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Risk for unemployment of cancer survivors: A Danish cohort study

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ABSTRACT

Aim: To investigate whether cancer survivors are at an increased risk for unemployment after cancer.

Materials and methods: A cohort of 65,510 patients who were part of the workforce in the year before diagnosis and a random sample of 316,925 age and gender-matched controls were followed for up to 20 years in a longitudinal register-based cohort study. Demographic, socioeconomic and health-related information were obtained through Danish administrative registers.

Results: Cancer survivors had a small but significantly increased risk for unemployment following cancer. Stratified analyses showed that the risk for unemployment was highest amongst persons aged 50–60 years at time of diagnosis. Risk factors for unemployment were found to be manual work, medium income and vocational education.

Conclusion: Generally, cancer patients were at a small increased risk for unemployment and low socioeconomic position was a significant risk factor.

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1. Introduction

Each year, cancer is diagnosed in close to 60,000 citizens aged 30–69 in the Nordic countries.¹ Early detection and molecular-based targeted therapy have improved the survival rates from many cancer types.² Therefore, the prevalence of persons with a history of cancer is increasing,³ and the need to look beyond survival has become more important. Treatment for cancer often includes not only well-defined treatments, such as a surgery, but also other more complicated adjuvant treatments, such as irradiation, chemotherapy, endocrine therapy and stem-cell transplantations, depending on the site and stage of the cancer. Each of these treatments can have both physical and psychological late effects, whether given alone or in combination.⁴ Not only do the

side-effects of cancer treatment have an impact on the ability to work during treatment, but the late effects can also have a long-term effect on employment. The impact cancer has on the work ability might also be influenced by other somatic and psychiatric diseases as depression and musculoskeletal diseases factors that also play a pivotal role for working market participation amongst persons not affected by a cancer disease.

A diagnosis of cancer and its subsequent treatment can have a serious impact not only on the employment and productivity of cancer survivors but also on work-related discrimination as unwanted changes in working tasks and impossibility of changing job.^{5,6} This discrimination might lead to work-related problems, increased vulnerability and expulsion years after the diagnosis.

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We conducted a nationwide, population-based cohort study of persons who were active in the labour market at the time of entry. We included only cancer sites with relatively good prognosis and with high incidences amongst middle-aged persons. In addition, the selected cancer sites should cover the socioeconomic spectrum of the Danish population. Many persons under the age of 30 years are students under education while it is possible to retire in Denmark after the age of 60 years and therefore we decided to define the working aged population as those between 30 and 60. Information from Danish administrative registers was used to determine the risk for first unemployment amongst cancer patients and in a cancer-free control cohort. In this study, we were able not only to adjust for age, gender and socioeconomic factors but also to include hospital admissions for somatic and psychiatric diseases as confounding risk factors for unemployment amongst cancer survivors.

2. Materials and methods

2.1. Cancer cohort

Since 1943, all incident cases of cancer in Denmark have been registered in the Danish Cancer Registry. We obtained information on 65,510 patients aged 30–60 years on the date of diagnosis of their first incident cancer between 1980 and 2000, who were alive 1 year after the date of diagnosis. The information retrieved included date of diagnosis, extent of disease and the personal identification number, which is assigned to all residents of Denmark shortly after birth by the Central Population Register. This identification number permits accurate linkage of information amongst registers. The selected cancer sites and extent of disease are listed in Table 1.

2.2. Control cohort

We sampled a random control cohort of 316,925 persons in the Central Population Register. Sampling was conducted

once a year during the study period and five controls free of cancer at the time of sampling were frequency matched on gender and date of birth to one cancer case.

2.3. Statistics Denmark

Information on a number of demographic and socioeconomic characteristics for both 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 Danish administrative registries. In order to obtain information on household income, we identified partners and their income for each year in the study period. All income variables were deflated according to the 2001 value of the Danish crown.

2.4. Variables related to economic subsidies

As in most European countries, Danish citizens are economically secured by various social security systems. Their insurance ranges from completely union-organised payments to tax-paid public social support. Most unemployed persons are supported by the union, and only a few are supported by the social security system administered by local municipal authorities. Unemployment benefit is only available for persons who are actively seeking job and only for a limited period of 2 years following the date of unemployment registration. If a person is not able to work due to disability or illness, it is not possible to receive unemployment benefit. Depending on the severity and duration of the disability or illness, a person may receive sickness benefit for a maximum of 52 weeks or retire permanently from the working market. Persons on sickness benefit are assumed to be able to work after a recovery period, but if the disability is so severe that it permanently reduces the ability to work by more than 50%, the person may be given a so-called 'early retirement pension', allowing the person to leave the workforce. Assignment to these social support op-

Table 1 – Cancer sites and extend of disease included in the study of cancer survivors and risk for unemployment, Denmark 1981–2000

Site	ICD-7 code ^a	Number of cases	Extent of disease			
			Local (%)	Regional (%)	Metastatic (%)	Unknown (%)
Colorectum	153, 154	7269	52	34	9	5
Breast	170	24,711	51	39	3	7
Cervix	171	4868	81	14	2	4
Uterus	172	2962	84	9	2	6
Ovary	175	3011	36	43	16	5
Prostate	177	1252	40	9	31	20
Testis	178	3052	70	9	8	12
Kidney	180	1751	68	9	10	13
Urinary bladder	181	4227	63	23	4	10
Malignant melanoma of the skin	190	6795	91	3	1	5
Non-Hodgkin lymphoma	200, 202	2887	26	15	18	41
Hodgkin lymphoma	201	904	21	22	14	43
Leukaemia	204	1821	5	13	12	70

^a The notification follows a modified Danish version of the ICD-7 and since 1978 all cases have been notified in accordance with ICD-O.

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