

Work satisfaction and quality of life in cancer survivors in the first year after oncological rehabilitation

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Abstract.

BACKGROUND: Since a growing number of patients are likely to return to work (RTW) after cancer diagnosis and treatment, there is an increasing recognition of the work situation, and the physical as well as psychosocial functioning among those survivors who returned to work.

OBJECTIVE: To prospectively examine Health Related quality of Life (HRQoL) and different aspects of work satisfaction in cancer survivors.

PARTICIPANTS: $N = 702$ employed cancer patients (85% women) were recruited on average 11 months post diagnosis and assessed at the beginning (t_1), the end (t_2) and 12 months after cancer rehabilitation program (t_3).

METHODS: Participants completed validated measures assessing work satisfaction, working conditions, job strain and HRQoL.

RESULTS: Participants showed a high work satisfaction and were most satisfied with job related activities and least satisfied with work organization and leadership. Total work satisfaction was significantly associated with older age, higher monthly income, higher school education, and HRQoL, but not with any cancer- or treatment related characteristics. No significant changes in work satisfaction over time were observed except for a significant deterioration in satisfaction with job related activities ($p = 0.002$; $\eta^2 = 0.019$), professional acknowledgement ($p = 0.036$; $\eta^2 = 0.009$), and overall work satisfaction ($p < 0.001$; $\eta^2 = 0.087$) with small to moderate effect sizes.

CONCLUSIONS: Our findings emphasize the need for comprehensive cancer rehabilitation programs and specific vocational interventions.

Keywords: Work satisfaction, employment, cancer, quality of life, rehabilitation

1. Introduction

With an increasing prevalence of cancer in the working-age population worldwide [10], more evidence is needed to better understand factors both promoting and limiting employment and work satisfaction in cancer patients. Although there has been increasing research looking at return to work in cancer sur-

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vivors [3,5,7,15,20,22,24,28,31,32,34], there is more limited evidence regarding the impact of cancer and cancer treatments on work satisfaction and health related quality of life (HRQoL) among employed cancer patients.

A recent publication showed that breast cancer patients who had returned to work six months after surgery showed a significantly higher life satisfaction as a whole, and a higher satisfaction with their vocational situation, somatic health and psychological health than women not working [17]. The highest levels of physical and mental functioning, and HRQoL were found in women who continued to work through treatment, followed by women who discontinued to work through treatment but returned to work [19]. Among fully employed patients with hematological cancers, 73% reported good HRQoL compared to 22% of those on disability insurance and 28% of those on part-time work. HRQoL was significantly associated with employment status and age [2]. Findings by Hamilton et al. [13] among survivors after hematopoietic stem cell transplantation indicated that financial stress was consistently related to HRQoL: it was inversely associated with physical well-being, emotional well-being, functional well-being, and transplant-specific concerns.

Torp et al. [33] examined worksite adjustments in cancer survivors, measured within 15–39 months of diagnosis. Their findings showed that 26% of cancer survivors had made one or more adjustments at work such as reduce the number of weekly work hours or change work tasks to reduce physical and mental strains. Following a diagnosis of cancer, 56% of patients reported changes in their occupational role [29]. Cancer survivors who had changed their work due to cancer had significantly higher levels of anxiety and depression as well as significantly poorer physical and mental HRQoL [11].

Given the limited number of studies examining work satisfaction and HRQoL in employed cancer survivors, more research is necessary to investigate work-related outcomes and its association with patient's physical, functional and emotional well-being. The purpose of this study was to examine different aspects of work satisfaction and HRQoL in a sample of cancer survivors at the beginning of a cancer rehabilitation program and 12 months after the rehabilitation program. In detail, we investigated work satisfaction related to different areas of the job, and HRQoL at the beginning of the rehabilitation program. Group differences in work satisfaction and HRQoL between patients on sick leave and not on sick leave were tested. We analyzed de-

mographic (age, gender, marital status, education and net income), cancer- and treatment-related (cancer entity, stage, disease phase/remission, time since diagnosis and treatments) as well as type of work significantly related with work satisfaction.

We further examined the associations between work satisfaction, working conditions and job strain as well as changes in work satisfaction over time in those patients who were working 12 months after the cancer rehabilitation program. Changes in HRQoL over time depending on the working status of the patient as well as the associations between work satisfaction and HRQoL were additionally analysed.

2. Methods

2.1. Study design and participants

Cancer patients were recruited consecutively from four inpatient cancer rehabilitation facilities in the Northern part of Germany and assessed at the beginning (t_1) and end of rehabilitation (t_2), and 12 months after rehabilitation (t_3). Inclusion criteria comprised (a) age 18–60 years, (b) the capability to complete study measures, and (c) the absence of permanent invalidity and early retirement. The study received research ethics committee approval. All patients provided written informed consent prior to participation. The study methodology has been described fully elsewhere [22].

Cancer rehabilitation programs in Germany are mainly provided in specialized rehabilitation clinics immediately after completion of the primary treatment. However, cancer rehabilitation at a later stage during the course of cancer treatment is also provided. A cancer rehabilitation program lasts three weeks following a multidimensional therapeutic approach that includes patient education, exercises, and physical therapy, relaxation training, and psychosocial counseling.

2.2. Study variables and measures

Demographic, cancer and treatment-related information was obtained at the beginning of the rehabilitation program using standardized questions and medical charts. The Karnofsky status was used as a performance measure for rating the ability of a somatically ill person to perform usual activities [18].

Work satisfaction, working conditions, job strain and occupational characteristics were assessed using questions and brief questionnaires developed and psy-

chometrically evaluated by Bürger et al. [4]. Occupational information included type of work, work ability and sick leave absence. Work satisfaction (e.g. satisfaction with co-workers, supervisors) was measured using a 12 item Likert scale ranging from 1 = “not satisfied at all” to 7 = “totally satisfied” (Cronbach’s $\alpha = 0.92$). Various working conditions (e.g. physically heavy work) were measured using an 8 item scale ranging from 0 = “not applicable” to 3 = “totally true”. Job strain (e.g., many responsibilities at work, highly competitive work) was measured using a 9 item 4-point Likert scale ranging from 1 = “almost never” to 7 = “quite often” (Cronbach’s $\alpha = 0.87$).

The Short-Form Health Survey (SF-8) [35] measures dimensions of QOL: Physical Functioning, Role Physical, Bodily Pain, General Health, Vitality, Social Functioning, Mental Health, Role Emotional and two summary scores for physical (PCS) and mental health (MCS). Each item score or summary measurement ranges from 0–100, higher scores indicating better health. Representative German population-based reference data for different age groups were published by Ellert et al. [6].

2.3. Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 18.0. Group differences were calculated using analysis of variance (ANOVA) in normally distributed metric data. We also used repeated measures analysis of variance (RM-ANOVA) with time as within-subjects factor with two levels ($t_1 - t_3$). Cohen’s standardized effect size for uni- and multivariate tests (η^2) was calculated in order to provide an estimate of the magnitude of mean differences. Bivariate associations between variables were calculated using Pearson’s Product-Moment correlation coefficient. Two-tailed significance tests were conducted using a significance level of $p < 0.05$.

3. Results

A total of 1148 patients were enrolled at t_1 (75.5% participation rate); 372 patients declined to participate. Among those who participated at t_1 , 1060 completed the questionnaires at t_2 . At t_3 , questionnaires were mailed to 994 eligible patients (36 patients had moved to an unknown address and 30 had died); 750 (75%, 65% of the total sample) of whom returned questionnaires

Table 1
Sociodemographics and medical sample characteristics (t_1) ($N = 702$)

	<i>n</i>	%
Mean Age, (SD)	48.7	(6.7)
<i>Gender</i>		
Female	597	85.0
Male	105	15.0
<i>Marital status</i>		
Married	473	67.4
Single	113	16.1
Divorced	102	14.5
Widowed	14	2.0
<i>Cohabiting</i>	537	76.5
<i>Educational level</i>		
Elementary school or less	281	40.0
Junior high school	214	30.5
High school degree	94	13.4
University/collegedegree	113	16.1
<i>Monthly household net income (€)</i>		
<1000	41	5.8
1000–<2000	234	33.3
2000–<3000	233	33.2
3000–<4000	136	19.4
4000 or more	58	8.3
<i>Cancer entity</i>		
Breast cancer	419	59.7
Gynecological cancers	100	14.2
Head and neck cancers	62	8.8
Other ^a	121	17.2
<i>Cancer stage (UICC)^b</i>		
I/II	542	77.2
III/IV	143	20.4
<i>Cancer remission</i>	612	87.2
<i>Mean months since diagnosis (SD)</i>	11.1	(8.5)
<i>Mean months since active treatment (SD)</i>	7.7	(12.5)
<i>Mean number of cancer treatments (SD)^c</i>	2.7	(1.1)
<i>Mean Karnofsky performance status</i>	91.7	(7.5)

^aSkin cancer, colon/rectum cancer, lung cancer, hematological cancer; ^bHematological cancers were excluded; ^cSurgery, radiation therapy, chemotherapy, hormonal treatment.

naires could be evaluated. For the analysis of the specific research questions addressed in this paper, unemployed patients at t_1 ($n = 48$) were subsequently excluded from the study sample.

Among the $N = 702$ participants, $n = 412$ (58.7%) were on sick leave at the beginning of the rehabilitation program. The majority of participants worked as employees (75.1%), 18.4% were skilled workers; 5.6% were self-employed (freelancers), and 1.0% worked as civil servants. Table 1 presents sociodemographic and medical sample characteristics.

3.1. Work satisfaction and HRQoL at the beginning of the rehabilitation program

Table 2 presents work satisfaction with regard to dif-

Table 2
Work satisfaction and HRQoL among patients at the beginning of the rehabilitation program (t_1)

	Total sample ($N = 702$)		Current sick leave absence ($n = 412$)		No sick leave absence ($n = 290$)		<i>p</i> -value	η^2
	M	SD	M	SD	M	SD		
Satisfaction with ^a								
Co-workers	5.18	1.55	5.13	1.52	5.26	1.59	0.285	–
Direct supervisor	4.69	1.80	4.72	1.76	4.65	1.85	0.610	–
Job related activities/tasks	5.40	1.54	5.34	1.58	5.48	1.48	0.244	–
Working conditions	4.79	1.64	4.64	1.65	4.99	1.61	0.006	0.011
Work climate	4.80	1.72	4.72	1.74	4.92	1.69	0.135	–
Organisation and leadership	4.45	1.69	4.39	1.70	4.52	1.68	0.318	–
Personal record to date	5.18	1.50	5.12	1.53	5.26	1.45	0.214	–
Payment	4.71	1.54	4.68	1.51	4.75	1.59	0.526	–
Professional acknowledgement	5.09	1.55	5.04	1.58	5.16	1.52	0.360	–
Working hours	4.97	1.71	4.84	1.71	5.16	1.69	0.016	0.009
Workplace security	4.96	1.85	4.97	1.80	4.95	1.92	0.905	–
Overall job	5.26	1.52	5.17	1.54	5.38	1.47	0.079	–
Total score	4.96	1.19	4.90	1.18	5.04	1.19	0.120	–
HRQoL								
Physical Functioning	39.84	8.68	37.75	8.41	42.82	8.19	<0.001	0.083
Role physical	36.66	8.50	34.54	8.03	39.66	8.25	<0.001	0.088
Bodily pain	46.29	9.42	44.56	9.54	48.74	8.69	<0.001	0.048
General health	42.37	5.75	41.66	5.80	43.37	5.54	<0.001	0.022
Vitality	45.66	8.75	44.71	8.75	47.01	8.58	0.001	0.017
Social functioning	44.37	9.04	43.63	9.14	45.43	8.81	0.009	0.010
Role emotional	40.09	7.97	39.00	8.04	41.63	7.63	<0.001	0.026
Mental health	40.72	9.43	40.86	9.71	40.52	9.04	0.648	–
Physical QoL	49.24	9.15	46.64	8.73	52.93	8.45	<0.001	0.114
Mental QoL	52.15	10.49	52.21	10.69	52.06	10.22	0.855	–

^aScale from 1 = “not satisfied at all” to 7 = “totally satisfied”.

ferent work areas for the total sample and both patient groups currently on sick leave and not on sick leave. Overall, participants showed a high satisfaction with their work ($M = 4.96$, $SD = 1.19$). Patients were most frequently satisfied with job related activities and tasks, their overall work, with their personal record to date, with their relations to co-workers, and professional acknowledgements. Participants were less satisfied with the work organization and leadership, the direct supervisor and their payment. Participants currently on sick leave were less satisfied with their working conditions ($p = 0.006$) and working hours ($p = 0.016$); however, overall MANOVA shows no significant difference in work satisfaction between both groups ($p = 0.092$).

In total work satisfaction (sum score) was associated with older age ($r = 0.09$) ($p = 0.022$), higher monthly net income ($r = 0.11$) ($p = 0.006$) and higher school education ($r = 0.09$) ($p = 0.023$). No significant group differences were found with regard to type of work (employees, skilled workers, freelancers and civil servants) ($p = 0.76$), gender ($p = 0.961$), cohabitation ($p = 0.187$); and with any cancer- or treatment related characteristics including the Karnofsky performance status ($p > 0.05$). Furthermore, work sat-

isfaction was positively correlated with perceived work ability ($r = 0.17$) ($p < 0.001$). With regard to HRQoL, participants currently on sick leave had significantly lower HRQoL in all dimensions except for the mental health dimension and the mental health sum score (Table 2).

3.2. Associations between working conditions, job strain, and work satisfaction

As shown in Table 3, lower work satisfaction at the beginning of the rehabilitation program was most likely associated with rationalizing and restructuring at work, with excessive overall work demands, under-challenging work, highly competitive work, and time pressure at work.

3.3. Changes in work satisfaction over time

One year after completion of the rehabilitation program, $n = 558$ patients (79.5%) had returned to work, on average at $M = 5.7$ ($SD = 8.6$) weeks after the rehabilitation program. Among the 568 patients who returned to work, the majority (81.2%) returned to their

Table 3
Associations between working conditions, job strain and work satisfaction at t_1 and t_3

	Total work satisfaction	
	$r(t_1)^c$ ($N = 702$)	$r(t_3)^c$ ($n = 558$)
Working conditions ^a		
Rationalizing and restructuring work processes	-0.31***	-0.27***
Excessive overall work demands	-0.30***	-0.28***
Under-challenging work	-0.21***	-0.14***
One sided posture	-0.16***	-0.17***
Wetness, coldness and draft	-0.14***	-0.16***
Implementation of new technologies at work	-0.11**	-0.13**
Physically heavy work	-0.08*	-0.17***
Frequent/long hours sitting position	-0.05	-0.02
Job strain ^b		
Highly competitive work	-0.27**	-0.32***
Time pressure at work	-0.22***	-0.23***
Tight appointment schedules	-0.17***	-0.27***
Many innovations and work changes	-0.10**	-0.07
Small errors can lead to serious harm	-0.10**	-0.19***
Overtime work	-0.08*	-0.15**
High levels of attention required	-0.07	-0.17***
Plenty of work	-0.04	-0.04
Many responsibilities at work	0.03	-0.01

^aScale from 0 = "not applicable" to 3 = "totally true"; ^bScale from 1 = "almost never" to 4 = "quite often"; ^c* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4
Work satisfaction among patients at t_1 and at one year after cancer rehabilitation (t_3) ($n = 558$)

Satisfaction with ^a	Employed patients				p -value	η^2
	t_1		t_3			
	M	SD	M	SD		
Co-workers	5.17	1.52	5.41	4.46	0.244	-
Direct supervisor	4.78	1.77	4.99	4.60	0.317	-
Job related activities/tasks	5.44	1.52	5.19	1.66	0.002	0.019
Working conditions	4.87	1.61	4.79	1.67	0.282	-
Work climate	4.82	1.70	4.81	1.73	0.918	-
Organisation and leadership	4.47	1.71	4.49	1.70	0.868	-
Personal record to date	5.19	1.50	5.20	1.54	0.910	-
Payment	4.75	1.53	4.85	1.52	0.137	-
Professional acknowledgement	5.12	1.53	4.96	1.66	0.036	0.009
Working hours	5.03	1.71	4.96	1.83	0.433	-
Workplace security	5.03	1.83	5.03	1.83	0.966	-
Overall work	5.32	1.48	4.77	1.58	<0.001	0.087
Total score	5.01	1.19	4.93	1.28	0.143	-

^aScale from 1 = "not satisfied at all" to 7 = "totally satisfied".

former position and workplace. Results about predictors of return to work in this sample (including unemployed patients) are described in detail by Mehnert and Koch [22].

As shown in Table 4, no significant changes between the baseline and follow-up total work satisfaction were observed except for a significant deterioration in satisfaction with job related activities and work tasks ($p = 0.002$; $\eta^2 = 0.019$), professional acknowledgement ($p = 0.036$; $\eta^2 = 0.009$), and the overall work satisfaction ($p < 0.001$; $\eta^2 = 0.087$). We moreover found a significant higher work satisfaction at t_1

in patients working at t_3 ($n = 558$) compared to patients who had not returned to work ($n = 144$) ($p = 0.007$) ($\eta^2 = 0.041$). Participants who reported work changes at t_3 did not significantly differ in their work satisfaction ($p = 0.66$).

3.4. Changes in HRQoL over time depending on return to work

The course of HRQoL over time was compared between patients working at follow up ($n = 558$) and patients not working at follow up ($n = 144$) (Ta-

Table 5
Repeated measures analysis of variance for HRQoL at t_1 and 12-months follow up (t_3)

HRQoL ^a	Employment at t_3	<i>n</i>	t_1		t_3		Time			Interaction		
			M	SD	M	SD	F (df)	<i>p</i> -value	η^2	F (df)	<i>p</i> -value	η^2
Physical Functioning	Yes	558	41.19	8.45	44.29	8.18	57.5 (1.0)	<0.001	0.077	0.2 (1.0)	0.671	–
	No	144	34.64	7.61	38.10	8.77						
	Total	702	39.86	8.69	43.03	8.67						
Role Physical	Yes	558	37.82	8.46	41.97	8.56	72.2 (1.0)	<0.001	0.094	1.3 (1.0)	0.260	–
	No	144	32.21	7.20	35.38	8.36						
	Total	702	36.68	8.52	40.63	8.92						
Bodily Pain	Yes	558	47.46	9.05	48.95	9.02	7.1 (1.0)	0.008	0.010	0.4 (1.0)	0.693	–
	No	144	41.91	9.57	42.83	9.35						
	Total	702	46.33	9.42	47.71	9.41						
General Health	Yes	558	43.28	5.24	45.41	5.62	56.9 (1.0)	<0.001	0.076	0.2 (1.0)	0.624	–
	No	144	38.92	6.31	41.34	5.80						
	Total	702	42.40	5.74	44.58	5.88						
Vitality	Yes	558	46.67	8.48	49.57	8.15	35.8 (1.0)	<0.001	0.049	0.2 (1.0)	0.643	–
	No	144	41.96	8.63	44.44	8.86						
	Total	702	45.71	8.71	48.52	8.55						
Social Functioning	Yes	558	45.34	8.77	47.43	8.28	16.9 (1.0)	<0.001	.024	0.2 (1.0)	.695	–
	No	144	40.94	9.20	42.67	9.26						
	Total	702	44.45	9.03	46.46	8.69						
Role Emotional	Yes	558	41.30	7.65	44.08	7.50	52.9 (1.0)	<0.001	0.071	0.4 (1.0)	0.551	–
	No	144	35.62	7.63	38.90	7.88						
	Total	702	40.15	7.98	43.03	7.85						
Mental Health	Yes	558	41.69	8.97	44.06	9.09	20.6 (1.0)	<0.001	0.029	0.4 (1.0)	0.516	–
	No	144	37.16	10.41	38.94	10.32						
	Total	702	40.77	9.45	43.02	9.57						
Physical QoL	Yes	558	50.70	8.98	54.39	8.86	63.5 (1.0)	<0.001	0.084	0.2 (1.0)	0.652	–
	No	144	43.73	7.70	47.03	8.75						
	Total	702	49.28	9.17	52.89	9.32						
Mental QoL	Yes	558	53.36	10.01	56.06	10.46	24.6 (1.0)	<0.001	0.034	0.1 (1.0)	0.757	–
	No	144	47.96	11.10	50.35	11.16						
	Total	702	52.26	10.46	54.90	10.85						

^aSF-8 Scale range from 0–100 (higher scores indicate better QoL).

ble 5). Both patient groups improved significantly over time in all HRQoL dimensions (p -values < 0.05), with small to moderate effect sizes. Repeated measures ANOVA revealed no significant interaction effects. However, at both time points (t_1 and t_3) patients working at t_3 showed significant better HRQoL in all dimensions (p -values < 0.001), even when UICC cancer stage and Karnofsky performance status was controlled.

For both men and women we found significant better physical and mental health in cancer survivors compared to age-adjusted normative data from the German general population (p -values < 0.01). However, men not working at t_3 showed lower physical health compared to age-adjusted normative data ($p = 0.01$). No differences were found in mental health ($p = 0.78$). Women not working at t_3 did not differ from age-adjusted normative data in both physical and mental

health. However, both men and women working at t_3 showed significantly better physical and mental health (p -values < 0.001).

3.5. Associations between work satisfaction and HRQoL

Participants' work satisfaction at the beginning of the rehabilitation program was positive correlated with all dimensions of HRQoL. At 12 months follow-up, we found significant and overall stronger correlations between work satisfaction and HRQoL (Table 6).

4. Discussion

In our study, participants showed a high work satisfaction and were most satisfied with job related ac-

Table 6

Associations between work satisfaction and HRQoL at t_1 ($N = 702$) and t_3 ($n = 558$)

	Total work satisfaction	
	$r(t_1)^a$	$r(t_3)^a$
HRQoL		
Physical Functioning	0.12***	0.19***
Role Physical	0.14***	0.23**
Bodily Pain	0.13***	0.17**
General Health	0.19***	0.26**
Vitality	0.18***	0.32**
Social Functioning	0.19***	0.30**
Role Emotional	0.21***	0.34**
Mental Health	0.22***	0.27**
Physical QoL	0.13***	0.21**
Mental QoL	0.23***	0.31**

^a $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

tivities and least satisfied with work organization and leadership. Total work satisfaction was significantly associated with older age, higher monthly income, higher school education, and HRQoL, but not with any cancer- or treatment related characteristics. No significant changes in work satisfaction over time were observed except for a significant deterioration in satisfaction with job related activities, professional acknowledgement, and overall work satisfaction.

The overall high work satisfaction in our study indicates that work can represent an important resource for cancer patients in coping with the disease and return to every day life. Previous research has shown that cancer survivors try to get back to work after treatment and try to re-establish their former structure of everyday-life that is seen as a normal and healthy existence [23]. In our study, patients were particularly satisfied with job related activities and tasks, their overall work, with their personal achievements and their relations to co-workers. The latter finding corresponds with previous results. Taskila et al. [30] as well as Gudbergsson et al. [12] showed that cancer survivors had received most support from their co-workers.

Observations that work satisfaction was not related to overall type of work or any medical characteristics, but was associated with higher net income and higher school education is important. It could be assumed that higher net income and higher school education is associated with more personal responsibility, flexibility and variation at work that probably leads to higher work satisfaction. Further research is needed to address job-related patterns that lead to higher work satisfaction in more detail.

Work satisfaction at both time points was significantly associated with better HRQoL. Our findings emphasize the significance of functional capacity particu-

larly with regard to vitality, emotional, social and role functioning for work satisfaction; and thus the need to provide rehabilitation programs for cancer survivors and to improve physical and psychosocial functioning [14,16,21,27]. Comprehensive rehabilitation programs for cancer patients should aim at ensuring continuity of care and provide interventions tailored to the individual problems of the patient. Reducing the impact of disabling and handicapping conditions and at enabling people with disabilities to achieve optimal (re-)integration into the society and working life is linked to the goals of the International Classification of Functioning, Disability and Health (ICF) [36].

Lower work satisfaction was particularly associated with working conditions that include a high amount of rationalizing (streamlining) work processes and restructuring work, and excessive work demands as well as perceived job strains such as highly competitive work and time pressure at work. It can be assumed that these factors might significantly contribute to lower work satisfaction and lead to adverse personal consequences also in healthy populations [26]. However, they might be particularly important in individuals with chronic health conditions and limitations in their functional capacities.

Particularly with regard to the needs of individuals with chronic health conditions, it has been previously described by Feuerstein et al. [9], that employees with cancer or other persistent health problems generally need some flexibility at various aspects and times at work. This demand for greater work flexibility among cancer patients can be adversely related to specific job requirements. Thus, it is essential for the development of vocational interventions to gain information about the frequency of work-related impairments and problems of cancer survivors in different companies and work sectors, and to gain knowledge about how employers deal with work-related problems among cancer survivors [8].

To our knowledge, no other study has examined whether various aspects of work satisfaction change over time in cancer survivors. We found no overall changes in work satisfaction (total score); however employed participants reported a significant decline in satisfaction with work tasks and job related activities, professional acknowledgement and the overall work. These results can be explained by possible changing preferences with regard to the importance of work and work related activities given the experience of a life-threatening illness. On the other hand, individuals with cancer in our society are often viewed as somehow now

defective [8], particularly at the workplace. Findings by Ahn et al. (2009) indicated that 2% of breast cancer survivors reported reduced opportunity for promotion; and one fifth of those survivors who returned to work and stayed in the same employment reported deterioration in job satisfaction and career prospects [1]. Schultz et al. [25] reported that 7% of cancer survivors had experienced difficulties at work such as denied promotion, which can have an adverse effect in job satisfaction.

Although participants who did not return to work had a significantly lower HRQoL, all patients improved significantly over time. Furthermore, both women and men who were return to work after cancer rehabilitation reported a significantly better HRQoL compared to the general population and patients who did not return to work. Our findings correspond with previous results [2,17,19].

Although our study has several strengths including the prospective design and the relatively large sample size, there are several methodological limitations. With regard to the generality and interpretation of the findings, a sample bias must be considered in two respects: Despite the fact that cancer rehabilitation programs are provided to every cancer patient in Germany, our sample consists only of patients who use the services provided. This might lead to a bias towards a sample with high physical and psychosocial impairments. With regard to our sample, a bias toward female gender, younger age, and cancer entities associated with a better physical health status, and better psychological well-being in the longitudinal course of the study must be taken into account [22]. Given this bias, our findings might overestimate the degree to which cancer patients stayed employed, and particularly work satisfaction. Another limitation is that due to the allocation process mainly regulated by the German pension insurance, it was not feasible to randomize the study sample. Furthermore, the inclusion of a matched control group could not be realized since most patients with rehabilitation needs are referred to a rehabilitation program.

5. Conclusions

The majority of employed cancer survivors are satisfied with work and that work satisfaction is moderately associated with HRQOL, working conditions and job strain, but not with cancer and treatment related characteristics. Our findings emphasize not only the need

for the implementation of comprehensive cancer rehabilitation programs but also the need to better explore work ability in cancer survivors from the perspective of employers in order to develop specific vocational interventions. Investigating relevant work-related aspects in cancer patients is critical to improving the understanding and assessment of central dimensions of work and occupational aspects in cancer survivorship.

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