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Published in:
European Journal of Cancer Care

DOI:
10.1111/j.1365-2354.2004.00546.x

2004

Link to publication

Citation for published version (APA):
Esbensen, B. A., Osterlind, K., Roer, O., & Hallberg, I. R. (2004). Quality of life of elderly persons with newly diagnosed cancer. *European Journal of Cancer Care*, *13*(5), 443-453. https://doi.org/10.1111/j.1365-2354.2004.00546.x

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4

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Original article

Quality of life of elderly persons with newly diagnosed cancer

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ESBENZEN B.A., ØSTERLIND K., ROER O. & HALLBERG I.R. (2004) *European Journal of Cancer Care* **13**, 443–453

Quality of life of elderly persons with newly diagnosed cancer

The aim was to investigate quality of life (QoL) in elderly persons newly diagnosed with cancer (65+ years) in relation to age, contact with the health-care system, ability to perform activities of daily living (ADL), hope, social network and support, and to identify which factors were associated with low QoL. The sample consisted of 101 patients (75 women and 26 men) newly diagnosed with cancer. EORTC QLQ-C30, Nowotny's Hope Scale, Katz ADL and the Interview Schedule for Social Interaction (ISSI) were used. The analysis was carried out in four age groups and revealed no significant differences in QoL. Compared with the other age groups, those of a high age (80+ years) more often lived alone, used more home-help service and had a smaller social network. Factors associated with low QoL were 'no other incomes than retirement pension', 'low level of hope' and 'lung cancer'. In addition, 'being told that the cancer disease has not come to an end', 'needing more help in activities of daily living', 'getting help from grown-up children' and 'needing help with PADL' were associated with low QoL. Those at risk of inferior QoL, that is, having poor economy, low level of hope and lung cancer need special attendance and specific interventions to improve QoL.

Keywords: cancer, age 65 and over, quality of life, activities of daily living, hope, social network and support.

INTRODUCTION

Since the mid-1990s interest has increased in elderly persons with cancer, primarily with focus on treatment (Boyle 2003). How elderly persons live their life as newly diagnosed cancer patients has been insufficiently investigated. In contrast to younger adults, the elderly will experience initial bodily weakness, multimorbidity, and in periods be dependent on the health-care system because of their greater risk of contracting disease. Health-care professionals need to recognize both the increase in cancer in the elderly and the subsequent comorbidity. Health-care professionals also need specific knowledge about problems and restrictions in daily living and quality of life (QoL) of elderly persons newly diagnosed with cancer to meet their specific needs and to provide support.

Physical status plays a role in the assessment of elderly persons with cancer because multimorbidity interacts with cancer and cancer treatment. Stafford and Cyr (1997) investigated physical functioning in persons 65+ years ($n = 9745$, median years 75, and 17% had cancer) and found limitations in activities of daily living (ADL) in 48% of those newly diagnosed with cancer, whereas ADL limitations were noted in 40% of the elderly in total. No

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Accepted 15 September 2004

European Journal of Cancer Care, 2004, **13**, 443–453

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specific figure was given for those without cancer. Assistance with cooking, shopping and housework was required in 24% of the cancer cases. In addition, use of health-care resources was higher among those with cancer than among those with other chronic conditions (Stafford & Cyr 1997). Identification of elderly persons' dependency in ADL can contribute to the understanding of the patients' specific needs and make the nursing care significantly more targeted.

In general, elderly persons experience changes in loss of income and social network (Bondevik & Skogstad 1998; Pedro 2001). Bondevik and Skogstad (1998) found in a Norwegian study including 221 individuals aged 80+ years that decreased functional ability was followed by a reduction in the size of social network. The relationship between functional status and social network in elderly persons newly diagnosed with cancer from a population based group ($n = 799$, age 65+ years) was investigated by Goodwin and colleagues (1991). They found that assistance with ADL increased with the patient's age, and those with poor social support also had functional limitations, especially those who were unmarried (Goodwin *et al.* 1991). Decreased physical functioning in elderly persons with cancer may impose limits on their ability to maintain social activities. Thus, understanding QoL in the elderly with cancer requires a broad approach because other factors beside the cancer have an impact on their QoL.

Improved QoL has been a goal of cancer treatment during the last decades, and instruments to measure QoL have therefore been developed and included in clinical trials to document this therapeutic endpoint (Ganz *et al.* 1991). Historically, persons over the age of 70 years have been treated differently to younger patients, and have been excluded from many clinical trials of cancer treatments (Aapro *et al.* 2000). Chronological age has been an inclusion criterion more often than assessment of the elderly patient's actual capacity. This is mainly the reason why knowledge about QoL in elderly persons with cancer is limited (Repetto *et al.* 2001a).

In a study by Rustoen and colleagues (1999) QoL was examined in 131 newly diagnosed cancer patients (median age 52 years, range year 19–78). The elderly (age range 60–78 years, who were 33% of the total sample) showed a higher QoL than the two younger groups (Rustoen *et al.* 1999). The study did not specifically focus on people recently diagnosed with cancer, and the median time since diagnosis was 5 months. Few studies have had the primary purpose of investigating QoL in elderly persons with cancer. A Swedish study compared persons aged 75+ years with cancer ($n = 150$) to a group without cancer ($n = 138$). Those with cancer had a lower QoL compared to those without cancer, and patients in the study group reported more health complaints than those without cancer (Thome *et al.* 2004). These patients, however, were diagnosed with cancer over a 5-year period and were thus not necessarily newly diagnosed. The result indicated that the combination of being elderly and having cancer influences QoL. These types of studies are few, but are essential to develop directions for optimal care and to identify factors related to QoL, especially in elderly persons newly diagnosed with cancer.

Despite the increasing focus on the assessment of patients' QoL (Repetto *et al.* 2001a), there is no consensus about the definition of QoL and how it should be measured although plenty of tools are available. Nevertheless, some consensus has been achieved concerning domains of importance in relation to QoL, such as functional ability, role functioning, social and community interaction, well-being, somatic sensation and life satisfaction (Bowling & Grundy 1997). Health-Related Quality of Life (HRQoL) refers to health as well-being; and physical, psychological, and social functioning. It is the assessment of the characteristics of a person's life at a point of time when health, illness and treatment conditions are relevant (Berzon 1998). Chronological age has generally been taken as an expression of declined physical abilities, and the interaction between cancer and the general ageing process has not been given due attention. Knowledge based on HRQoL contributes to bridging this gap of understanding, and can potentially make nursing care more targeted to the specific needs of the individual patient.

Although seeking meaning and hope is fundamental for human beings (Svarre 1999), it is seldom included in the definitions of QoL or in instruments that measure QoL (Rustoen & Hanestad 1998). This is the case even though having a cancer diagnosis often threatens the individual's future (Rustoen & Hanestad 1998). Loss of hope may well be threatening to an elderly person with cancer because of a strong reminder that life is limited (Thome *et al.* 2004). In a qualitative study, Benzein and Saveman (1998) identified the 'hope' of healthy persons as a process that was linked to meaning. Hope was also identified as the fundamental will to engage in living life, and was linked to a positive attitude to life. Therefore, hope is a notion that not only contains the number of years to live, but also the meaning of life. Few studies describe hope in relation to cancer patients and to elderly people. However, McGill and Paul (1993) found that age (age range from 65 to 86 years) was not significantly related to hope. Instead, they found that lower socio-economic status and declining physical health were a threat to hope (McGill & Paul 1993).

The aim of this study was to investigate the QoL of persons newly diagnosed with cancer (65 years and above) in relation to age, contact with the health-care system, ADL, hope, social network and social support, and to identify which factors were associated with low QoL.

METHOD

Sample

Elderly patients (age 65+ years) diagnosed with cancer within the previous 3 weeks were included ($n = 101$) in the study and recruited from the County of Copenhagen (Denmark). In addition to age an inclusion criterion was a diagnosis of: breast ($n = 24$), lung ($n = 26$), gynaecological ($n = 25$), or colorectal ($n = 26$) cancer. The four diagnosis groups were chosen pragmatically: partly because of their common prevalence and partly from the expectation of obtaining suitable material to analyse by limiting the number of possible diagnoses included in the study. All participants were to be receiving supportive hospital care or treatment, be Danish speaking, conscious, and be fully informed of their cancer diagnosis. Coexisting non-malignant disease was not an obstacle to participation.

Instruments

A questionnaire was developed specifically for this study and contained questions about age, sex, civil status, children, grandchildren, housing, living conditions, education and economy. Questions were included about the cancer, such as 'Has the doctor indicated to you that the disease has come to an end?' The questionnaire also included questions about contact to the secondary and primary health-care system, such as 'How many hospital periods have you had within the last six months?' and 'Have you had contact with your general practitioner within the last four weeks?' Finally, patients were asked about QoL, ADL, hope, social network and support.

The core questionnaire EORTC QLQ-C30 (version 3) was used to measure HRQoL, in the following named QoL (Fayers & Bottomley 2002). The European Organization Research and Treatment of Cancer (EORTC) 'Quality of Life Study Group' developed the questionnaire for assessment of QoL (Aaronson *et al.* 1993). The instrument is cancer specific, multidimensional and can be used in different cultures and is translated to several languages, including Danish (Anderson *et al.* 1993). It consists of 30 items in three subscales (global health status/QoL, functional scale and symptom scale). The global health status/QoL consists of two questions on a scale ranging from one to seven. The functional scale incorporates five scales and the symptom scale incorporates three (Table 1). The response score is a four-point Likert scale format ranging from 1 to 4 'not at all', 'a little', 'quite a bit' and 'very much' (Fayers *et al.* 2001). The EORTC subscale score was linearly transformed from 0 to 100 grade according to Fayers and colleagues (2001). A higher score for the functional subscale and global health status/QoL scales represents a better level of func-

Table 1. EORTC QLQ-C30 (Global health status/quality of life, functional scale and symptom scale) related to age groups

Median (Interquartile range IQR)	65–69 ($n = 24$)	70–74 ($n = 28$)	75–79 ($n = 26$)	80+ ($n = 23$)	Total ($n = 101$)	*P*-value*	α
Global health status/QLQ†	55.33 (33.33)	75.00 (16.67)	66.67 (43.75)	66.67 (33.33)	66.67 (33.33)	0.59	0.77
Functional scale‡	77.88 (33.33)	78.89 (22.22)	68.89 (22.22)	77.78 (34.44)	77.78 (25.56)	0.70	
Physical function (PF)	66.67 (66.67)	73.33 (26.67)	60.00 (46.67)	66.67 (46.67)	73.33 (40.00)	0.68	0.82
Role function (RF)	66.67 100.00	66.67 (50.00)	58.33 (87.50)	66.67 (66.67)	66.67 (66.67)	0.57	0.94
Emotional function (EF)	75.00 (33.33)	66.67 (33.33)	79.17 (41.67)	83.33 (50.00)	75.00 (41.67)	0.65	0.65
Cognitive function (CF)	83.33 (33.33)	83.33 (16.67)	83.33 (16.67)	100.00 (16.67)	83.33 (16.67)	0.28	0.45
Social function (SF)	100.00 (16.67)	100.00 (0.00)	100.00 (20.83)	100.00 (0.00)	100.00 (0.00)	0.76	0.98
Symptom scale§	28.21 (23.68)	20.51 (15.38)	24.36 (23.72)	25.61 (20.51)	23.08 (20.51)	0.34	
Fatigue (FA)	55.56 (44.44)	33.33 (44.44)	50.00 (47.22)	44.44 (33.33)	44.44 (44.44)	0.68	0.78
Nausea & vomiting (NV)	0.00 (33.33)	0.00 (0.00)	0.00 (33.33)	0.00 (16.67)	0.00 (16.67)	0.56	0.79
Pain (PA)	0.00 (33.33)	16.67 (33.33)	16.67 (33.33)	16.67 (50.00)	16.67 (33.33)	0.44	0.88
Dyspnoe (DY)	0.00 (66.67)	0.00 (33.33)	16.67 (66.67)	0.00 (33.33)	0.00 (66.67)	0.34	
Insomnia (SL)	33.33 (66.67)	0.00 (33.33)	0.00 (33.33)	33.33 (66.67)	0.00 (66.67)	0.51	
Appetite loss (AP)	33.33 (33.33)	0.00 (33.33)	0.00 (33.33)	33.33 (66.67)	0.00 (33.33)	0.81	
Constipation (CO)	0.00 (33.33)	0.00 (0.00)	0.00 (33.33)	0.00 (33.33)	0.00 (33.33)	0.78	
Diarrhoea (DI)	0.00 (33.33)	0.00 (0.00)	0.00 (33.33)	0.00 (33.33)	0.00 (33.33)	0.60	
Financial difficulties (FI)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.71	

*Kruskal–Wallis one-way analysis of variance.
†Higher scores indicate higher health-related quality of life.
‡Higher scores indicate fewer problems.
§Lower scores indicate fewer problems.
¶Lower scores indicate fewer problems.

tioning, and a higher score on the symptom scales and single items indicates a greater degree of symptoms. The internal consistencies of the instruments were calculated using Cronbach's Alpha ≥ 0.70–0.90 (Cronbach 1951). Reliability for EORTC QLQ-C30 in this study reached satisfactory levels at α = 0.77–0.98, except emotional function (α = 0.65) and cognitive function (α = 0.45) (Table 1).

Hope was measured using Nowotny's Hope Scale (NHS), an instrument developed to measure hope in an adult population after a stressful event, e.g. receiving a cancer diagnosis) (Nowotny 1989). In this study, NHS was translated from English to Danish according to internationally accepted guidelines (Streiner & Norman 1989). The scale consists of 29 questions on six dimensions, on different aspects of hope (Table 2). The response format is a four-point Likert format ranging from four to one 'strongly agree', 'agree', 'disagree' to 'strongly disagree' (Nowotny 1986). Scoring of NHS was carried out in accordance with the methodology developed by Nowotny, linearly transformed to scores ranging from 29 to 116, the higher the score the higher the degree of hope: 29–50 indicates 'hopelessness', 51–72 'low hope', 73–94 'moderately hopeful' and 95–116 'hopeful' (Nowotny 1986). Accordingly, each subscale was calculated as number of items times four. Reliability for NHS in this present study reached satisfactory levels from α = 0.64–0.89 except the dimension 'comes from within' α = 0.30 (Table 2).

Activity of daily living was assessed using the Katz Activities of Daily Living-Index (Katz ADL-index) (Katz & Akpom 1976) and the extended version developed by Sonn and Asberg (1991). Katz and Akpom (1976) summarize an individual's overall performance based on six functions in personal activities of daily living (PADL). The extended version instrumental activities of daily living (IADL) consists of four factors (Sonn & Asberg 1991). The response format ranges from 1 to 3: 1 = independent, 2 = partly dependent, 3 = dependent (continence: 1 = no, 2 = yes, 3 = catheter/colostomy). PADL and IADL variables were analysed with scores ranging from 4 to 12, and PADL from 6 to 18. The internal consistency of the scale was α = 0.81–0.85 (Table 2).

The Interview Schedule for Social Interaction (ISSI) was used to measure the social network and support (Henderson *et al.* 1981). The abbreviated form of ISSI developed by Undén and Orth-Gomer (1989) was used and consists of two subscales (a short 13-item version). The Interview Schedule for Social Interaction was translated from Swedish to Danish according to internationally accepted guidelines (Streiner & Norman 1989). The first subscale 'Availability of Social Integration' (AVSI) contains six questions about quantitative aspects of the extended network and its function, measuring aspects such as practical help and appraisal of support. Questions are, for example, 'Among your family and friends, how many people are there who are immediately available to you whom you can talk with frankly, without having to watch what you say?' (Henderson *et al.* 1981). Response alternatives are 'none', '1–2', '3–5', '6–10', '11–15' and 'more than 15'. The second subscale 'Availability of Attachment' (AVAT) contains seven questions and describes the availability of emotional support and consists of questions as, for example, 'Do you feel there is one particular person who feels

Table 2. Hope, activities of daily living and social network and support related to age groups

Median (Interquartile range IQR)	65–69 (n = 24)	70–74 (n = 28)	75–79 (n = 26)	80+ (n = 23)	Total (n = 101)	P-value*	α	Difference between age groups†
Nowotnys Hope Scale‡ (29–116)	92.00 (15.5)	87.50 (13.75	82.00 (15.25)	85.00 (12.00)	85.00 (14.50)	0.12	0.84	–
Confidence (8–32)	25.00 (3.75)	25.00 (5.75)	24.00 (4.25)	25.00 (7.00)	25.00 (5.00)	0.77	0.64	–
Related to others (5–20)	17.00 (4.50)	18.50 (3.75)	17.00 (4.25)	17.00 (6.00)	18.00 (5.00)	0.37	0.71	–
Future is possible (5–20)	15.00 (3.75)	13.50 (4.75)	12.50 (5.00)	13.00 (4.00)	14.00 (5.00)	0.03	0.73	C
Spiritual beliefs (3–12)	5.50 (5.00)	3.50 (4.00)	5.50 (5.00)	8.00 (8.00)	5.00 (5.00)	0.12	0.89	–
Active involvement (5–20)	15.50 (5.00)	15.00 (4.50)	13.00 (4.50)	13.00 (3.00)	14.00 (4.00)	0.05	0.69	–
Comes from within (3–12)	11.00 (1.00)	11.00 (1.00)	11.00 (1.25)	11.00 (2.00)	11.00 (1.00)	0.30	0.30	–
Activities of daily living (ADL)§								
IADL (4–12)	6.5 (5.75)	6.0 (3.0)	7.0 (3.5)	6.0 (4.0)	6.0 (4.0)	0.89	0.81	–
PADL (6–16)	6.0 (1.0)	6.0 (1.0)	7.0 (2.0)	6.0 (1.0)	6.0 (1.0)	0.07	0.85	–
ISSI (AVSI and AVAT)¶								
AVSI	4.0 (2.0)	5.0 (3.0)	4.0 (3.25)	2.0 (2.0)	3.0 (3.0)	<0.001	0.76	C, E, F
AVAT	6.0 (0.75)	6.0 (1.0)	6.0 (1.0)	5.0 (2.0)	6.0 (1.0)	0.10	0.73	–

*Kruskal–Wallis one-way analysis of variance.
†Mann–Whitney U-test with reduced P-value < 0.013 as post hoc test. A = 65–69 and 70–74, B = 65–69 and 74–79, C = 65–69 and 80+, D = 70–74 and 74–79, E = 70–74 and 80+, F = 74–79 and 80+.
‡Higher scores indicate higher hope.
§Lower scores indicate higher dependency.
¶Lower scores indicate higher level of social network.

very close to you?' (Henderson *et al.* 1981). Response alternatives are 'yes' and 'no'. A higher score for both subscales represents a better level of social network and support. The Interview Schedule for Social Interaction was transformed as indicated by Henderson and colleagues (1980) and the questions allotted to each dimension were totalled; AVSI 1–6 and AVAT 1–6, and the higher the score the higher the social network and attachment (Henderson *et al.* 1980). The reliability analysis for AVSI was $\alpha = 0.73$ and for AVAT $\alpha = 0.76$ (Table 2).

Procedure

The participants were primarily consecutively chosen from a hospital referral list to the department of oncology; they were invited by letter and subsequently contacted by the first author (B.A.E.). The first author, who was responsible for the study, had no access to the National Central Person Registry (CPR) or to hospital case records. Among the 142 patients initially approached and asked by the first author to participate in the study, 101 agreed to participate. Reasons for not participating were: general frailty, next of kin not wanting the patient to participate, cognitive disease, and not wishing to participate. All data were self-reported, except age, sex, and type of diagnosis. Structural interviews each of 30–90 min were conducted from the questionnaire. Interviews were conducted at home ($n = 23$), in outpatient clinics ($n = 59$) or by telephone ($n = 19$). Two oncology nurses interviewed 10 patients each after being instructed by the first author. Data collection was from 2001 to 2002.

Ethics

The Danish Data Protection Agency was informed of the database. The study protocol was sent to the Copenhagen County Ethical Committee which did not find a need for a formal approval. The participants received both oral and written information about the aim of the study, and it was emphasized that it was voluntary and that the procedure secured confidentiality. Informed consent was obtained. Two psychologists from the oncology unit were available to handle possible emotional reactions from the participants.

Analysis

The sample was split into four age categories (65–69, 70–74, 75–79 and 80+ years) (Table 3). Differences between age groups were analysed using Pearson's Chi-square test when data were on a nominal or categorical scale, and Kruskal–Wallis one-way analysis of variance was used for analysing ordinal scale data. For comparison between age groups non-parametric tests were applied as the variables were regarded as non-normal. Mann–Whitney *U*-test was used as a post hoc test to identify statistically significant differences between age groups ($P < 0.013$) (Bland & Altman 1995). Descriptions of quantitative variables are given as median and interquartile range (IQR).

Multiple logistic regression analysis (forward selection, likelihood ratio) (Altman 1991) controlling for sex was performed to identify risk factors for low QoL. Variables that in the univariate analyses were significantly related (≥ 0.15) to the dependent variables in the EORTC QLQ-C30: global health status/QoL, functional scale and symptom scale, were included in the regression model (Table 4). Despite high age (79+ years) not being found significant in the univariate analyses, it was included in the regression model. Independent variables were dummy coded. Apart from dichotomous independent variables [not married, sex, living conditions, told that the disease has come to an end, contact with general practitioner (GP), home help and home nurse] continuous and ordinal variables were dichotomized with the first or third quartile as cut-off, depending on which values constituted increased risk for low QoL. Because the highest QoL was found in the colorectal cancer group, it was chosen as a reference value in relation to the other diagnoses groups. Confidence Intervals (CI) of 95% were calculated for the Odds Ratios (OR). The Hosmer–Lemeshow test was used to evaluate the goodness-of-fit of the final regression model. Tests with *P*-values < 0.05 were regarded statistically significant. Statistical analyses were carried out using SPSS 11.5 for Windows®.

RESULTS

Demographic characteristics

The median age of the study group was 74.74 years (IQR 8.75) (Table 3) and 73.3% of the participants were women. In total, 58.1% of the women lived alone while 25.9% of all men lived alone ($P = 0.004$). Between participants in the four age groups there were no statistically significant differences in the distribution by age, sex, type of accommodation, number of years at school, last occupation, incomes other than retirement pension and reduced economic ability because of cancer disease. The oldest group (80+ years) to a greater extent (30.4%) lived alone ($P = 0.01$), compared to the three other groups, and a significant difference ($P = 0.006$) regarding being married was also found between the youngest and the oldest age group. In total, 72.3% reported incomes other than retirement pension, while 12.9% had reduced economic ability

Table 3. Demographic characteristics of the participants and participants' contact with the health-care system related to age groups

Variable	65–69 ($n = 24$)	70–74 ($n = 28$)	75–79 ($n = 26$)	80+ ($n = 23$)	Total ($n = 101$)	P-value*	Difference between age groups†
Age at diagnoses median (Interquartile range IQR)	67.71 (3.15)	72.83 (1.98)	77.23 (1.75)	81.98 (3.48)	74.74 (8.75)		
Sex (%)						0.81	–
Women	70.8	67.9	76.9	78.3	73.3		
Men	29.2	32.1	32.1	21.7	26.7		
Marital Status (%)						0.01	C
Married	70.8	60.7	38.5	30.4	50.5		
Not married‡	29.2	39.3	61.5	69.6	49.5		
Accommodation (%)						0.06	–
Flat	41.7	39.3	50.0	47.8	44.6		
House	58.3	60.7	50.0	39.1	52.5		
Sheltered accommodation	–	–	–	13.0	3.0		
Years at school (Interquartile range IQR)	8.00 (3.00)	10.00 (3.75)	7.50 (3.00)	8.00 (3.00)	8.00 (3.00)	0.51§	–
Last profession/occupation (%)						0.36	–
Housewife or blue collar	9.9	14.9	14.9	6.9	46.5		
Employee/civil servant	8.9	9.9	5.0	9.9	33.7		
Self-employed	5.0	3.0	5.9	5.9	19.8		
Economical situation (%)							
No other incomes than retirement pension	45.8	25.0	26.9	13.0	27.7	0.09	–
Reduced economy because of the cancer disease	16.7	14.3	7.7	13.0	12.9	0.81	–
Not free of cancer disease (%)	58.3	60.7	61.5	78.3	64.4	0.46	–
In contact with the health-care system (%)							
Hospital periods within the last 6 months	100.0	100.0	96.2	73.9	93.1	<0.001	C, E
In contact with general practitioner (GP)	83.3	89.3	76.9	82.6	83.2	0.69	–
In contact with home help	16.7	21.4	26.9	56.5	29.7	0.01	C, E
In contact with home nurse	25.0	14.3	23.1	34.8	23.8	0.40	–
Need more help in daily living (%)	75.0	76.9	80.8	69.6	75.8	0.83	–
Grown-up children and grandchildren (%)							
Having grown-up children	100.0	89.3	92.3	78.3	90.1	0.09	–
Getting help from grown-up children	62.5	56.0	62.5	66.7	61.5	0.91	–
Having grandchildren	95.8	82.1	84.6	78.3	85.1	0.36	–
Getting help from grandchildren	26.1	21.7	22.7	27.8	24.4	0.97	–

*Chi-square test.
†Mann–Whitney U-test with reduced P-value < 0.013 as post hoc test. A = 65–69 and 70–74, B = 65–69 and 74–79, C = 65–69 and 80+, D = 70–74 and 74–79, E = 70–74 and 80+, F = 74–79 and 80+.
‡Includes divorced, widowed, separated and single.
§Kruskal–Wallis one-way analysis of variance.

because of cancer disease, but without any significant differences regarding age (Table 3).

Activities of daily living, help from family members and the health-care system

In total, 72.3% were independent in all IADL functions, with an overall median score of 6.00 (IQR 4.00). In PADL 82.2% were independent with a total median score of 6.00 (IQR 1.00). Regarding IADL, 55.4% of all persons were independent in shopping. There were no significant differences among age groups regarding dependency in IADL and PADL (Table 2). Out of the 101 persons, 33.7% reported incontinence. None was dependent on assistance regarding food intake. Altogether, 90.1% of the participants had grown-up children, 85.1% had grandchildren, and no significant differences with respect to age groups were found regarding relation to spouse, children, grandchildren, or friends. In total, 61.5% received help from their grown-up children, while 24.4% received help from grandchildren. The oldest age group (80+ years) had significantly ($P = 0.001$) fewer hospital periods within the last 6 months (73.9%), and received more home-help service than the other three age groups

Table 4. Factors associated with low quality of life (QoL) in EORTC QLQ-C30 (the three subscales)

	Odds ratio	95% CI for OR	*P*-value
Dependent variable: global health status/QoL*			
No other incomes than retirement pension	3.709	1.241–11.080	0.019
Low level of hope	7.382	2.365–23.042	0.001
Colorectal cancer			0.023
Lung cancer	5.650	1.434–22.260	0.013
Breast cancer	0.899	0.202–4.009	0.889
Gynecological cancer	0.694	0.148–3.260	0.643
Dependent variable: functional scale†			
Cancer disease has not stopped	6.863	1.649–28.564	0.008
Contact with general practitioner (GP)	5.846	0.998–34.236	0.050
Need more help in daily living	6.275	1.659–23.727	0.007
Dependent in PADL	6.817	1.892–24.556	0.003
Dependent variable: symptom scale‡			
No other incomes than retirement pension	3.386	1.047–10.953	0.042
Low level of hope	6.203	1.849–20.812	0.003
Colorectal cancer			0.006
Lung cancer	11.943	2.151–66.318	0.005
Breast cancer	1.604	0.298–8.628	0.582
Gynecological cancer	0.654	0.116–3.674	0.630
Getting help from grown-up children	4.520	1.400–14.591	0.012

Multiple logistic regression stepwise controlling for sex.
Hosmer and Lemeshow goodness-of-fit test:
Global health status/QoL = 0.739.
Functional scale = 0.712.
Symptom scale = 0.801.
Nagelkerke *R*-square:
Global health status/QoL = 0.343.
Functional scale = 0.359.
Symptom scale = 0.427.
*Independent Variables without significant influence: Age 79+, Not married, Cancer disease has not stopped, In contact with GP, Dependent in IADL, Dependent in PADL, Need more help, Low level of AVAT and Low level of AVSI.
†Independent Variables without significant influence: Age 79+, Not married, No other incomes than retired pension, Type of cancer (reference category: colorectal cancer), Dependent in IADL, Low level of AVAT, Low level of AVSI and Low level of hope.
‡Independent Variables without significant influence: Age 79+, Not married, Cancer disease has not stopped, In contact with GP, Dependent in IADL, Dependent in PADL, Need more help, Low level of AVAT, Low level of AVSI and Low level of hope.

(Table 3). There were no differences among age groups in 'need more help' and 75.8% of the total group needed more help in daily living.

Quality of life

There were no significant differences among the four age groups in the three subscales in EORTC QLQ-C30 (Table 1). In global health status/QoL, the total median value was 66.67 (IQR 33.33), on the functional scale there was a median value of 77.78 (IQR 25.56), and a median value of 23.08 (IQR 20.51) on the symptom scale. Fatigue of 44.44 (IQR 44.44) was the most reported complaint on the symptom scale, followed by insomnia, pain and dyspnoea. Financial difficulties had the lowest score on the symptom scale.

Hope, and social network and support

The total median score of hope was 85.00 (IQR 14.50), which according to the classification developed by Nowotny, was 'moderately hopeful', and showed no significant difference between the four age groups (Table 2). Differences between the four age groups were found in the subscale depicting 'future is possible' ($P = 0.03$) and 'active involvement' ($P = 0.05$). The two oldest groups had the lowest score in 'future is possible' compared to the other three age groups. However, comparison between age groups showed significant differences only between the youngest age group (65–69 years) and the oldest group (80+ years) at $P = 0.009$. There were significant differences ($P < 0.001$) between the age groups in AVSI with the lowest scores in the oldest age group compared to the other groups (Table 2).

Factors associated with low quality of life

Multiple logistic regression analyses showed that factors significantly associated with low QoL in global health status/QoL were 'No other incomes than retirement pension', 'Low level of hope' and 'Lung cancer' (Table 4). Factors significantly associated with low QoL on func-

tional scale were 'The disease has come to an end', 'Need more help in daily living' and 'Need of help with PADL'. On symptom scale, factors significantly associated with low QoL were 'No other incomes that retirement pension', 'Low level of hope', 'Lung cancer' and 'Getting help from grown-up children'.

DISCUSSION

In contrast to earlier studies, this study has a specific focus on elderly persons newly diagnosed with cancer. The oldest age group diverged from the other younger age groups by having a poorer social network and to a greater extent by living alone, they were more in need of home-help services, and had fewer hospital periods within the last 6 months. High age was not associated with low QoL, while poor economy, a diagnosis of lung cancer, needing help with PADL, getting help from grown-up children and low level of hope were associated with low QoL. However, further research may be needed including a larger sample in each age group to confirm these results.

The following issues should be emphasized concerning external and internal validity (Kazdin 2003). Patients were primarily selected from a weekly referral list to the oncology clinic, which apart from being a practical solution also had the methodological advantage that none of the authors had any influence on which patients were asked to participate in the study (Polit & Hungler 1999). The sample might be biased by being restricted to patients referred to an oncology clinic for special assessment and with a purpose to treat. Therefore, some groups of elderly persons with cancer were not represented in the study, for example, the frailest. The study, however, provides useful information about elderly persons with cancer referred to an oncology clinic. It may be that the mere fact of being referred to a hospital department in itself could possibly have a positive influence on QoL, because it can be perceived by patients that they receive the best available treatment, which may lead to higher hope. Collecting data in terms of a structured personal interview has strengthened the result of the study. This method is time consuming (Bowling 2002), but has the advantage of the participants having personal contact with a registered nurse with specific knowledge about oncology nursing and about being a cancer patient. It has been highlighted that this specific method is suitable for elderly persons, because more complicated and emotional questions can be asked, and misinterpretations can be checked immediately (Repetto *et al.* 2001b). Considering newly diagnosed cancer patients, who are in a vulnerable situation (Weisman & Worden 1976), the interviewer was aware of possible emotional reactions from the individual patient. Thus, the structured personal interviews were not only a way of collecting data, but also contained a planned and deliberate element of conversation, whereby the interviewers created a situation based on comfort and trust. However, the interviewer was also aware of the personal relationship (Wenger 2002), and its possible influence on the results of the interviews. Moreover, the researcher needed to be aware of the potential bias introduced in person–to–person interaction (Ganz & Reuben 2000), where patients could possibly respond with more positive answers than if they had received a postal questionnaire. This way of collecting data could therefore have influenced the QoL and level of hope in a more positive way.

Validity of the findings in EORTC may be considered acceptable ranging $\alpha = 0.77–0.98$, except emotional function ($\alpha = 0.65$) and cognitive function ($\alpha = 0.45$). Regarding cognitive function similar patterns were reported from a Swedish study on elderly persons with cancer concerning cognitive function (Thome *et al.* 2004). Whether EORTC in relation to 'cognitive function', as well as NHS when an α value was found at 0.30 in the depicting subscale 'comes from within' (Nowotny 1986, 1989), is suitable for elderly persons with cancer remains to be further investigated, as these scales have not been calibrated to use in elderly samples. The overall acceptable α values in ADL and ISSI indicate that these instruments are suitable for elderly people.

Interpretation of results in QoL studies still remains problematic (King 1996). However, both King (1996) and Osoba and colleagues (1998) propose that a difference of more than 10 units on the 0–100 scale can be interpreted as clinically significant. When analysing results from the current study, with two earlier populations based studies (using EORTC QLQ-C30) performed, respectively, in Denmark (Klee *et al.* 1997) and in Sweden (Michelson *et al.* 2000), differences of more that 10 units could be identified in similar age groups. Hence, elderly persons newly diagnosed with cancer from the current study, had a clinically important lower QoL in physical and role functioning. They reported more fatigue and dyspnoea compared with reported data from the studies mentioned above. In addition, elderly persons with cancer in the current study had a 10-unit lower score in global health status/QoL compared with elderly people not having cancer from a population study (Klee *et al.* 1997). The findings are consistent with a Swedish cross-sectional study, which concluded that elderly persons with cancer [mean age 84.26 (SD 5.80)] had overall lower scores in different domains of QoL and a higher number of complaints than those without cancer [mean age 83.44 (SD 4.95)] (Thome *et al.* 2004). Comparing newly diagnosed elderly persons with cancer

aged 65+ years in the current study with results from the mentioned other studies, showed they had lower QoL, lower physical and role function, and had more fatigue and dyspnoea than elderly people not having cancer (Thome *et al*. 2004). Despite no significant differences in EORTC QLQ-C30 being found when comparing the four age groups, and that high age was not associated with low QoL, the results indicate that age in combination with a cancer disease may influence life in other ways. It is crucial that health-care providers assess the individual patients' QoL and focus on age as a complex process rather than a chronological fact.

Lung cancer was significantly associated with low QoL. Similar findings have also been reported in other studies (O'Driscoll *et al*. 1999; Di Maio & Perrone 2003). Lung cancer holds a unique position among solid tumours, because the disease at time of diagnosis is more advanced and the median survival is relatively short (Grunberg & Bibawi 2000). Lung cancer diagnosis and treatment often produce stress resulting from the actual symptoms of the disease. The results emphasize that elderly persons newly diagnosed with lung cancer are especially vulnerable, and need special attention in clinical conditions to compensate for their grave situation in relation to QoL.

'Having no other income than retirement pension' was reported by 27.7% and was associated with an inferior QoL. Other studies have reported findings supporting this result (McGill & Paul 1993; Thome & Hallberg 2004). In Denmark, the retirement pension for all Danish citizens aged 65+ years is dependent on certain general conditions, but independent of personal income. All citizens have access to the health-care system irrespective of their financial situation. Therefore, limited access to necessary treatment and care cannot explain this result. Instead, limited financial resources available for the elderly person with cancer may lead to decreased ability to conduct or participate in social activities, low health status, poor emotional well-being and loneliness (Posborg 2003) and thus probably lead to low QoL. Accordingly, health-care professionals can be advised whenever possible to avoid financially burdening patients whose economy is poor, as this may further an inferior QoL. Also, steps to improve their economic situation may be helpful, for instance informing them where to obtain economic support.

In interpreting the results of this study it must be taken into account that QoL was measured by a cancer disease specific HRQoL instrument. EORTC QLQ-C30 was primarily developed for clinical trials to measure symptoms and the degree of side-effects following treatment. Perhaps it might be the reason why such instruments as EORTC QLQ-C30 focus on negative aspects and limitations in a person's life (Sjöden 1997), and that an existential dimension, such as hope, is not integrated in the instruments. However, the existential dimension is essential in elderly persons newly diagnosed with cancer, and in the current study it was measured in NHS. From the classification system developed by Nowotny (1986) the total sample was classified as 'moderately hopeful' in the total hope scale. The level 'moderately hopeful' could be explained by the sample consisting of those who were actually referred to an oncology specialist clinic and who had expectations of treatment. It must be highlighted that the theoretical approach to hope in this study was not only related to the future, but also to new goals and strategies for life, and/or a feeling of safety and comfort (Nowotny 1986). From the current study a low level of hope was associated with low QoL in elderly persons newly diagnosed with cancer. However, based on the literature the relationship between the two different concepts hope and QoL is not yet clear (Rustoen 1995), though earlier intervention studies have explained a relation between hope and QoL, and that both increase following intervention (Rustoen 1995; Herth 2000). Based on this study it is not possible to explain the causality between low level of hope and decreased QoL, only that hope interacts with QoL.

CONCLUSION

The results from this study indicate that the oldest age group (80+ years) had a poorer social network and needed more support from home-help services than the younger participants. Dependency, getting help from grown-up children and receiving help in daily living were also related to low QoL for the total sample. The results also showed that the type of cancer diagnosis and perceived seriousness of it were of importance to QoL. Additionally, limited financial resources and low level of hope for an elderly person newly diagnosed with cancer were associated with a higher risk for low QoL. The results are relevant for nursing care for elderly persons newly diagnosed with cancer (65+ years) and indicate areas with a need for further investigations and research. The situation of elderly persons with cancer cannot be understood as simply a function of chronological age, but must be perceived as an individual process with certain individual characteristics of events and situations. Health-care professionals and in particular the nursing care profession, could provide more relevant and targeted care based on the knowledge provided by this study: that characteristics of the patients such as dependency, type of cancer diagnosis, limited financial resources, perceived seriousness of the cancer disease and low level of hope are indications of risk for

a low QoL. Thus, providing targeted nursing care will increase awareness of relevant nursing interventions regarding patients with lung cancer, low level of hope, the patients' perception of their cancer disease and patients in poor economic circumstances.

ACKNOWLEDGEMENTS

The authors are grateful to the participants. In addition, special thanks go to the participating clinics. This research was made possible by grants from The Danish Nurses Organization, Velux Foundation, Novo Nordic Foundation, Lundbeck Foundation, Maersk McKinney Møller Foundation, Knud Højgård Foundation, Roché and Lund University; the Faculty of Medicine, Department of Nursing. Further, special thanks go to Aase Blyhme RN and Pernille Haaning RN for helping with the structured interviews, to Carol Bang-Christensen for revising the English language and to Per Nyberg for statistical advice.

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