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Social inequality and incidence of and survival from cancers of the kidney and urinary bladder in a population-based study in Denmark, 1994–2003

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ABSTRACT

We investigated the effects of socioeconomic, demographic and health-related indicators on the incidence of and survival from cancers of the kidney and urinary bladder diagnosed in Denmark during 1994–2003 with follow-up through 2006 using information from nationwide registers. The analyses were based on data on 2941 patients with kidney cancer and 9471 patients with urinary bladder cancer in a cohort of 3.22 million people born between 1925 and 1973 and aged ⩾30 years. Our results indicate that lower socioeconomic position is associated with higher incidences of cancers at both sites in both sexes, whether socioeconomic position is measured as educational level, disposable income, affiliation to the work market, housing tenure or size of dwelling. We also found a moderate pattern of better survival from cancers at both sites in the most advantaged groups, most clearly reflected by the level of education, disposable income and affiliation to the work market.

1. Introduction

The incidence rates of cancers of both the kidney and the urinary bladder increase with age and are highest in men and in western countries. In Denmark, the incidences of cancers at both sites, but particularly that of urinary bladder cancer in men, have been increasing since 1943 when registration began, although the trend has levelled out in recent decades.[1] In Denmark, in 2003, urinary bladder cancer was the fourth most frequent cancer in men (1385 cases) and the ninth most frequent cancer in women (489 cases). Kidney cancer is less common, being diagnosed in 319 men and 195 women that year, making this cancer the 12th most frequent cancer in men and the 15th most frequent cancer in women.[1]

The aetiology of kidney cancer is largely unknown, but smoking, certain occupational exposures, hypertension and obesity are all considered risk factors.[2–4] Further, racial differences and familial clustering have been reported.[2,4] For urinary bladder cancer, smoking is a well-established risk factor but various occupational bladder carcinogens have also been reported.[5,6] Studies in several countries have shown that lower socioeconomic position is associated with higher incidences of urinary bladder cancer[7,8] and kidney cancer;[3,9] however, the results are not consistent.[10,11]

The survival of patients with kidney and urinary bladder cancers diagnosed in 1990–1994 was poorer in Denmark than in Europe as a whole.[12] In the period 1994–2001 in Denmark, urinary bladder cancer was the fourth most frequent cause

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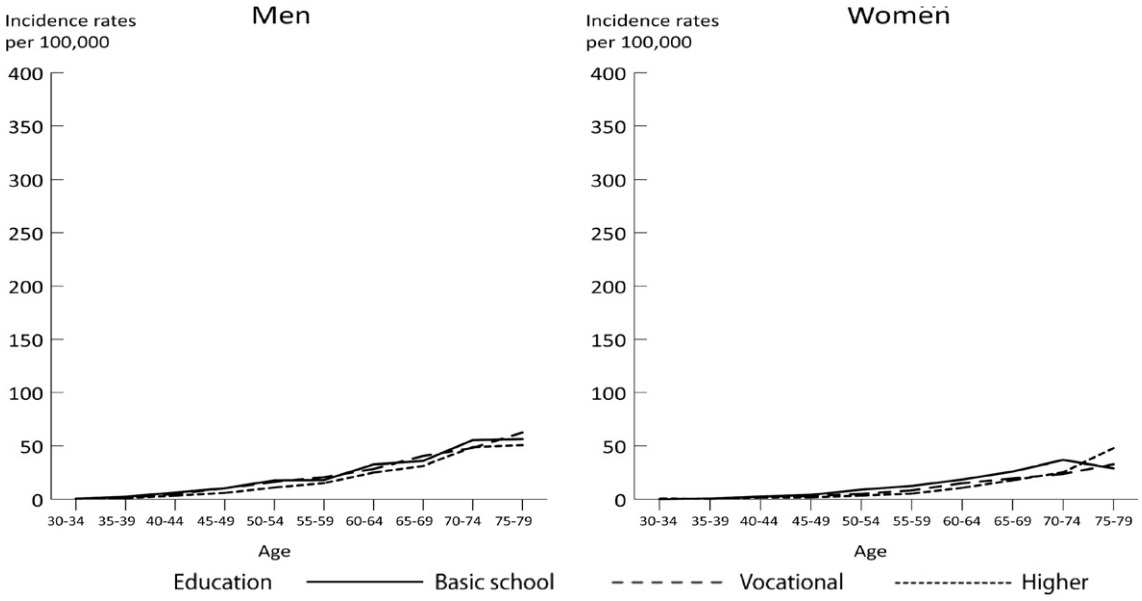
of death from cancer in men and the eighth in women, and kidney cancer was the 11th and the 12th most frequent cause of death from cancer in men and women, respectively.[1] In general, survival from cancer depends on socioeconomic position, and many studies have indicated that lower socioeconomic position is associated with poorer survival after cancers of both the kidney and the urinary bladder.[13–16]

The aim of this study was to investigate the association between various socioeconomic, demographic and health-related factors and the incidence of and survival from cancers of the kidney and the urinary bladder in Denmark, as part of a rigorous, comprehensive analysis of the role of socioeconomic position in cancer incidence and survival.

2. Material and methods

The material and methods are described elsewhere.[17] Briefly, the study population comprised all 3.22 million Danish residents born between 1925 and 1973 without a previous cancer and who entered the cohort at age 30 (see Fig. 1 in [17]). Information on socioeconomic, demographic and health-related indicators was obtained from various Danish registers based on administrative data.[17] Crude, age-specific and age-standardised incidence rates are presented for kidney cancer (ICD-10: C64) and urinary bladder cancer, including cancers of the renal pelvis and the ureter (ICD-10: C65-68, D09, D41.4), diagnosed in the cohort in 1994–2003. The incidence rates were standardised by age (in 5-year age groups) and period (in two 5-year periods), with the total study population as the standard.[18] Further, we used log-linear Poisson regression to model incidence rate ratios (IRRs), first adjusted for period (in 5-year periods) and age (as two continuous variables: age and age^2 in years) and second by adding education and disposable income to the models. For each level of each indicator, we conducted relative survival analyses, adjusting for population mortality amongst the incident cancer cases in 1994–2003 with follow-up through 2006.[17] Population mortality rates were stratified by age, period and the respective indicators. Except for the analyses of ethnicity, all analyses included only residents born in Denmark to at least one Danish-born parent with Danish citizenship.[17]



Incidence rate	Men			Women		
	Basic school (n =787)	Vocational (n =754)	Higher (n =262)	Basic school (n =666)	Vocational (n =243)	Higher (n =102)
Crude	18	14	10	12	6	4
Standardised	16	15	12	9	7	6
Difference	4	3	0	3	1	0

Persons with unknown level of education not included

Fig. 1 – Age-specific incidence rates per 100,000 person–years for kidney cancer by education amongst persons born between 1925 and 1973, Denmark, 1994–2003. Supplementary table shows the crude incidence rate and the incidence rate standardised by age (5-year age groups) and period (two 5-year periods) with the total study population as the standard and the incidence rate difference with higher education as the reference.