study); (2) study characteristics (e.g., design, measurements); (3) study population characteristics (e.g., size, tumour type, work status); (4) physical and/or psychosocial problems (e.g., fatigue, pain, cognitive limitations); and (5) outcome measures (e.g., work productivity, work limitations). In addition, qualitative and quantitative results were extracted from each paper. Finally, the authors S.D. and M.v.E. compared their extracted characteristics and findings and discussed them until consensus was reached.

Results

Study characteristics

The literature search initially identified 8979 articles, with the majority retrieved by Medline. After removing duplicates, and exclusion on title and abstract, a total of 64 were retrieved for full text screening, of which 30 met the inclusion criteria [2,5,7,17,20,21,24,25,28–49]. Table 1 provides an overview of the main characteristics of these 30 articles, which described 25 studies, and involved a total of 32 027 participants.

Almost all studies were conducted in high income countries, with the greater part of articles describing research from the US ($N=12$), whereas another 14 articles reported studies in Europe (UK $N=7$; Norway $N=4$; Denmark $N=1$; Finland $N=1$; The Netherlands $N=1$), Canada ($N=2$), and Korea ($N=2$). Nineteen studies had a cross-sectional design, five presented cross-sectional data within a case-control ($N=3$) or a cohort study ($N=2$), and six had a longitudinal design, with follow-up lasting up to 24 months. A total of 20 studies reported quantitative and ten reported qualitative results. Subject of research were breast cancer ($N=17$), prostate cancer ($N=6$), testicular cancer ($N=4$), brain cancer ($N=2$), non-Hodgkin lymphoma ($N=1$), lymphoma ($N=1$), cancer of the uterus ($N=1$), laryngeal cancer ($N=1$), stomach cancer ($N=1$), gynaecological cancer in general ($N=1$), or a variety of tumour types, mostly including those already mentioned ($N=9$). The majority of the studies used questionnaires to gather data ($N=15$), but also (focus group) interviews ($N=8$), telephone interviews ($N=3$), (web-based) surveys ($N=5$), and physical exams ($N=2$) were conducted.

Physical and psychosocial problems were measured specifically in those who were employed at time of study-entry. If, as in some studies, currently employed participants were only a part of the total study population, this is indicated in Table 1. Next to physical problems (e.g., pain, hot flushes, arm disability, (physical) fatigue, and/or general health) and psychosocial problems (e.g., cognitive functioning, confidence, coping, distress, depression, anxiety, and/or fatigue), also work-related issues (e.g., support at work, the ability to meet the tasks and duties of the job, problem solving, and adjustments at work) were described (Table 1).

Quality assessment

With regard to the quality assessment of qualitative studies, the Critical Appraisal Skills Programme criterion less described was the adequate consideration of the relationship between the researcher and the participants. Regarding both case-control and cohort studies, the criterion less described was the use of potential confounders in the analyses. In the included cross-sectional studies, Strengthening the Reporting of Observational Studies in Epidemiology criteria less described were the indication of the study design in the title or abstract, the presentation of key elements of the design early in the paper, potential sources of bias, an explanation of how the study size was arrived at, the presentation of unadjusted estimates, and, finally, the generalizability of the study results. Because 28 of the included studies were of high quality, and only two studies of medium quality, no weight difference was employed in this systematic review (Table 1).

Quantitative studies

A total of 20 studies [5,21,24,25,28–32,34–36,38,39,42–44,46,47,49] reported quantitative results, of which three described mainly physical problems [32,43,44], such as poor health status, functional limitations, chronic conditions, and arm pain/motion limitations, to influence work; six mainly described psychosocial problems [24,28,30,31,34,39], such as depressive symptoms, fatigue, exhaustion, and cognitive limitations, to affect work ability; and eleven described both physical and psychosocial problems [5,21,25,29,35,36,38,42,46,47,49], such as the aforementioned problems, but also lack of energy, nausea, hot flashes, coping issues, and the inability to perform physical/cognitive tasks, to influence functioning at work. In Table 2, a detailed and comprehensive overview of all results from these quantitative studies is given.

A selection of physical problems at work

About one quarter (22–30%) of prostate cancer survivors indicated to experience difficulties with physical tasks, such as lifting and stooping [29]. Yet, self-reported physical disability of prostate cancer survivors at work decreased from 29 to 18% over a period of 12 to 18 months of follow-up [42].

With regard to breast cancer survivors, difficulties with physical tasks, such as stooping (32%), physical effort (49%), and heavy lifting (62%), were frequently reported by working women [29]. Overall impaired physical ability was reported in 28% of working women with a history of breast cancer [5]. Specifically, physical fatigue was more common among the survivors than in the non-cancer control group [25]. Also, hot flushes were associated with work performance loss in these survivors [38]. Those reporting some arm pain or some movement limitations

Table 1. Characteristics of included studies on physical and/or psychosocial problems and health-related work functioning in cancer survivors

Author, year (ref)	Country	Design ^a	N (b)	Tumour type ^c	Measurement ^d	Physical/psychosocial problems ^e	Outcome	QA
Ahn, 2009 [28]	Korea	Cross-sec.	1595 (498)	Breast	Questionnaire	Fatigue, exhaustion	Work-related functioning	H
Amir, 2008 [2]	UK	Cross-sec.	41	Various	Phone interview	Fatigue, cognitive functioning, confidence, stress, job demands, coping, support	Work-related functioning	H
Boykoff, 2009 [17]	USA	Cross-sec.	74 (40)	Breast	(Focus group) interview	Cognitive functioning	Job performance	H
Bradley, 2007 [29]	USA	Longitudinal	496/294	BC/PC	Interview	Job requirements, cognitive tasks	Work-related functioning	M
Calvio, 2010 [31]	USA	Cross-sec.	122	Breast	Web-based survey	Distress, fatigue, job stress, cognitive functioning	Work limitations	H
Calvio, 2009 [30]	USA	Cross-sec.	113	Brain	Web-based survey	Fatigue, depression, anxiety, sleep, problem solving	Cognitive limitations	H
Clarke, 2011 [32]	USA	Cross-sec.	22,952 (7424)	Various	Survey	Health status, functional limitations	Work-related functioning	H
Fenlon, 2007 [20]	UK	Cross-sec.	8 (5)	Breast	Interview	Hot flushes	Work ability	H
Feuerstein, 2007 [24]	USA	Cross-sec.	95	Brain	Web-based survey	Fatigue, distress, cognitive limitations, sleep, health behavior; problem solving	Work limitations	H
Grunfeld, 2012 [33]	UK	Longitudinal	55 (34)	Gynaecological	Interview	Physical (e.g., fatigue) and psychosocial symptoms (e.g., confidence)	Work-related functioning	H
Gudbergsson, 2008 [35]	Norway	Cross-sec./case-cont.	226/166/54	BC/Test/PC	Questionnaire	Work-related issues (e.g., demand-control-support), anxiety, QoL, personality	Work ability/engagement	H
Gudbergsson, 2008 [36]	Norway	Cross-sec./case-cont.	219/150/62	BC/Test/PC	Questionnaire	Work-related issues (e.g., demand-control-support), fatigue, QoL, personality	Work ability	H
Gudbergsson, 2007 [34]	Norway	Cross-sec./case-cont.	208/163/46	BC/Test/PC	Questionnaire	Work-related issues (e.g., demand-control-support), distress, QoL, personality	Work limitations	H
Hansen, 2008 [25]	USA	Cross-sec.	100	Breast	Web-based survey	Work-related issues, fatigue, emotional distress, cognitive limitations	Work limitations	H
Kennedy, 2007 [37]	UK	Cross-sec.	24/2/2/1 (27)	BC/non-HL/Uts/Lar	(Focus group) interview	Support, attitude, side effects	Work-related functioning	M
Lavigne, 2008 [38]	USA	Cross-sec.	83	Breast	Questionnaire	Hot flushes, fatigue, mental health, general health	Work productivity	H
Lee, 2008 [39]	Korea	Cross-sec.	408 (218)	Stomach	Questionnaire	Fatigue	Work-related functioning	H
Main, 2005 [40]	USA	Cross-sec.	28 (26)	Various	Interview	Feelings about work, priorities	Work-related functioning	H
Munir, 2010 [41]	UK	Cross-sec.	31 (17)	Breast	Questionnaire/Interview	Fatigue, mood, cognitive functioning, depression	Work ability	H
Munir, 2011 [7]	UK	Cross-sec.	13 (9)	Breast	Interview	Cognitive functioning	Work ability	H
Oberst, 2010 [42]	USA	Longitudinal	447/267	BC/PC	Phone interview	Cognitive tasks	Work ability	H
Quinlan, 2011 [44]	Canada	Longitudinal	372	Breast	Questionnaire/physical exam	Arm disability, fatigue	Work ability/productivity	H
Quinlan, 2009 [43]	Canada	Cross-sec./cohort	278	Breast	Questionnaire/physical exam	Arm disability, fatigue	Work ability/productivity	H
Rasmussen, 2008 [45]	Denmark	Longitudinal	23 (6)	Various	Questionnaire	Physical (e.g., pain, hot flushes, fatigue), psychosocial side effects	Work-related functioning	H
Steiner, 2008 [21]	USA	Cross-sec.	100 (92)	Various	Questionnaire	Physical and psychosocial factors	Work-related functioning	H
Taskila, 2007 [5]	Finland	Cross-sec.	394/107/44/46	BC/Lymp/Test/PC	Questionnaire	Mental and physical health status, social factors at work	Work ability	H
Taskila, 2011 [46]	Netherlands	Longitudinal	135	Various	Questionnaire	Work-related factors (e.g., pressure, workload)	Fatigue at work	H
Torp, 2012 [47]	Norway	Cross-sec./cohort	563	Various	Questionnaire	Support at work, worksite adjustments, coping	Work ability	H
Yarker, 2010 [48]	UK	Cross-sec.	26	Various	Phone interview	Support at work, empathy, adjustments	Work ability	H
Yu, 2012 [49]	USA	Longitudinal	1354	Various	Questionnaire	Mental and physical health status	Work-related experiences	H

^aDesign: Cross-sec, cross-sectional; Case-cont, case-control.

^bNumber of participants currently employed.

^cTumour type: BC, breast cancer; PC, prostate cancer; Test, testicular cancer; non-HL, non-Hodgkin Lymphoma; Uts, cancer of the uterus; Lar, Laryngeal cancer; Lymp, Lymphoma.

^dMeasurement: QoL, quality of life.

^eA selection of physical and/or psychosocial problems is presented here; QoL, quality of life.

^fQA, quality assessment; M, medium quality; H, high quality.

Table 2. Quantitative results from studies on physical and/or psychosocial problems and health-related work functioning in cancer survivors

Author (ref)	Participants	Problems/functioning	Main findings
Ahn [28]	Breast CS vs. general population	Fatigue and exhaustion; reduction in work ability	46.8% vs. 25%; $p < 0.0001$; 17.9% vs. 11.6%; $p = 0.0059$
Bradley [29]	Prostate CS; breast CS	Physical task performance; cognitive task performance	In men, 22-30% found that cancer and its treatment interfered with their ability to perform physical tasks (such as physical effort, heavy lifting, and stooping); 5-16% noted an effect on cognitive tasks (such as concentration, analysis, keeping up with others, and learning new things). In women, 32-62% of those performing physical tasks found that cancer and its treatment interfered with their ability to perform these tasks; 20-39% noted an effect on cognitive tasks.
Calvio [31]	Breast CS vs. non-cancer control group	Cognitive limitations; work output	Memory $\beta = 0.29$; $p < 0.05$; executive function $\beta = 0.26$; $p < 0.05$. Changes in work output were more responsive to changes in job stress and fatigue in breast CS.
Calvio [30]	MBTS vs. non-cancer control group	Cognitive limitations; working memory; executive functioning; attention. Job stress; depressive symptoms; negative problem solving	MBTS reported more overall cognitive limitations $F = 48.6$, $p < 0.001$; more deficits in working memory $F = 86.5$, $p < 0.001$; executive function $F = 24.8$, $p < 0.001$ and attention $F = 18.7$, $p < 0.001$. Job stress $\beta = 3.9$, 95% CI 1.5-6.4, $p < 0.01$; depressive symptoms $\beta = 0.7$, 95% CI 0.1-1.3, $p < 0.05$; negative problem solving $\beta = 4.2$, 95% CI 1.5-7.0, $p < 0.01$ were associated with higher levels of cognitive limitations in both MBTS and healthy workers.
Clarke [32]	(1) Employed with cancer vs. unemployed with cancer; (2) employed with cancer vs. employed without cancer; (3) blue vs. white collar workers (all cancer)	Health status; functional limitations; chronic conditions; bed-days (>1 week)	(1) First group less likely to report poor-fair health status OR 0.25 (95% CI 0.24-0.26); functional limitations OR 0.37 (95% CI 0.35-0.38); chronic conditions OR 0.30 (95% CI 0.27-0.32); bed-days (>1 week) OR 0.28 (95% CI 0.27-0.29); (2) First group more likely to report poor-fair health status OR 2.06 (95% CI 1.96-2.17); functional limitations OR 1.72 (95% CI 1.64-1.80); chronic conditions OR 1.31 (95% CI 1.22-1.41); bed-days (>1 week) OR 1.89 (95% CI 1.79-2.01); (3) First group more likely to report poor-fair health status OR 1.98 (95% CI 1.53-2.56); functional limitations OR 1.28 (95% CI 1.04-1.59); chronic conditions OR 2.03 (95% CI 1.35-3.05); bed-days (>1 week) OR 1.29 (95% CI 0.98-1.70).
Feuerstein [24]	MBTS vs. non-cancer control group	Work limitations; depressive symptoms; fatigue; cognitive limitations; negative problem solving; sleep quality	Working limitations $M = 5.6$, $SD = 4.4$ vs. $M = 2.6$, $SD = 2.7$ ($t = 6.2$; $p < 0.001$); MBTS had higher levels of depressive symptoms ($\beta = 0.32$; $p < 0.01$), fatigue ($\beta = 0.21$; $p < 0.01$), cognitive limitations ($\beta = 0.22$; $p < 0.01$), and negative problem solving ($\beta = 0.15$; $p < 0.05$). Also, they reported poorer sleep ($\beta = -0.17$; $p < 0.05$).
Gudbergsson [35]	CS vs. matched controls from general population	Current work ability; support at work; physical work ability; mental work ability; engagement (dedication; absorption; vigor); health status; somatic symptoms; anxiety; physical QoL; neuroticism; extraversion	CSs reported poorer current work ability ($ES = 0.25$; $p < 0.001$), and expected more on support at work ($ES = 0.14$; $p = 0.005$); CSs reported poorer physical ($ES = 0.34$; $p \leq 0.001$); mental work ability ($ES = 0.30$; $p \leq 0.001$). Engagement (dedication and absorption) did not differ between both groups. CSs had significantly lower vigor score ($ES = 0.19$; $p = 0.003$). Control group reported better health status ($ES = 0.18$; $p = 0.001$), lower somatic symptom score ($ES = 0.14$; $p = 0.03$), lower mean anxiety score ($ES = 0.14$; $p = 0.02$), better physical QoL ($ES = 0.26$; $p = 0.001$). Neuroticism ($ES = 0.16$; $p = 0.002$) and extraversion ($ES = 0.12$; $p = 0.02$) were higher in the CSs.
Gudbergsson [36]	CS who made work changes due to cancer vs. those who made no changes	Work changes; current work ability; physical and mental work ability; job demands; support; somatic symptoms; health status; comorbidity;	17 vs. 83%; Change group: more females ($ES = 0.39$; $p = 0.003$); poorer current work ability ($ES = 0.75$; $p \leq 0.001$), reduced physical and mental work ability

(Continues)

Table 2. (Continued)

Author (ref)	Participants	Problems/functioning	Main findings
		anxiety and depression; physical and mental QoL; neuroticism	(ES > 0.50 both; $p \leq 0.001$); higher demands subscale (ES = 0.38; $p = 0.005$); lower support subscale (ES = 0.38; $p = 0.005$); lower mean score on the somatic symptom scale (ES = 0.44; $p \leq 0.001$); poorer subjective health status (ES = 0.60; $p < 0.001$); more comorbidity (ES = 0.53; $p \leq 0.001$); higher scores on anxiety and depression (ES ≥ 0.60 both; $p \leq 0.001$); poorer physical (ES = 0.74; $p < 0.001$) and mental QoL (ES = 0.35; $p = 0.004$); more neuroticism (ES = 0.54; $p < 0.001$).
Gudbergsson [34]	CS vs. matched controls from general population	Job strain; DCS	Female survivors experienced more strain than males ($p = 0.04$). In certain subgroups, statistically significant differences on the DCS questionnaire were found: older survivors showed higher scores on demands than their controls ($p = 0.01$), female survivors reported lower control ($p < 0.001$) and higher strain than male survivors ($p = 0.04$), and older male survivors felt higher demands than younger ones ($p = 0.04$). The effect sizes of these differences were so small (<0.20) that they hardly were relevant for the work situation.
Hansen [25]	Breast CS vs. non-cancer control group	Physical fatigue; depressive symptoms; anxiety; cognitive limitations; work limitations	Physical fatigue ($t = 5.90$; $p < 0.001$); depressive symptoms ($t = 3.72$; $p < 0.001$); anxiety ($t = 2.79$; $p < 0.01$); cognitive limitations ($t = 4.60$; $p < 0.001$). The average score on work limitations was significantly higher in breast CS (mean = 5.5, SD = 4.0) than in non-cancer controls (mean = 2.8, SD = 2.7); ($t = 5.6$; $p < 0.001$). This difference was even greater after adjusting for age (mean difference = 3.1, $t = 5.7$; $p < 0.001$).
Lavigne [38]	Breast CS	Productivity; fatigue; hot flashes; work performance losses; overall health	Reduction in productivity of 3.1% below the healthy worker norm; fatigue and hot flashes were each associated with work performance losses of 1.6% ($p = 0.05$) and 2.2% ($p < 0.001$). Protective factors included a score of excellent overall health of -1.4% ($p = 0.08$).
Lee [39]	Stomach CS vs. general population	Fatigue; work ability	Stomach CS had more fatigue in performing their work OR 4.02 (95% CI 2.55-6.33); more CS had reduced work ability OR 6.11 (95% CI 3.64-10.27).
Oberst [42]	Breast CS; prostate CS	Physical disability; cognitive disability	Breast cancer: 60% reported physical disability at 12 months, decreasing to 36% at 18 months ($p < 0.01$); cognitive disability was reported by 34% and 22% for 12 and 18 months ($p < 0.01$). Prostate cancer: 29% reported physical disability at 12 months, and 17% at 18 months ($p < 0.05$), cognitive disability decreased from 12% to 7%.
Quinlan [44]	Breast CS with arm pain vs. those without arm pain; Breast CS with motion limitations vs. those without motion limitations	Productivity	At 6–12 months post-surgery, survivors with some arm pain are more likely to experience loss in productivity compared with those without pain (OR 2.39 CI 1.08-5.28; $p = 0.031$); those experiencing some range of motion limitations are more likely to experience loss in productivity than those with no limitations (OR 3.12 CI 1.45-6.69; $p = 0.003$). At 30–36 months post-surgery, survivors with some arm pain are more likely to experience loss in productivity compared with those without pain (OR 7.93 CI 1.82-34.46; $p = 0.006$); and those experiencing some range of motion limitations are more likely to experience loss in productivity than those with no limitations (OR 4.08 CI 1.09-15.34; $p = 0.037$).

(Continues)

Table 2. (Continued)

Author (ref)	Participants	Problems/functioning	Main findings
Quinlan [43]	Breast CS with arm pain vs. those without arm pain; Breast CS with motion limitations vs. those without motion limitations	Productivity	At 6–12 months post-surgery, survivors with some arm pain are more likely to experience loss in productivity compared with those without pain OR 2.48 (95% CI 1.14-5.43; $p = 0.023$); those experiencing some range of motion limitations are more likely to experience loss in productivity than those with no limitations OR 2.56 (95% CI 1.24-5.43; $p = 0.015$).
Steiner [21]	Survivors with reduction in work hours; survivors with changes in occupational role vs. survivors with no changes	Physical symptoms; energy; nausea/vomiting; psychological symptoms or fear (feeling bored or useless, anxiety, feeling down or depressed); physical symptoms; psychological symptoms	Reduction in work hours: physical symptoms ($p = 0.002$), specifically lack of energy ($p = 0.0008$), or nausea/vomiting ($p = 0.009$); psychological symptoms or fears ($p = 0.01$), specifically feeling bored or useless, anxiety, or feeling down or depressed (all $p < 0.05$). Changes in occupational role: physical symptoms ($p < 0.0001$); psychological symptoms or fears ($p = 0.02$).
Taskila [5]	CS	Physical work ability; mental work ability; commitment; co-worker support; social climate; other diseases	Physical work ability: 20% ($n = 31$) of men and 28% ($n = 121$) of women; the higher the commitment to the work organization, the less the risk of impaired physical work ability among both men OR 0.79 (95% CI 0.69-0.91) and women OR 0.90 (95% CI 0.83-0.97). In women, co-workers support was related to reduced risk of impaired physical work ability OR 0.83 (95% CI 0.73-0.94); Mental work ability: 23% ($n = 35$) of men and 18% ($n = 79$) of women; good social climate in men OR 0.80 (95% CI 0.70-0.91) and in women OR 0.84 (95% CI 0.76-0.94) and in addition, in women, commitment to the organization OR 0.87 (95% CI 0.79-0.96) and social support from co-workers OR 0.84 (95% CI 0.73-0.96) were significant. Both men and women who had at least two other diseases had an increased risk of impaired mental work ability OR 5.08 (95% CI 1.49-19.29) and OR 3.82 (95% CI 2.11-6.92) in men and women, respectively.
Taskila [46]	CS	Fatigue; work pressure; physical workload; workplace accommodation; depression	At 6 months, fatigue was related to higher work pressure ($p = 0.02$), higher physical workload ($p < 0.05$), and lack of workplace accommodations ($p = 0.03$). At 18 months, fatigue was related to lack of workplace accommodations ($p < 0.001$). Depression scores were significantly higher among those who did not have workplace accommodations at 6 months ($p = 0.03$) and at 18 months ($p < 0.001$).
Torp [47]	CS	Physical work ability; mental work ability; coping	31% reported a reduction of physical work ability because of cancer; 23% reported a reduction of mental work ability. Only 7% and 6% reported that they did not cope well with the physical and mental strains at work, respectively.
Yu [49]	CS	Physical and mental health	At 2 years post-diagnosis, poorer physical and mental health (both $p < 0.001$) were associated with having at least one negative work experience (univariate). Multivariate, those reporting at least one negative experience had deteriorating physical OR 0.96 (95% CI 0.94-0.98) and mental OR 0.94 (95% CI 0.92-0.96) health.

MTBS, malignant brain tumor survivor; CS, cancer survivor; QoL, quality of life; DCS, demands, control, support.

were more likely to experience loss in productivity than those without pain or without limitations, respectively [44]. In breast cancer survivors at work, physical disabilities decreased from 60 to 36% over a period of 12 to 18 months follow-up [42].

Looking at physical problems in cancer survivors of various tumour types, employed cancer survivors showed better health status, less functional limitations, and less chronic conditions than unemployed cancer survivors. To be expected, employed cancer survivors showed poorer health

status, more functional limitations, and more chronic conditions than those employed without a history of cancer [32].

A selection of psychosocial problems at work

Around one tenth (5-16%) of prostate cancer survivors indicated to experience difficulties with cognitive tasks, such as concentration, keeping up with others, and learning new things [29]. Yet, self-reported cognitive disability of prostate cancer survivors at work decreased from 12 to 7% over a period of 12 to 18 months follow-up [42].

With regard to breast cancer survivors, difficulties with cognitive tasks, such as learning new things (20%) and keeping up with others (39%), were reported by working women [29]. Also, overall cognitive limitations, depressive symptoms, anxiety, fatigue, and exhaustion were more common among the survivors than in the non-cancer control group [25,28,31].

Looking at psychosocial problems in brain tumour survivors, cognitive (work) limitations, deficits in working memory, executive function and attention, and negative problem solving orientation were more present in these survivors than in the non-cancer control group [24,30]. Overall, cancer survivors reported poorer mental work ability, higher anxiety scores, but also higher scores on neuroticism and extraversion, compared with matched controls from the general population [35,36].

Qualitative studies

A total of 10 studies [2,7,17,20,33,37,40,41,45,48] reported qualitative results, of which, six mainly described psychosocial problems [2,7,17,40,41,48], such as coping issues, stress, cognitive limitations, fatigue and lack of social support, and/or work accommodation, to influence work; and four described both physical and psychosocial problems [20,33,37,45], such as the aforementioned problems, but also hot flashes, susceptibility to infections, hair loss, and emotional strain, to influence functioning at work. In Table 3, a detailed and comprehensive overview of all results from these qualitative studies is given.

A selection of physical problems at work

As a result of physical job demands or because of symptoms, continuing longer than expected, cancer survivors were sometimes not able to continue in their old work role. Also, coping with return to the work environment, often as a result of ongoing physical issues, seemed to require a period of adjustment [33]. Regarding the impact of treatment-induced menopausal symptoms, the effect of hot flashes at work were primarily described, for example: 'I have deliberately got work where I am working on my own a lot and I can be shut away a lot of the time so people don't even see me' [20,45]. Further, the occurrence of hair loss and wearing a wig was considered a difficulty at

work, with some women describing the hair loss as 'one of the worst things that happened' [37].

A selection of psychosocial problems at work

Cognitive problems, such as poor concentration, memory, and attention problems, and their negative effect at performance, quality, and the speed of work, were reported by various studies [7,41]. 'Every 2 hours, I was going somewhere to sit down and relax, I couldn't think well. I couldn't coordinate everything that was going on' [17]. Confusion or loss of concentration, influencing confidence, and self-esteem was also found, specifically in breast cancer survivors, trying to deal with the emotional and social consequences of hot flashes at work [20].

Next to cognitive limitations, difficulties with coping were described in the larger part of the included qualitative studies. For example, cancer survivors who were already in stressful jobs found it more difficult to cope when returning. Also, coping with expectations from employers and colleagues was difficult for those who felt they could not perform [37]. Many survivors described their colleagues as being over-protective. 'The restrictions at work made me feel I was being prevented from getting back to normal, when I was capable to cope with the demands at work' [2].

Finally, the impact of fatigue on work ability was something that took many employees by surprise [48]. It was described as disruptive and difficult to manage at work, even years after treatment [37]. The initial period following return to the workplace was often more tiring than had been anticipated [33]. Cancer survivors indicated that colleagues were soon to forget about their cancer and failed to recognize or understand the impact of late effects of treatment, such as fatigue, upon work and well-being [48]. In order to cope with fatigue, regular short breaks while at work were scheduled and many reported that they went to bed early, sometimes as soon as they returned home, in the first few weeks after returning to work. 'One afternoon, when I got very, very tired, I said: "Could I just take 10 minutes please?" and they very kindly said: "Do you want to go home?" But I didn't want to go home. I had a half hour break and I felt a lot better' [33].

Discussion

General findings

In this systematic review, a summary of 25 studies, described in 30 articles, exploring physical and/or psychosocial problems related to functioning of employees with a history of cancer, is provided. The majority of the studies in this review assessed psychosocial problems in cancer survivors at work. Particularly, cognitive limitations, such as concentration problems, memory deficits, or difficulties learning new things, were found to affect work ability

Table 3. Qualitative results from studies on physical and/or psychosocial problems and health-related work functioning in cancer survivors

Problems/functioning	Author (ref)	Findings and quotes (Q)
Cognitive functioning	Boykoff [17]	Decreased efficiency and speed at work; reduced chances of being promoted or assigned to projects; no longer able to handle the level of work; getting passed over for opportunities and not getting chances for advancement; memory problems; increased stress. Q: 'I am very insecure when I am talking to people professionally, because I am worried I am just going to draw a blank'; 'Every 2 hours, I was going somewhere to sit down and relax, I couldn't think well. I couldn't coordinate everything that was going on.'; 'When I began the chemo, I couldn't concentrate at all and I couldn't read academic material. I couldn't work, I couldn't write. I needed to finish my PhD, but I couldn't concentrate adequately.'
	Munir [41]	Problems with remembering tasks.
	Munir [7]	Cognitive side effects; poor concentration, memory problems and difficulties in thinking; hiding cognitive difficulties from the employer rather than discussing them; feeling overwhelmed by the work environment and in some cases found it unbearable; noise affected cognitive functioning and the ability to perform; fatigue affected cognitive functioning; problems with organizing information and decision-making.
Coping	Amir [2]	Q: 'Being over-protected (...) the restrictions at work made me feel I was being prevented from getting back to normal, when I was capable to cope with the demands at work'; 'Significant changes in duties to be able to cope with the demands at work'; 'I came back on a very slow return and they looked after me every step of the way.'
	Grunfeld [33]	Coping problems related to being back in the work environment and the demands of the role at work, because of ongoing physical issues, including hot flashes, poor concentration and difficulty sitting for prolonged periods; reduced confidence; difficulties with learning new systems or new information; fear of having forgotten previous learned information.
	Main [40]	Survivors needed to work 'smarter' after cancer; to pace and to concentrate on aspects of the job that best utilized strengths; shifts in motivation (do what you love to do), relevance (priority in life), and tolerance (some were more/some less tolerant).
Fatigue	Grunfeld [33]	Returning to work was more tiring than anticipated; regular short breaks were scheduled; going to bed early (sometimes as soon as returning home) in the first weeks after returning at work.
	Kennedy [37]	Side effects (most of all fatigue) were disruptive and difficult to manage at work, even years after treatment.
	Yarker [48]	The delayed impact of fatigue on work ability was not something that had been highlighted by professionals and took the employee, and the line manager, by surprise.
Hot flashes	Fenlon [20]	Social impact; individual difficulties, such as lack of concentration; difficult relationship with colleagues as women found themselves needing to explain what was happening to them; embarrassment; confusion; reduced confidence and self-esteem; physical, emotional, and social consequences made women alter their work patterns; changed self-image. Q: 'I have deliberately got work where I am working on my own a lot and I can be shut away a lot of the time so people don't even see me.'; 'Take measures to reduce stress, work demands.'
	Rasmussen [45]	Q: 'Those hot flashes meant that I could not work nights, not being able to do my best. You can't do it to your colleagues and not to oneself either.'
Physical functioning	Kennedy [37]	Increased susceptibility to infections; difficulties with hair loss/wearing a wig, feeling uncomfortable, self-conscious; difficulties about prosthesis and clothing.
Stress	Amir [2]	Q: 'I don't get as stressed about things at work. I think it gives you the attitude to enjoy every day and I would never worry about work or let it dominate me now.'
Support	Kennedy [37]	Those already in stressful jobs found it more difficult when returning.
	Amir [2]	Q: 'Everybody forgets what you have just gone through, once you get back in the office. They forget you have cancer and have got to muck in like everyone else.'; 'Insensitive management.'
	Kennedy [37]	Difficulties with expectations and lack of understanding from employers and colleagues; survivors suggested that if they looked well, this might mislead employers into thinking they had completely recovered; some had to make the time up if specialists appointments were during work hours; a minority described negative reactions and support at work.
	Main [40]	Many found their employers and colleagues to be compassionate, helpful, offering sympathy, and encouragement; several mentioned co-workers' discomfort with the topic of cancer; many reported understanding from employers for time off for medical appointments.
	Rasmussen [45]	Q: 'Okay, you are back, and the cancer is gone. What is the problem? The emotional strain afterwards that is your problem, your personal battle. You can't confront your colleagues with that, you just can't.'
Work accommodation	Yarker [48]	No help or support with managing late effects, because of employers not knowing how survivors were affected by their cancer at work; difficulties with employers and colleagues forgetting about their cancer and failing to recognize or understand the impact of late effects of treatment on work and well-being; feeling left isolated in dealing with side effects, symptoms, and work, when no adjustments were made and no long-term support was provided; difficulties, when empathy and support started to wane and was replaced by business-as-usual.
	Amir [2]	Q: 'Excessive job demands once back at work.'
	Kennedy [37]	Adjustments were offered around flexibility, gradual assimilation, changes in work tasks; paradox was that survivors wanted to be treated normally, but they also felt they needed support and allowances; this highlights the difficulty for employers to strike the balance in between.
	Main [40]	Many were able to keep working because employers and colleagues helped tailor their work; accommodations were offered without asking.

both in quantitative and qualitative studies. Coping issues were extensively described in qualitative studies, with experiences diverging from dealing with insensitive

management to over-protectiveness of supervisors and colleagues. The impact of fatigue was both quantitatively and qualitatively assessed, and found to be significantly

more present in cancer survivors at work than in the general working population. It was reported to be disruptive for both employee and supervisor, as it unexpectedly affected work ability even years after treatment. Depression and anxiety were significantly more present in those who needed changes at work because of cancer. And, depression was also higher in those who did not have work accommodations at follow-up. Regarding physical problems, cancer and its treatment were reported to interfere with the ability of cancer survivors to perform physical tasks, such as lifting and stooping. Finally, treatment-induced menopausal symptoms, specifically hot flashes, were frequently described as being disruptive at work and affecting work performance.

Interpretation of findings

It was striking to find that only few studies were primarily aimed at functioning of cancer survivors, beyond their RTW. Up to now, most studies have RTW, work status or work disability, as their main focus. It can be reasoned that because occupationally active cancer survivors are indeed working, they represent a high functioning subgroup of this population. As a result, many may not realize that, next to the well-functioning contributors to the workplace, there is a significant proportion of cancer survivors that returns to work with impaired work ability. These survivors are more likely to change or leave employment altogether. Therefore, (occupational) health care professionals, but also employers, colleagues, and insurance companies, should be notified that diagnosis-induced and/or treatment-induced problems may linger long after treatment has been completed.

That said, questions may arise about the duration of the problems. The time period that symptoms still can be indicated as diagnosis-related and/or treatment-related needs further exploration. Also, attention for the causality of the findings is important. For example, it is known that treatment-induced hot flashes can be triggered by psychological factors, such as being stressed or overtired [20]. As indicated, cancer survivors often require a period of adjustment to cope with the demands at work again. Ongoing physical issues, such as hot flashes, may increase in frequency and intensity because of high job demands [33]. On the contrary, experiencing menopausal symptoms at work may result in more stress at work and, consequently, in loss of productivity. In line with this, one could question if concentration problems increase because of being at work again, where attention is required for several hours a day, and what could be more tiring than anticipated. Or, if these cognitive limitations are the cause of, for example, more fatigue, which could lead to additional difficulties at work. It would be recommendable to disentangle physical and/or psychosocial problems that are already present at time of RTW, in frequency and intensity, and the influence of being back at work has on the course of these problems. Further, it is advisable to

explore the impact coping strategies, used by cancer survivors, may have on physical and psychosocial problems at work.

Exploring functioning at work in the general population, previous studies have shown that, for example, fatigue is associated with sickness absence [50]. Because cancer survivors rarely struggle with only a single late effect of diagnosis and treatment, one could imagine that these employees are more susceptible to potential long-term sickness absence or work disability than the general working population. The findings of this review should be taken into account when developing interventions for cancer survivors to improve functioning at work. For example, worksite health promotion programs on physical activity, directed at the general working population, may also show promising effects in terms of diminishing sickness absence and increasing work ability, when tailored to occupational active cancer survivors. When developing and implementing such supportive interventions, (occupational) health care professionals, but also employers and colleagues, should be included in the organization of these interventions to keep cancer survivors occupationally active.

Strengths and limitations

The main strength of this systematic review is that this is the first review exploring physical and psychosocial problems related to functioning of employees with a history of cancer, beyond their RTW. Up to now, the period prior to RTW received most attention, disregarding the number of occupationally active cancer survivors nowadays, and the late effects they are confronted with while working. Another strength is that both qualitative and quantitative studies were included, resulting in an overview of all available studies.

A limitation of this systematic review is that no inter-rater reliability has been calculated in selecting the studies and in extracting characteristics and findings, nor in assessing the quality of the studies. A second limitation is that it was not possible to pool the results and quantitatively summarize effect sizes, because of heterogeneity in the study characteristics. For overall frequencies of physical and/or psychosocial problems in cancer survivors at work, further research is therefore needed. Regarding the studies included in the review, a limitation was that merely studies with cross-sectional rather than longitudinal designs have been included. Consequently, it was not possible to elaborate on causality of these findings. In addition, the small number of studies with control groups from the general population in this review made it difficult to explore the difference between general physical and/or psychosocial problems at work and cancer-related physical and/or psychosocial problems at work. Finally, studies on breast cancer survivors at work were primarily present. No included studies concerned men only. Consequently, it is difficult to generalize the

results to cancer survivors from other tumour types, or to conclude upon physical and/or psychosocial problems men at work mainly experience.

Recommendations and conclusion

Return to work in cancer survivors receives a great amount of attention and is an essential part of societal integration and participation. Moreover, employment has been rated by cancer survivors as the third most important aspect of quality of life, after the ability to get out and to engage in social activities. Because it is vital to alleviate physical and/or psychosocial problems related to functioning in the expanding group of occupationally active cancer survivors, it is necessary to monitor cancer survivors,

beyond their RTW. This comprehensive overview of most explored and reported problems in cancer survivors impacting functioning at work may be a point of departure for research on, for example, presenteeism and sickness absence in occupationally active cancer survivors. Also, the results from this review could be used to raise awareness in both clinical practice and in research about the presence of long-term effects of diagnosis and/or treatment beyond RTW, and to explore the need of interventions for cancer survivors at work. When employees with a history of cancer are given tailored support, and personal recommendations and work-related adjustments are made, they may be more likely to continue and manage their (former) illness at work.

References

- de Boer AG. The European Network Cancer and Work (CANWON). *Psycho-Oncology* 2013;**4**:15.
- Amir Z, Neary D, Luker K. Cancer survivors' views of work 3 years post diagnosis: a UK perspective. *Eur J Oncol Nurs* 2008;**12**(3):190–197.
- Hoffman B. Cancer survivors at work: a generation of progress. *CA Cancer J Clin* 2005;**55**(5):271–280.
- Spelten ER, Sprangers MA, Verbeek JH. Factors reported to influence the return to work of cancer survivors: a literature review. *Psycho-Oncology* 2002;**11**(2):124–131.
- Taskila T, Martikainen R, Hietanen P, Lindbohm ML. Comparative study of work ability between cancer survivors and their referents. *Eur J Cancer* 2007;**43**(5):914–920.
- Smith T, Stein KD, Mehta CC, et al. The rationale, design, and implementation of the American Cancer Society's studies of cancer survivors. *Cancer* 2007;**109**(1):1–12.
- Munir F, Kalawsky K, Lawrence C, Yarker J, Haslam C, Ahmed S. Cognitive intervention for breast cancer patients undergoing adjuvant chemotherapy: a needs analysis. *Cancer Nurs* 2011;**34**(5):385–392.
- Kattlove H, Winn RJ. Ongoing care of patients after primary treatment for their cancer. *CA Cancer J Clin* 2003;**53**(3):172–196.
- Wilt TJ. Clarifying uncertainty regarding detection and treatment of early-stage prostate cancer. *Semin Urol Oncol* 2002;**20**(1):10–17.
- Deimling GT, Bowman KF, Sterns S, Wagner LJ, Kahana B. Cancer-related health worries and psychological distress among older adult, long-term cancer survivors. *Psycho-Oncology* 2006;**15**(4):306–320.
- Gandubert C, Carriere I, Escot C, et al. Onset and relapse of psychiatric disorders following early breast cancer: a case-control study. *Psycho-Oncology* 2009;**18**(10):1029–1037.
- Wagner LI, Cella D. Fatigue and cancer: causes, prevalence and treatment approaches. *Br J Cancer* 2004;**91**(5):822–828.
- Wefel JS, Lenzi R, Theriault RL, Davis RN, Meyers CA. The cognitive sequelae of standard-dose adjuvant chemotherapy in women with breast carcinoma: results of a prospective, randomized, longitudinal trial. *Cancer* 2004;**100**(11):2292–2299.
- de Boer AG, Taskila T, Tamminga SJ, Frings-Dresen MH, Feuerstein M, Verbeek JH. Interventions to enhance return-to-work for cancer patients. *Cochrane Database Syst Rev* 2011;**(2)**:CD007569.
- Macmillan Cancer Support. Working through cancer. The Road to Recovery: Getting Back to Work. London; 2007.
- Tamminga SJ, de Boer AG, Verbeek JH, Frings-Dresen MH. Return-to-work interventions integrated into cancer care: a systematic review. *Occup Environ Med* 2010;**67**(9):639–648.
- Boykoff M, Moieni M, Subramanian SK. Confronting chemobrain: an in-depth look at survivors' reports of impact on work, social networks, and health care response. *J Cancer Surviv* 2009;**3**:223–232.
- Grober SE. Resources for treatment of chemotherapy-related cognitive difficulty. *Cancer Pract* 2002;**10**(4):216–218.
- Engel J, Kerr J, Schlesinger-Raab A, Sauer H, Holzel D. Axilla surgery severely affects quality of life: results of a 5-year prospective study in breast cancer patients. *Breast Cancer Res Treat* 2003;**79**(1):47–57.
- Fenlon DR, Rogers AE. The experience of hot flushes after breast cancer. *Cancer Nurs* 2007;**30**(4):E19–E26.
- Steiner JF, Cavender TA, Nowels CT, et al. The impact of physical and psychosocial factors on work characteristics after cancer. *Psycho-Oncology* 2008;**17**(2):138–147.
- Pryce J, Munir F, Haslam C. Cancer survivorship and work: symptoms, supervisor response, co-worker disclosure and work adjustment. *J Occup Rehabil* 2007;**17**(1):83–92.
- Munir F, Yarker J, Haslam C, et al. Work factors related to psychological and health-related distress among employees with chronic illnesses. *J Occup Rehabil* 2007;**17**(2):259–277.
- Feuerstein M, Hansen JA, Calvio LC, Johnson L, Ronquillo JG. Work productivity in brain tumor survivors. *J Occup Environ Med* 2007;**49**(7):803–811.
- Hansen JA, Feuerstein M, Calvio LC, Olsen CH. Breast cancer survivors at work. *J Occup Environ Med* 2008;**50**(7):777–784.
- Critical appraisal skills programme. International Centre for Allied Health Evidence. <http://www.unisa.edu.au/Research/Sansom-Institute-for-Health-Research/Research-at-the-Sansom/Research-Concentrations/Allied-Health-Evidence/Resources/CAT/> [cited August 13 2013]. 2013.
- STROBE statement. <http://www.strobe-statement.org/index.php?id=strobe-home>. 2013. University of Bern, Switzerland.
- Ahn E, Cho J, Shin DW, et al. Impact of breast cancer diagnosis and treatment on work-related life and factors affecting them. *Breast Cancer Res Treat* 2009;**116**(3):609–616.
- Bradley CJ, Neumark D, Luo Z, Schenk M. Employment and cancer: findings from a longitudinal study of breast and prostate cancer survivors. *Cancer Invest* 2007;**25**(1):47–54.
- Calvio L, Feuerstein M, Hansen J, Luff GM. Cognitive limitations in occupationally active malignant brain tumour survivors. *Occup Med (Lond)* 2009;**59**(6):406–412.
- Calvio L, Peugeot M, Bruns GL, Todd BL, Feuerstein M. Measures of cognitive function and work in occupationally active breast cancer survivors. *J Occup Environ Med* 2010;**52**(2):219–227.
- Clarke TC, Soler-Vila H, Lee DJ, et al. Working with cancer: health and disability disparities among employed cancer survivors in the U.S. *Prev Med* 2011;**53**(4–5):331–334.
- Grunfeld EA, Cooper AF. A longitudinal qualitative study of the experience of working following treatment for gynaecological cancer. *Psycho-Oncology* 2012;**21**(1):82–89.
- Gudbergsson SB, Fossa SD, Sanne B, Dahl AA. A controlled study of job strain in primary-treated cancer patients without metastases. *Acta Oncol* 2007;**46**(4):534–544.

35. Gudbergsson SB, Fossa SD, Dahl AA. Is cancer survivorship associated with reduced work engagement? A NOCWO Study. *J Cancer Surviv* 2008;**2**(3):159–168.
36. Gudbergsson SB, Fossa SD, Dahl AA. A study of work changes due to cancer in tumor-free primary-treated cancer patients. A NOCWO study. *Support Care Canc* 2008;**16**(10):1163–1171.
37. Kennedy F, Haslam C, Munir F, Pryce J. Returning to work following cancer: a qualitative exploratory study into the experience of returning to work following cancer. *Eur J Cancer Care (Engl)* 2007;**16**(1):17–25.
38. Lavigne JE, Griggs JJ, Tu XM, Lerner DJ. Hot flashes, fatigue, treatment exposures and work productivity in breast cancer survivors. *J Cancer Surviv* 2008;**2**(4):296–302.
39. Lee MK, Lee KM, Bae JM, et al. Employment status and work-related difficulties in stomach cancer survivors compared with the general population. *Br J Cancer* 2008;**98**(4):708–715.
40. Main DS, Nowels CT, Cavender TA, Etschmaier M, Steiner JF. A qualitative study of work and work return in cancer survivors. *Psycho-Oncology* 2005;**14**(11):992–1004.
41. Munir F, Burrows J, Yarker J, Kalawsky K, Bains M. Women's perceptions of chemotherapy-induced cognitive side affects on work ability: a focus group study. *J Clin Nurs* 2010;**19**(9–10):1362–1370.
42. Oberst K, Bradley CJ, Gardiner JC, Schenk M, Given CW. Work task disability in employed breast and prostate cancer patients. *J Cancer Surviv* 2010;**4**(4):322–330.
43. Quinlan E, Thomas-MacLean R, Hack T, et al. The impact of breast cancer among Canadian women: disability and productivity. *Work* 2009;**34**(3):285–296.
44. Quinlan E, Maclean R, Hack T, et al. Breast cancer survivorship and work disability. *J Disabil Policy Stud.* 2011;**22**(1):18–27.
45. Rasmussen DM, Elverdam B. The meaning of work and working life after cancer: an interview study. *Psycho-Oncology* 2008;**17**(12):1232–1238.
46. Taskila T, de Boer AGEM, van Dijk FJH, Verbeek JHAM. Fatigue and its correlates in cancer patients who had returned to work—a cohort study. *Psycho-Oncology* 2011;**20**(11):1236–1241.
47. Torp S, Gudbergsson SB, Dahl AA, Fossa SD, Flotten T. Social support at work and work changes among cancer survivors in Norway. *Scand J Public Health* 2011;**39**(6 Suppl):33–42.
48. Yarker J, Munir F, Bains M, Kalawsky K, Haslam C. The role of communication and support in return to work following cancer-related absence. *Psycho-Oncology* 2010;**19**(10):1078–1085.
49. Yu M, Ferrucci LM, McCorkle R, et al. Employment experience of cancer survivors 2 years post-diagnosis in the Study of Cancer Survivors-I. *J Cancer Surviv* 2012;**6**(2):210–218.
50. Bultmann U, Huibers MJ, van Amelsvoort LP, Kant I, Kasl SV, Swaen GM. Psychological distress, fatigue and long-term sickness absence: prospective results from the Maastricht Cohort Study. *J Occup Environ Med* 2005;**47**(9):941–947.