Associations between health care seeking and socioeconomic and demographic determinants among people reporting alarm symptoms of cancer: a population-based cross-sectional study

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Background. Late diagnosis of cancer may partly be explained by the fact that some patients do not seek health care promptly when experiencing an alarm symptom. Socioeconomic and demographic differences exist concerning knowledge and awareness of cancer alarm symptoms in the general population and socioeconomic differences are found in cancer incidence and survival. We therefore hypothesise that socioeconomic and demographic differences in health care-seeking behaviour are present among people with alarm symptoms.

Objectives. To analyse associations between health care seeking and socioeconomic and demographic factors among people reporting cancer alarm symptoms.

Methods. A questionnaire survey comprising 20,000 people aged $>$20 from the Danish population. The questionnaire concerned alarm symptoms of common cancers and subsequent health care seeking. Data on socioeconomic factors were obtained from Statistics Denmark. Main outcomes: health care seeking and patient interval.

Results. A total of 26.1\% of all subjects reported that they did not seek health care when having experienced an alarm symptom. Women—subjects aged $>$40, subjects living with a partner and subjects having a cancer diagnosis—were more likely to seek health care, whereas medium educational level was negatively associated with health care seeking. Further, women were more likely to seek health care within 1 month, whereas subjects out of the workforce were less likely to do so.

Conclusions. Approximately three out of four subjects sought health care when having experienced an alarm symptom but 50\% waited for at least 1 month. Some demographic factors were found to be associated with health care-seeking behaviour and the patient interval, whereas no consistent associations were found with regard to socioeconomics.

Keywords. Cross-sectional survey, demographic factors, family practice, health care-seeking behaviour, signs and symptoms, socioeconomic factors.

Introduction

Early symptoms of cancer are well described in the literature. Some early cancer symptoms are quite unspecific, while others are more characteristic and distinctive—so-called ‘alarm symptoms’. Alarm symptoms are features in the clinical presentation considered to predict serious, often malignant, diseases.\textsuperscript{1}

Cancer alarm symptoms are common in the general population\textsuperscript{2} and socioeconomic and demographic differences are present among people reporting alarm symptoms.\textsuperscript{3} Previous studies have shown inequality in the general population concerning cancer knowledge, cancer awareness and awareness of lifestyle risk factors related to cancer.\textsuperscript{4,5}

In comparison with many other countries, Denmark has poor cancer survival rates.\textsuperscript{6} One reason for this may be late diagnosis, although considerable efforts have been put into facilitating more effective diagnostic pathways in order to reduce the diagnostic delay.
Late diagnosis may to some extent be explained by patients not seeking medical help immediately after experiencing an alarm symptom. This phenomenon is described as the ‘patient delay’ or ‘patient interval’ and accounts for the time from the first symptom is noticed by the patient until he/she seeks medical advice. The patient interval accounts for a substantial part of cancer patients’ pre-hospital time interval. It is reasonable to assume that some cancers may be diagnosed at an earlier stage if medical help was sought immediately after noticing alarm symptoms. Hence, it is important to obtain a deeper insight into the patients’ decisions in relation to health care seeking.

The Danish health care system is tax financed, giving all Danish citizens free and equal access to the majority of health services. Still socioeconomic disparities persist among Danish cancer patients, both with respect to patient delay, cancer incidence and survival.

Our hypothesis is that socioeconomic and demographic differences in health care-seeking behaviour exist among people who have experienced an alarm symptom. The aim of this study was therefore, in a population-based cross-sectional design, to analyse associations between health care-seeking behaviour and socioeconomic and demographic factors among persons reporting cancer alarm symptoms.

Methods

Study design
A cross-sectional questionnaire survey based on a stratified sample of the general population was conducted in April 2007 in the former County of Funen, Denmark, comprising 9% of the Danish population. The population of Funen is generally regarded as being representative of Denmark, e.g. with respect to rural as well as urban patients.

Sampling
The survey comprised 20000 people aged >20. The sample was randomly selected using the Danish Civil Registration System (CRS) stratified on gender, ensuring that half of the included were women and half of them men. We stratified the sample with respect to age, so that only 1000 subjects of each gender were under the age of 40 and the remaining subjects were at least 40 years. Further details are described elsewhere.

Data sources and measurements
The questionnaire concerned breast, lung, urinary tract and colorectal cancer. These four cancers were chosen because they are the most common cancer forms in Denmark and their symptoms are well described in the literature. For each cancer form there was a question on whether the person had had a specific symptom strongly related to that particular cancer, e.g. ‘Felt a lump in your breast?’ ‘Coughed for >6 weeks?’ ‘Seen blood in the urine?’ or ‘Seen blood in the stool?’ within the preceding 12 months. When the study was conducted in 2007, the Danish National Board of Health had not yet implemented standardised referral guidelines for cancer, and no public health campaigns concerning cancer alarm symptoms were initiated in the years preceding the data collection. Today the four alarm symptoms are included in the current fast-track referral guidelines. The subjects also had to report whether they had a cancer diagnosis. Subjects reporting at least one of the four symptoms were asked to choose one of their symptoms to be their ‘personal symptom’ and to answer two questions concerning health care seeking: ‘Did you consult your GP regarding your personal symptom?’ (Yes/No), ‘How long did it take from noticing your personal symptom until consulting your GP?’ (<1 month, 1–3 months, 3–6 months, >6 months and ‘did not consult my GP’).

The two outcome variables were (i) health care seeking (Yes/No) and (ii) patient interval (dichotomised into: ‘consulted within 1 month from noticing my personal symptom’ and ‘consulted after at least 1 month from noticing my personal symptom’).

The questionnaire was based on a thorough literature search and clinical experience. A qualitative pilot test was conducted. Then a test–retest was carried out on 200 subjects aged >40 with the objective of analysing how the questionnaire was perceived by recipients and to assess its reproducibility.

All Danish citizens are registered with the Danish CRS with a unique personal identification number enabling accurate linkage between national registers. Socioeconomic and demographic factors were collected through data linkage to Statistics Denmark using the civil registration number. For each subject we obtained information on the following socioeconomic variables: education, income and labour market affiliation. Further, we obtained information on cohabitation status. Information was retrieved for the year preceding the questionnaire (2006). To level out annual variation in income, we calculated the average income for the preceding 5 years. Education was categorised according to the length of highest attained educational level: <10 years (primary and lower secondary school), 10–12 years (vocational education and upper secondary school) and >12 years (short-, medium- and long-term higher education). This categorisation was selected because it reflects the organisation of the Danish educational system. We obtained gross income comprising all income liable to general taxation. Income was categorised as low, middle and high income. Labour market affiliations were categorised into three groups: (i) working, (ii) pensioners and (iii) out of the workforce. Cohabitation status was categorised into: cohabiting/married or single. Further details about the socioeconomic variables are given in Svendsen et al.
**Statistical analysis**

Prevalence estimates of health care-seeking behaviour concerning any alarm symptom and for each separate alarm symptom of cancer were calculated with 95% exact confidence intervals (CIs), based on binomial distributions. All prevalence estimates were weighted according to the general Danish population’s age and gender distribution to account for the stratified sampling procedure.

Logistic regression models were used to calculate unadjusted and adjusted odds ratios (ORs) with 95% CIs for the associations between each covariate and health care seeking and patient interval, respectively. The covariates considered for each outcome were gender, age, education, income, labour market affiliation, cohabitation status and having a cancer diagnosis. In adjusted analyses, adjustments were made for the a priori selected possible confounders: gender, age and having a cancer diagnosis.

**Results**

**Description of participants**

Overall 13,777 subjects returned the questionnaire, yielding a response rate of 69.4%, and 1,930 subjects reported a personal alarm symptom (Fig. 1).

**Health care seeking (any symptom)**

The mean age of respondents reporting a personal alarm symptom of cancer was 55 years, and 57% were women. A total of 26.1% of all subjects reported that they did not seek health care when having experienced an alarm symptom. The adjusted analyses showed that women—subjects aged >40, subjects living with a partner and subjects having a cancer diagnosis—were more likely to seek health care, whereas medium educational level was negatively associated with health care seeking (Table 1).

**Health care seeking (specific symptoms)**

Analysing each symptom separately showed that women were more likely to seek health care when having felt a lump in the breast or having coughed for >6 weeks. Subjects aged 40–59 years were more likely to seek health care when having felt a lump in the breast, while subjects aged 40–59 or 60–79 years were more likely to seek health care than those aged 20–39 years when having seen blood in their stool. Medium educational level was negatively associated with health care seeking for subjects having seen blood in the urine. Those living with a partner were more likely to seek health care when having coughed for >6 weeks, and having a cancer diagnosis was positively associated with health care seeking when having seen blood in the stool (Table 2).

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**Figure 1** Study flowchart
Among those who sought health care, a total of 801 subjects (55.3%) waited for at least 1 month to seek health care. Women were more likely to seek health care within 1 month, whereas subjects out of the workforce were more likely to wait for at least 1 month (Table 3).

Patient interval (specific symptoms)
Analysing the symptoms separately showed that women were more likely to seek health care within 1 month when having noticed a lump in the breast or having coughed for >6 weeks.

Subjects aged 40–59 years were more likely to seek health care within 1 month when having noticed a lump in the breast and subjects living with a partner were more likely to seek health care after at least 1 month when having seen blood in the stool (Table 4).

Discussion
We analysed possible associations between socioeconomic and demographic factors and health care seeking among subjects reporting cancer alarm symptoms. The results reflect self-reporting of four predefined alarm symptoms of cancer and registration of how often the symptoms were presented to the GP. When examining all four symptoms together, we found that approximately three out of four subjects sought health care when noticing an alarm symptom. However, ~50% waited for at least 1 month.

Demographic factors such as female gender, increasing age, living with a partner and having a cancer diagnosis were positively associated with seeking health care. Among socioeconomic factors, only medium educational level was negatively associated with health care seeking. Women were more likely to seek health care within 1 month, whereas subjects out of the workforce were less likely to.

Table 1
Descriptive participant characteristics together with weighted prevalences and crude and adjusted ORs for health care seeking (any symptom)

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<tr>
<th>Health care seeking</th>
<th>Total sample (n)</th>
<th>Yes (%)</th>
<th>Weighted prevalence (%)</th>
<th>Crude OR 95% CI</th>
<th>Adjusted OR* 95% CI</th>
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<td>1.00</td>
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The values given in bold are statistically significant (P < 0.05).

*Adjusted for gender, age and having a cancer diagnosis.
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The values given in bold are statistically significant ($P < 0.05$).

*Adjusted for gender, age and having a cancer diagnosis.
Strengths and limitations

Selection bias was reduced by randomly selecting participants by means of the Danish CRS. No differences between respondents and non-respondents were observed in terms of age, but women were slightly more represented among respondents. Late respondents had similar prevalences of symptom reporting, health care seeking and patient interval as immediate respondents. The symptom prevalences may be underestimated due to recall bias, since symptoms turning out to be harmless may soon be forgotten. However, this phenomenon is probably not pertinent to a specific socioeconomic status and therefore unlikely to have influenced the estimated effects of socioeconomic factors. The subjects included in this study were to choose only one symptom to be their personal symptom, even if they had noticed more than one. They may have chosen the symptom they experienced as the most serious, i.e. the one they sought health care for, if any, which could lead to overestimation of health care seeking. However, since only few reported more than one symptom, the possible overestimation will be of minor magnitude.

Generalisability

Smith et al.\textsuperscript{14} found that health care-seeking experiences among cancer patients including several cancer forms were very similar across cancer forms. As we included alarm symptoms of four common cancer types exhibiting easily detectable symptoms, e.g. a lump or bleeding, we find it reasonable to assume that our results to a large degree are generalisable to other groups of cancers with similar onset of symptoms or symptoms that the public is aware of. The associations between socioeconomics and health care seeking can probably be generalised to other western countries with similar health care systems.

Comparison with existing literature

As expected, we found that women were more likely to seek health care than men when having experienced...
Table 4  Descriptive participant characteristics together with weighted prevalences and crude and adjusted ORs for the patient interval ≥1 month (each symptom)

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<th>Felt a lump in the breast</th>
<th>Coughed for &gt;6 weeks</th>
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</thead>
<tbody>
<tr>
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<td>Patient interval ≥1 month</td>
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</table>

<table>
<thead>
<tr>
<th>n</th>
<th>Yes (%)</th>
<th>Weighted (%)</th>
<th>Crude OR 95% CI</th>
<th>Adjusted OR* 95% CI</th>
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<th>Yes (%)</th>
<th>Weighted (%)</th>
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<td>1</td>
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### Table 4 (Continued)

**Associations between health care seeking and socioeconomic and demographic determinants**

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The values given in bold are statistically significant ($P < 0.05$).

*Adjusted for gender, age and having a cancer diagnosis.
an alarm symptom of cancer. This may partly be due to the fact that one of the symptoms in our study was predominantly gender specific (lump in the breast) and that the majority sought health care for this particular symptom. When analysing the symptoms separately we found that women sought health care more often than men only for feeling a lump in the breast and for coughing. Feeling a lump in the breast was the symptom with the highest rate of health care seeking. This could be explained by the fact that a lump in the breast is a well-known cancer-related symptom.\textsuperscript{15}

In the present study, a total of 67\% sought health care when having noticed blood in the stool. Crosland and Jones\textsuperscript{16} found that only 41\% sought health care after having noticed rectal bleeding. In their study a distinction was made between seeing blood on the toilet paper and blood mixed with stools. This may explain some of the difference from our results.

Increasing age was associated with health care seeking among people reporting having seen blood in the stool, and similar results were found by Crosland and Jones. The effect of age may partly be explained by the association between higher knowledge of cancer symptoms and age.\textsuperscript{17} Subjects living with a partner were more likely to seek health care than singles. The same tendency was found when analysing the symptoms separately, although it was not statistically significant. This might reflect an increased knowledge of cancer symptoms among married couples.\textsuperscript{17} The possibility of discussing a symptom with a partner may also encourage health care seeking. We have not been able to identify other studies on the association between seeking health care for cancer symptoms and marital status.

When examining the four symptoms together, the only association found between health care seeking and socioeconomic factors was that subjects with a medium educational level were less likely to seek health care compared with subjects with a low educational level. We have not identified other studies on socioeconomic factors and health care seeking among the general population reporting alarm symptoms. Van Osch et al.\textsuperscript{18} in a hypothetical setting studied help-seeking for different symptoms, ranging from mild, self-limiting symptoms to alarm symptoms. They found that educational level was negatively related to medical help-seeking among the general population,\textsuperscript{19} which could be explained by an overall higher usage of primary health care services in lower educated people.\textsuperscript{19} In our study we did not find that subjects with a high educational level had a different health care-seeking behaviour compared with subjects with a low educational level. One explanation for this difference may be that the analyses of Van Osch et al.\textsuperscript{18} assumed a linear effect of education and thus treated education as a continuous variable, while we treat education as a categorical variable. Our results suggest that the effect of education may be non-linear.

Finally, subjects with a cancer diagnosis were more likely to seek health care. These people may have an increased fear of a relapse or of a new cancer and therefore they have an increased attention to bodily sensations and symptoms. Or maybe the cancer diagnosis in question was a diagnosis they got after presenting their ‘personal symptom’ to their GP.

Other studies have shown that women have higher knowledge of cancer symptoms, pay more attention to symptoms and are more likely to seek timely health care than men.\textsuperscript{18} Likewise, we found that women were more likely to seek health care within 1 month than men. In line with a previous study,\textsuperscript{20} \textsuperscript{–}\textsuperscript{44} of the subjects (who sought health care) waited for at least 1 month, when having noticed a lump in the breast.

In a small study among lung cancer patients, Corner et al.\textsuperscript{21} found that all subjects waited for 3 months or longer to seek health care. They included several symptoms of lung cancer such as shortness of breath, persistent cough and tiredness. Apparently, the patients attributed their symptoms to everyday causes, ageing and comorbidity, rather than interpreting them as indicative of ill health.\textsuperscript{21} In the present study, the majority of subjects coughing for >6 weeks waited for >1 month before seeking health care. This could indicate that persistent coughing may not be interpreted as an alarm symptom in the general population.

There have been conflicting findings concerning age and patient interval. Older age is found to be associated with long patient intervals among breast cancer patients.\textsuperscript{22} Others found no association.\textsuperscript{20} We found that subjects aged 40–59 years were more likely to seek health care within 1 month when having felt a lump in the breast compared with the younger age group. One reason could be that people in this age group are more aware of the higher cancer risk involved in feeling a lump in the breast.

We also tested hypotheses on socioeconomic differences in patient interval among people with alarm symptoms. Surprisingly, no consistent patterns were found. Subjects out of the workforce were more likely to wait for at least 1 month before seeking health care when having noticed an alarm symptom. One explanation for the lack of pattern may be that people in Denmark have free and equal access to primary health care. Another explanation may be that not only physical sensations but also psychological, cultural and other aspects influence the interpretations of symptoms and the subsequent actions, including health care seeking.

**Conclusions**

Approximately three out of four subjects sought health care when having noticed an alarm symptom but 50\% waited for at least 1 month. Some demographic factors...
were found to be associated with health care seeking and the patient interval, whereas no consistent associations were found with regard to socioeconomics.

**Implications**

Our results suggest that campaigns encouraging people to seek health care promptly upon noticing a cancer alarm symptom should be tailored to specific gender and age groups, rather than to specific socioeconomic groups. Health care professionals should be aware of possible reasons for the patient interval in seeking health care and find new ways to address these barriers. To explore why some differences in patient intervals persist, future studies may focus on people’s interpretation of symptoms, recognition of symptom seriousness and anxiety related to health care seeking.

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**Declaration**

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Ethical approval: According to the Scientific Ethics Committee for the County of Funen, the Biomedical Research Ethics Committee System Act does not apply to this project. The study was approved by the Danish Data Protection Agency, journal number 212-41-1160.

Conflict of interest: none.

**References**