EUROPEAN JOURNAL OF CANCER 43 (2007) 2093–2099

available at www.sciencedirect.com

ScienceDirect

journal homepage: www.ejconline.com

Are cancer survivors at an increased risk for divorce? A Danish cohort study

Kathrine Carlsen[a,*], *Susanne Oksbjerg Dalton*[a], *Kirsten Frederiksen*[a], *Finn Diderichsen*[b], *Christoffer Johansen*[a]

[a]*Department of Psychosocial Cancer Research, Institute of Cancer Epidemiology, Danish Cancer Society, Strandboulevarden 49, DK 2100 Copenhagen, Denmark*

[b]*Department of Social Medicine, Institute of Public Health, University of Copenhagen, Copenhagen, Denmark*

ARTICLE INFO

Article history:
Received 27 April 2007
Received in revised form 25 May 2007
Accepted 29 May 2007
Available online 12 July 2007 12 July 2007

Keywords:
Cancer
Survivorship
Divorce
Social relations

ABSTRACT

The purpose of this study was to determine the risk for divorce among cancer survivors. We conducted a nationwide, population-based study of 46,303 persons aged 30–60 years in whom selected cancers were diagnosed in 1981–2000 and 221,028 randomly sampled, cancer-free controls. Information on socioeconomic status, demographics and comorbidity was obtained from Danish administrative registries. We analysed the risk for divorce, adjusted for known risk factors, during follow-up and whether the socioeconomic and health status at the time of diagnosis had an impact on the risk for divorce.

Except for survivors of cervix cancer, who had an increased risk for divorce, we found that cancer survivors were not at greater risk for divorce than the general population (rate ratios (RR), 1.06; 95% confidence interval (CI), 1.0;1.1 and RR, 0.98; 95% CI, 0.9;1.0 for women and men, respectively). This finding shows that cancer survivors need not have unnecessary fears for their marriage.

1. Introduction

During a lifetime, nearly one of three persons in the Danish population of 5.4 million will receive a diagnosis of cancer.[1] Concurrently with advances in treatment and early detection, more than 10 million people in the USA are cancer survivors, indicating that more than 60% of persons with a newly diagnosed cancer in that country will expect to survive for more than 5 years.[2]

The impact of cancer on the life trajectory depends on disease-related factors, treatment factors and possible late effects but also on life circumstances, such as personal resources, socioeconomic status and social support.[3] A substantial proportion of social support is provided by a partner, and married cancer patients have consistently been found to benefit from such support in terms of better survival than unmarried cancer patients.[4–6] It might be hypothesised that a major life event such as diagnosis of cancer would have a considerable effect on the quality of a marriage and that cancer patients are therefore at increased risk for divorce. Besides loss of a spouse, divorce can also disrupt the social network of survivors and reduce their socioeconomic status and overall quality of life.[7,8] In addition, divorce can increase the risk for an unhealthy lifestyle, including increased consumption of alcohol and tobacco smoking, reduced physical activity and an unhealthy diet. Such changes can subsequently increase the risks for recurrence and comorbidity and jeopardise survival.[9]

Despite both public and clinical interest, only a few small- and medium-sized studies have addressed the association

* *Corresponding author*: Tel.: +45 35257500; fax: +45 35257731.
E-mail address: kathcarl@cancer.dk (K. Carlsen).
0959-8049/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.ejca.2007.05.024

between cancer and divorce;[10–16] however, all these studies suffer from one or more methodological problems, including lack of a control group, low response rate or lack of adjustment for important confounders.

In this nationwide, population-based study, we investigated the extent to which diagnosis and treatment of cancer increase the risk for divorce during up to 20 years of follow-up. In addition, we analysed how socioeconomic and health status at the time of diagnosis affect the divorce rate. We used information from Danish administrative registers, allowing us to account for factors such as age, gender, cancer site, socioeconomic status and hospitalisation for major somatic and psychiatric comorbidity.

2. Materials and methods

Since 1943, all incident cases of cancer in Denmark have been registered in the Danish Cancer Registry. We obtained information from the Registry on patients aged 30–60 years at the date of diagnosis of an incident cancer between 1980 and 2000, who were alive 1 year after the date of diagnosis. The selected cancer sites are listed in Table 1. In addition, we obtained the unique personal identification number, the date of diagnosis and stage of disease, defined as local, regional or metastatic, for each of the 65,510 persons with cancer who fulfilled these criteria.

A random control cohort from the Danish population ($n = 316,925$) was sampled from the Central Population Register, which holds information on all persons in Denmark. Approximately, five controls free of cancer and alive at the time of sampling were frequency matched on gender and date of birth to each cancer case. The entry for the controls was the same calendar year as the year of cancer diagnosis for the cases, so that the controls could change their status to cases during follow-up.

2.1. Registers

Information on a number of demographic and socioeconomic characteristics for the two cohorts was obtained by data linkage to the population-based Integrated Database for Labour Market Research, which has been administered by Statistics Denmark since 1980. The core variables in the Database are derived once a year by linkage with the Central Person Registry, covering all persons in Denmark, all companies with more than one employee, the taxation authorities, the Registry for Education Statistics and the Registry Relating to Unemployment. In order to determine household income for both cohorts, we identified partners and their income for each year of the study period.

The demographic variables (Table 2) included age, gender, degree of urbanicity and children living at home the previous year. The socioeconomic variables included highest attained educational level, job type and income the previous year, adjusted for the number of adults in the household and deflated according to the 2001 value of the Danish crown.

By linking the personal identification number to the files of the Hospital Discharge Register, which has registered information on all hospitalisations in Denmark since 1978, we obtained a full history of illness leading to hospitalisation or outpatient visits for each cohort member from 1980 to 2001.[17] We obtained information on date of admission and discharge and all diagnoses and operations per hospitalisation. Comorbidity was defined according to the Charlson index of 19 selected diseases scored on a severity scale from 1 to 3.[18] On the basis of the accumulated sum of scores, the comorbidity index was grouped into scores of 0 and $\geqslant 1$.

The nationwide Danish Psychiatric Central Register contains data on all admissions to psychiatric hospitals and psychiatric wards in general hospitals since 1969. We obtained information on date of admission, date of discharge and one main diagnosis for all cohort members. All hospital contacts for depression were identified, and the variable was dichotomised.[19]

Table 1 – Cancer sites included in the study cancer and the risk for divorce

Site	ICD-7 code	No. of cases
Colorectum	153, 154	7269
Breast	170	24,711
Uterus	172	2962
Ovary	175	3011
Cervix	171	4868
Prostate	177	1252
Testis	178	3052
Kidney	180	1751
Urinary bladder	181	4227
Malignant melanoma of the skin	190	6795
Non-Hodgkin lymphoma	200, 202	2887
Hodgkin lymphoma	2001	904
Leukaemia	204	1821

2.2. Total sample

In total, the two cohorts consisted of 382,435 individuals, representing 10.9% of the Danish population aged 10–60 years in 1980. We excluded persons for whom there were errors in the data files ($n = 8463$), missing values for core variables ($n = 6657$) or entry before January 1st, 1981 ($n = 14,767$). We also excluded persons who were not Danish citizens ($n = 8136$) at entry on the basis of the possibility that immigrants have a different family structure from that of Danish citizens. We also excluded persons who were not living with a partner in the year of entry ($n = 77,081$), leaving 46,303 persons in the cancer cohort and 221,028 controls for analysis.

2.3. Follow-up

The outcome of the study was divorce, defined as a change in civil status (unless the change was due to the death of a spouse) for married persons and a change in cohabitating status to living alone for persons registered as cohabitating. All persons were followed from the date of cancer diagnosis (case) or entry (control) until divorce, death of a spouse, attaining 60 years of age, date of death or December 31st, 2001. Controls who became cases during follow-up ($n = 6657$) were followed in the unexposed cohort until the year of

Table 2 – Descriptive characteristics at time of inclusion of 46,303 persons with selected cancers and 221,028 age- and gender-matched cancer-free controls, Denmark 1981–2000

Characteristic	Women		Men	
	Case	Control	Case	Control
	(*n* = 32,897) No. (%)	(*n* = 158,203) No. (%)	(*n* = 13,406) No. (%)	(*n* = 62,825) No. (%)
Age (years)				
30–39	4843 (15)	22,754 (14)	2324 (17)	11,190 (18)
40–49	12,633 (38)	56,776 (36)	3597 (27)	16,915 (27)
50–60	15,421 (47)	78,673 (50)	7485 (56)	34,720 (55)
Children aged 0–6 years				
0	30,025 (91)	144,708 (91)	11,531 (86)	53,739 (86)
1	2872 (9)	13,495 (9)	1875 (14)	9086 (14)
Children aged 7–14 years				
0	25,265 (77)	122,992 (78)	10,085 (75)	47,042 (75)
1	7632 (23)	35,211 (22)	3321 (25)	15,783 (25)
Children aged 15–17 years				
0	27,261 (83)	132,216 (84)	11,368 (85)	52,861 (84)
1	5636 (17)	25,987 (16)	2038 (15)	9964 (16)
Highest attained educational level				
Primary school and high school	15,296 (47)	77,503 (49)	4353 (32)	22,099 (35)
Vocational education	10,932 (33)	51,205 (32)	5952 (44)	27,456 (44)
Long education	6312 (19)	28,196 (18)	2918 (22)	12,544 (20)
Other or unknown	357 (1)	1299 (1)	183 (1)	726 (1)
Comorbidity (score)				
0	30,755 (93)	46,330 (93)	11,891 (89)	57,119 (91)
$\geqslant 1$	2142 (7)	11,873 (7)	1515 (11)	5706 (9)
Depression[a]				
Not present	32,389 (98)	155,389 (98)	3281 (99)	62,231 (99)
Present	508 (2)	2814 (2)	125 (1)	594 (1)
Household income per person (€)				
<20,000	9201 (28)	43,305 (27)	3780 (28)	17,776 (28)
20,000–29,000	9293 (28)	44,656 (28)	4026 (30)	19,320 (31)
29,000–38,000	8826 (27)	41,718 (26)	3666 (27)	16,927 (27)
>38,000	5577 (17)	28,524 (18)	1934 (14)	8802 (14)
Job type				
Employed	25,028 (76)	117,822 (74)	11,918 (89)	55,873 (89)
Unemployed	7869 (24)	40 381 (26)	1488 (11)	6952 (11)
Degree of urbanicity				
Capital area	2094 (6)	9566 (6)	832 (6)	3847 (6)
Capital suburban area	4203 (13)	19,327 (12)	1787 (13)	7704 (12)
Provincial cities	3702 (11)	16,972 (11)	1520 (11)	6782 (11)
Rural area >10,000 inhabitants	9924 (30)	50,096 (32)	3983 (30)	19,975 (32)
Rural area <10,000 inhabitants	12,974 (39)	62,242 (39)	5284 (39)	24,517 (39)
Period of entry				
1981–1985	7863 (24)	33,925 (21)	2852 (21)	13,077 (21)
1986–1990	8345 (25)	37,768 (24)	3171 (24)	14,677 (23)
1991–1995	8305 (25)	40,811 (26)	3555 (27)	16,541 (26)
1996–2000	8384 (25)	45,699 (29)	3828 (29)	18,530 (29)

a (ICD-8, 296.09-39, 296.89-99, 298.19, 301.19 and 300.49; ICD-10, F30-39).

diagnosis and from that year onwards were followed in the exposed cohort.

2.4. *Statistical analysis*

In this cohort–cohort study, the data were analysed by gender. Rate ratios (RRs) for divorce and 95% confidence intervals (95% CI) were estimated on the assumption that the events were generated in a Cox proportional hazard model. To take into account the fact that information on outcome was available only once a year, discrete-time Cox regression models were fitted with the follow-up time separated into 1-year age groups by the GENMOD procedure in SAS 9.1.3 with the complementary log–log function as link function.

First, a model predicting the divorce rates among controls was fitted with the variables listed in Table 2. All the variables were entered as time-dependent variables with values for 1-year intervals. For the continuous variables (calendar year, duration of marriage and age), linearity was checked by testing whether a description as a linear spline with 10 knots placed at the percentiles gave a significantly better fit. All three variables could be entered linearly.

Because of the large amount of material, a 5% significance level was used for men and a 1% significance level for women, and the model was reduced by removing insignificant variables one by one and collapsing levels of categorical variables with similar divorce rates. Subsequently, the overall rate ratios of divorce among cancer patients and controls were estimated in a model including adjustment for the variables found to be predictors of divorce among the controls.

Furthermore, we analysed how socioeconomic and health status at the time of diagnosis influenced the divorce rate by including in the model the same variables as above but with the status at time of diagnosis. In this analysis, a variable indicating time since diagnosis, categorised as 1–2 years, 3–5 years, 6–8 years and more than 9 years after diagnosis, was included in the model. We tested for interaction between the time since diagnosis and each of the variables expressing status at diagnosis.

In addition to the adjusted estimate of divorce among all cancer survivors and controls, we estimated separate effects by cancer site, including time since diagnosis.

3. Results

At the time of entry, no major differences in demographic or socioeconomic variables were observed between the two cohorts (Table 2). A total of 21,965 persons (8%) were divorced during the 20 years of follow-up (Table 3).

The factors associated with an increased risk for divorce were similar among women and men and included having no children below 14 years of age living at home, having at

Table 3 – Mutually adjusted rate ratio's (RR's) for divorce in 46,303 persons with selected cancers and 221,028 age- and gender-matched cancer-free controls, Denmark 1981–2000

Characteristics	Women	Men
	No. of divorces: 15,297	No. of divorces: 6668
Cancer diagnosis		
Yes	1.06 (1.0–1.1)	0.98 (0.9–1.1)
No	1.00	1.00
Age (per year)	0.97 (1.0–1.0)	0.98 (1.0–1.0)
Duration of marriage (per year)	0.93 (0.9–0.9)	0.92 (0.9–0.9)
Number of children at home 0–14 years the year before		
0	1.32 (1.3–1.4)	1.40 (1.3–1.5)
⩾1	1.00	1.00
Number of children at home 15–17 years the year before entry		
0	0.70 (0.7–0.7)	0.69 (0.7–0.7)
⩾1	1.00	1.00
Education		
Primary and high school	1.01 (1.0–1.1)	1.08 (1.0–1.1)
Vocational education	1.00	1.00
Long education	1.10 (1.1–1.2)	1.07 (1.0–1.1)
Other or unknown	1.44 (1.2–1.7)	1.48 (1.2–1.8)
Employment		
Unemployed	1.45 (1.4–1.5)	1.63 (1.5–1.8)
Employed	1.00	1.00
Household income per person the year before (€)		
<22,000	1.31 (1.2–1.4)	1.46 (1.3–1.6)
22,000–30,000	1.00 (1.0–1.1)	1.14 (1.1–1.2)
30,000–38,000	0.92 (0.9–1.0)	0.96 (0.9–1.0)
>38,000	1.00	1.00
Depression[a]		
Yes	2.11 (2.0–2.3)	1.89 (1.6–2.2)
No	1.00	1.00
Comorbidity		
Yes	1.30 (1.2–1.4)	1.34 (1.3–1.4)
No	1.00	1.00

a (ICD-8, 296.09–39, 296.89–99, 298.19, 301.19 and 300.49; ICD-10, F30-39).

Table 4 – RR for divorce among 46,303 persons with selected cancers and 221,028 age- and gender-matched cancer-free controls, Denmark 1981–2000[a], by depression status and duration of marriage

	Women	Men
Control – no depression	1.00	1.00
Control – depression	2.15 (2.0–2.3)	1.99 (1.7–2.4)
Case – no depression	0.94 (0.9–1.0)	0.82 (0.7–0.9)
Case – depression at time of cancer diagnosis	1.58 (1.2–2.1)	0.80 (0.4–1.5)
Case – depression during follow-up	2.01 (1.8–2.3)	1.63 (1.3–2.0)
Control – duration of marriage (per year)	0.93 (0.9–0.9)	0.92 (0.9–0.9)
Case – duration of marriage at time of cancer diagnosis (per year)	0.94 (0.9–0.9)	0.94 (0.9–0.9)

a Adjusted for age, duration of marriage, children living at home, education, income, employment, depression and comorbidity.

Table 5 – Adjusted rate ratio's (RR's) for divorce in 32,897 women and 13,406 men diagnosed with selected cancer sites, Denmark 1981–2000[a]

Cancer site	Women RR (95% CI)	*p*-Value	Men RR (95% CI)	*p*-Value
Bladder	1.12 (0.8–1.6)	0.48	1.04 (0.9–1.3)	0.68
Breast	1.05 (1.0–1.2)	0.28	–	–
Cervix	1.43 (1.3–1.6)	<0.0001	–	–
Colorectal	1.20 (1.0–1.5)	0.07	0.88 (0.7–1.1)	0.24
Hodgkins lymphoma	1.26 (0.9–1.9)	0.23	0.96 (0.7–1.3)	0.81
Kidney	0.91 (0.6–1.4)	0.69	0.98 (0.7–1.3)	0.89
Leukaemia	1.36 (0.9–2.0)	0.11	1.24 (0.9–1.7)	0.15
Melanoma	1.01 (0.9–1.2)	0.87	1.01 (0.8–1.2)	0.94
Non-Hodgkin lymphoma	0.92 (0.7–1.2)	0.55	1.22 (1.0–1.5)	0.09
Ovary	1.00 (0.8–1.2)	0.98	–	–
Prostate	–	–	1.12 (0.8–1.6)	0.55
Testis	–	–	0.92 (0.8–1.1)	0.34
Uterus	0.88 (0.7–1.1)	0.24	–	–

a Adjusted for time since diagnosis, year of diagnosis, age, duration of marriage, children living at home, education, income, employment, depression and comorbidity.

least one child between 15 and 17 years of age living at home, unknown educational level, unemployment and low income (Table 3). Comorbidity, as measured by the Charlson index, was a risk factor for divorce among both men and women (RR, 1.30; 95% CI, 1.2;1.4 for women and RR, 1.34; 95% CI, 1.3;1.4 for men). Both men and women with a previous diagnosis of depression were at increased risk for divorce (RR, 2.11; 95% CI, 2.0;2.3 for women and RR, 1.89; 95% CI, 1.6;2.2 for men).

After adjustment for the identified risk factors for divorce among persons with no diagnosis of cancer, the overall estimated rate ratio for divorce among cancer survivors was close to unity when compared with the cancer-free, age- and gender-matched cohort (RR, 1.06; 95% CI, 1.0;1.1; $p < 0{,}01$ for women and RR, 0.98; 95% CI, 0.9;1.1; $p = 0.46$ for men) (Table 3).

No significant interactions were found between time since diagnosis and the variables expressing socioeconomic and health status at the time of diagnosis among cancer patients ($p \geqslant 0.03$ for women and $p \geqslant 0.07$ for men).

There was no association between cancer and risk for divorce among men who had had depression before their diagnosis of cancer (RR, 0.80; 95% CI, 0.4;1.5), whereas experiencing depression after the diagnosis was associated with an elevated risk (RR, 1.63; 95% CI, 1.3;2.0) that was of the same magnitude among controls (Table 4). The association between cancer and divorce was less dependent on the length of marriage than among controls (Table 4). In general, the identified risk factors were weaker if they had been present at the time of diagnosis (data not shown).

In our estimates of the associations between cancers at different sites and divorce, the risk estimates were close to unity for all cancer sites selected (Table 5). For women, however, most of the estimates pointed in the direction of a slightly increased risk for divorce. Only for women with cervix cancer did the risk estimate reach statistical significance (RR, 1.43; 95% CI, 1.3;1.6).

4. Discussion

In this large, population-based, nationwide study with up to 20 years of follow-up, we observed that female cancer survivors have a slightly increased risk for divorce, whereas the risk of men is not higher than that of the general population. This finding is in accordance with those of most previous studies on this hypothesis.[10–15,20,21] A slightly increased risk during the first five years after diagnosis was observed in a study of 403 survivors of Hodgkin disease, in which the mean age of those who divorced after cancer was lower than the mean age at divorce in the general population, so that future marital disruptions are to occur.[11]

In a Swedish register-based study, women with diagnosed breast cancer had a significant, almost 25% increase in risk for divorce, whereas men with diagnosed prostate cancer had more than 40% reduction in risk.[16] A possible explanation for this finding is the lack of control for important confounders, such as comorbidity and number of children living at home, which were identified as risk factors for divorce in the present study. The finding of a significantly increased risk for divorce among cervix cancer survivors in both the Swedish and our study might be explained by the relatively young age at diagnosis of cervix cancer, in combination with the effect of treatment for cervix cancer on the fertility of women; young age and nulliparity are known risk factors for divorce.[22] Furthermore, the treatment of cervix cancer might also affect sexual life[23] and body image,[24,25] perhaps giving rise to marital disharmony and thereby contributing to a higher risk for divorce.

Our finding of an increased risk for divorce, albeit not significant, among women with diagnosed Hodgkin disease is not supported by the results of a cross-sectional study in the USA of 222 men and 181 women with Hodgkin disease, in which the overall rate of divorce among survivors (32%) was comparable to that of the background population.[11] As the authors did not report separate analyses by gender, we were unable to determine whether the risk for divorce in that study was uniform for men and women.

For testis cancer, we found no increased risk for divorce over that of the unexposed cohort, in line with the overall results of a French case-control study of 71 survivors of testis cancer and 119 healthy controls.[12] Likewise, Rieker et al., in a retrospective study of 223 survivors of testis cancer diagnosed 2–18 years before the study and 120 age-matched controls, observed no effect on marital status at the time of interview.[14] These two studies confirmed the findings of two cross-sectional studies in the USA of 74 and 121 survivors of testis cancer.[13,15]In comparison with survivors of other forms of cancer, survivors of testis cancer have relatively little chronic physical pain or disability; however, they do report sexual impairment and problems with fertility.[12–15] Nevertheless, testis cancer survivors reported that their marriages were strengthened by the cancer experience.[14]

Although depression is known to be a strong risk factor of divorce,[16,22] we found that depression did not have an effect on the divorce rate among men who had been hospitalised for depression before cancer. One might speculate that marriages that can accommodate a male partner with depression are more likely to withstand yet another chronic disorder, such as cancer. This hypothesis is underscored by the Canadian study of 503 women with breast cancer, in which Dorval et al.[10] observed that couples who initially reported low marital satisfaction were more likely to divorce.

Unemployment, low income, living in an urban area, short duration of marriage, nulliparity and psychiatric disease are well-known risk factors for divorce.[22] We also observed that comorbidity is a predictor for divorce. Although most cancer patients experience changes in physical appearance during treatment, which persist for life in some patients, such changes do not appear to increase the risk for divorce. In contrast, other serious diseases and disabling disorders are associated with increased risks for divorce.[16,22] We have no explanation for this difference. One could hypothesise that a diagnosis of cancer is a 'major life event' that can 'be fought', giving a more time-limited perspective than, for instance, towards cardiovascular disease and diabetes, which might be seen as more chronic and thus infer more irreversible changes to the relationship between the survivor and the spouse, leading to a higher risk for divorce. We could not evaluate this hypothesis further in our dataset.

The advantages of this study include the fact that it is large, nationwide and population-based, with a matched control group, thus excluding the possibility of selection and information biases. The data in the study were obtained from public administrative registers established years before the diagnoses, leaving little room for information bias. In addition, we were able to adjust for important confounding factors and also to include both officially married persons as well as cohabitating couples, making it possible to quantify the risk for a relationship dissolving in general. At least for northern Europe, where unofficial marriages are prevalent during the first years of cohabitation, this is an important strength of this study. Most of the studies conducted so far addressed breast cancer and testis cancer; to our knowledge, our study is the first to evaluate the risk for divorce associated with cancers at various sites. We were unable to adjust for emotional factors, the quality of the relationship or marital history. The last might be a confounder, because people in a second marriage are generally at higher risk for divorce than people in their first marriage.[26]

For an increasing proportion of cancer patients, the disease becomes a chronic disorder, as illustrated by the term 'survivorship'.[2,27,28] Many lay publications, especially in the USA, focus on the fear felt by breast cancer patients of being left by their husbands.[29] Although we found an increased risk for divorce among women with diagnosed cervix cancer, the clinical message from the findings of our study is that cancer patients face the same challenges with regard to divorce as people who have never been confronted with cancer. In other words, cancer patients in a marital relationship need not fear that their disease will have a more negative impact on their marriage than would have been expected if they had not had cancer. Although the marital relationship is probably stressed by a diagnosis of cancer, most couples appear to have the resources to meet this challenge,[30] and many couples find that cancer strengthens their relationship.[14,15] It is nevertheless important to point out that cancer does not protect against divorce, even in the first years after diagnosis.

Conflict of Interest Statement

None declared.

Acknowledgements

Funding: The study was financed by the National Labour Market Authority, the Danish municipal VAT foundation and the Danish Graduate School in Public Health Science, University of Copenhagen.

REFERENCES

1. Cancer Incidence in Denmark 2001. København: Sundhedsstyrelsen; 2006.
2. Ganz PA. Monitoring the physical health of cancer survivors: a survivorship-focused medical history. *J Clin Oncol* 2006;**24**(32):5105–11.
3. Northouse L, Kershaw T, Mood D, Schafenacker A. Effects of a family intervention on the quality of life of women with recurrent breast cancer and their family caregivers. *Psychooncology* 2005;**14**(6):478–91.
4. Johansen C, Schou G, Soll-Johanning H, Mellemgaard A, Lynge E. Influence of marital status on survival from colon and rectal cancer in Denmark. *Br J Cancer* 1996;**74**(6):985–8.
5. Kato I, Tominaga S, Ikari A. The role of socioeconomic factors in the survival of patients with gastrointestinal cancers. *Jpn J Clin Oncol* 1992;**22**(4):270–7.
6. Kvikstad A, Vatten LJ, Tretli S. Widowhood and divorce in relation to overall survival among middle-aged Norwegian women with cancer. *Br J Cancer* 1995;**71**(6):1343–7.
7. Kornblith AB, Herndon JE, Zuckerman E, et al. Social support as a buffer to the psychological impact of stressful life events in women with breast cancer. *Cancer* 2001;**91**(2):443–54.
8. Lehto US, Ojanen M, Kellokumpu-Lehtinen P. Predictors of quality of life in newly diagnosed melanoma and breast cancer patients. *Ann Oncol* 2005;**16**(5):805–16.
9. Doyle C, Kushi LH, Byers T, et al. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. *CA Cancer J Clin* 2006;**56**(6):323–53.
10. Dorval M, Maunsell E, Taylor-Brown J, Kilpatrick M. Marital stability after breast cancer. *J Natl Cancer Inst* 1999;**91**(1):54–9.
11. Fobair P, Hoppe RT, Bloom J, Cox R, Varghese A, Spiegel D. Psychosocial problems among survivors of Hodgkin's disease. *J Clin Oncol* 1986;**4**(5):805–14.
12. Joly F, Heron JF, Kalusinski L, et al. Quality of life in long-term survivors of testicular cancer: a population-based case-control study. *J Clin Oncol* 2002;**20**(1):73–80.
13. Rieker PP, Edbril SD, Garnick MB. Curative testis cancer therapy: psychosocial sequelae. *J Clin Oncol* 1985;**3**(8):1117–26.
14. Rieker PP, Fitzgerald EM, Kalish LA, et al. Psychosocial factors, curative therapies, and behavioral outcomes. A comparison of testis cancer survivors and a control group of healthy men. *Cancer* 1989;**64**(11):2399–407.
15. Schover LR, von Eschenbach AC. Sexual and marital relationships after treatment for nonseminomatous testicular cancer. *Urology* 1985;**25**(3):251–5.
16. Socialstyrelsen. [Social rapport 2001] in Swedish; 2006. p. 140–1.
17. Storm HH, Michelsen EV, Clemmensen IH, Pihl J. The Danish Cancer Registry – history, content, quality and use. *Dan Med Bull* 1997;**44**(5):535–9.
18. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis* 1987;**40**(5):373–83.
19. Munk-Jorgensen P, Mortensen PB. The Danish Psychiatric Central Register. *Dan Med Bull* 1997;**44**(1):82–4.
20. Syrjala KL, Langer SL, Abrams JR, Storer BE, Martin PJ. Late effects of hematopoietic cell transplantation among 10-year adult survivors compared with case-matched controls. *J Clin Oncol* 2005;**23**(27):6596–606.
21. Claus EB, Petruzella S, Carter D, Kasl S. Quality of life for women diagnosed with breast carcinoma in situ. *J Clin Oncol* 2006;**24**(30):4875–81.
22. Christoffersen M. Dissolved families; 2002.
23. Cull A, Cowie VJ, Farquharson DI, Livingstone JR, Smart GE, Elton RA. Early stage cervical cancer: psychosocial and sexual outcomes of treatment. *Br J Cancer* 1993;**68**(6):1216–20.
24. Juraskova I, Butow P, Robertson R, Sharpe L, McLeod C, Hacker N. Post-treatment sexual adjustment following cervical and endometrial cancer: a qualitative insight. *Psychooncology* 2003;**12**(3):267–79.
25. Hawighorst-Knapstein S, Fusshoeller C, Franz C, et al. The impact of treatment for genital cancer on quality of life and body image - results of a prospective longitudinal 10-year study. *Gynecol Oncol* 2004;**94**(2):398–403.
26. Booth A, Edwards JN. Starting over. Why remarriages are more unstable. *J Fam Issues* 1992;**13**(2):179–94.
27. Ayanian JZ, Jacobsen PB. Enhancing research on cancer survivors. *J Clin Oncol* 2006;**24**(32):5149–53.
28. Rowland JH, Hewitt M, Ganz PA. Cancer survivorship: a new challenge in delivering quality cancer care. *J Clin Oncol* 2006;**24**(32):5101–4.
29. Taylor-Brown J, Kilpatrick M, Maunsell E, Dorval M. Partner abandonment of women with breast cancer. Myth or reality? *Cancer Pract* 2000;**8**(4):160–4.
30. Dorval M, Guay S, Mondor M, et al. Couples who get closer after breast cancer: frequency and predictors in a prospective investigation. *J Clin Oncol* 2005;**23**(15):3588–96.