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European Journal of Cancer 37 (2001) 2161–2168

European Journal of Cancer

www.ejconline.com

Reduced utilisation of specialist care among elderly cancer patients: a randomised study of a primary healthcare intervention

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Received 29 September 2000; received in revised form 29 May 2001; accepted 8 August 2001

Abstract

The aim of this study was to evaluate the effect of an individual support (IS) intervention including intensified primary healthcare on the utilisation of specialist care among cancer patients, and to investigate if such an effect was modified by the patient's age (<70 years/$\geqslant 70$ years). Newly diagnosed cancer patients ($n=416$) were randomised between the intervention and a control condition, and data were collected on the utilisation of specialist care within 3 months from inclusion. Intensified primary healthcare comprised extended information from the specialist clinics, and education and supervision in cancer care for general practitioners (GPs) and home-care nurses. The support given also included interventions designed to diminish problems of weight loss and psychological distress. The intervention reduced the number of admissions (NoA) and the days of hospitalisation (DoH) after adjustment for weight loss and psychological distress, but only for older patients. Older patients randomised to the intervention ($n=82$) experienced 393 fewer DoH than the older control patients ($n=79$). In addition, the proportion of older patients in the IS group who utilised acute specialist care was smaller compared with older control patients group. The conclusion is that older cancer patients' utilisation of specialist care may be reduced by intensified primary healthcare services.

Keywords: Primary healthcare; Hospitalisation; Aged; Neoplasms

1. Introduction

To satisfy patient's preferences and for economical reasons, a recent ambition in the care of cancer patients has been to reduce the utilisation of inpatient care [1,2]. Improved management of side-effects has facilitated the transfer of radiotherapy and chemotherapy from the inpatient to outpatient settings [3]. However, several types of problems have been demonstrated to increase cancer patients' need for inpatient care. Malnutrition is associated with prolongation of hospital stays and an increase of healthcare costs. Early intervention to improve poor nutrient intake is an important step to prevent malnutrition [4,5]. Cancer patients are also likely to suffer from psychological distress [6,7], which has been shown to increase the use of medical services and healthcare costs [8,9].

Most cancer patients are old, with a median age in Sweden above 70 years [10]. Advancing age is related to a higher prevalence of comorbidity and an increasing use of healthcare services [11–13]. Results from intervention studies suggest that improved continuity of outpatient medical care and healthcare services in patients' homes may reduce elderly patients' need of inpatient care [14,15].

Swedish healthcare authorities have attempted to reduce the need for inpatient care by increasing the accessibility and continuity of care, especially for the elderly and for patients needing long-term contacts [16]. However, an evaluation of such reforms recently concluded that there is a need for improved co-operation between home-care, primary healthcare and the specialist

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0959-8049/01/$ - see front matter
PII: S0959-8049(01)00278-7

clinics, and that the routines for exchanging information between the organisations are deficient [17].

A 'Support-Care-Rehabilitation'-project [18,19], aimed at evaluating the effectiveness of an individual support intervention (IS) and group rehabilitation (GR) for relieving physical and psychosocial problems among cancer patients was set up. The IS included an intensified primary healthcare intervention, aimed at improving general practitioners' (GPs') and home-care nurses' possibilities to care for newly diagnosed cancer patients [19]. One of the research questions was if such an intervention resulted in an increase of the proportion of patients cared for in their own homes after hospital discharge and during oncological treatment, compared with a control group. In an earlier evaluation of the effects of the intensified primary healthcare intervention [19] on the frequency of follow-up contacts with the home-care nurse 6 months after diagnosis, only a fourth of the control patients (26%) reported such contacts compared with almost all of the patients (90%) randomised to the IS group. The strongest predictor of a continuing contact with the home-care nurse in the IS group was older age. Other studies indicate that many patients suffer from a variety of problems during periods after hospital discharge, but that assistance from home-care nurses is rare [20–23]. The earlier evaluation also suggested that the information from the specialist clinic to the GP is insufficient in Swedish standard care, and that the intervention increased the GPs' knowledge about the disease and the treatments, and appeared to facilitate their determination of the patients' need for support [24].

The aim of the present study was to evaluate the effect of intensified primary healthcare services on newly diagnosed cancer patients' utilisation of specialist care after hospital discharge and during periods of radiation and chemotherapy, in comparison to patients in standard care. A further aim was to investigate if such an effect is modified by the patient's age, after adjustment for weight loss and the level of psychological distress.

2. Patients and methods

2.1. Patients

A series of consecutive patients with the following diagnoses was included. (1) Newly diagnosed with prostate cancer or (2) gastrointestinal cancer (GI cancer = colorectal or gastric cancer). (3) Breast cancer patients were included in a period ranging from the mammography at which their malignancy was first detected to 3 months after diagnosis. Patients with GI or prostate cancer were included as soon as possible after the confirmation of their diagnosis, but no later than 3 months from diagnosis. Exclusion criteria were a need for constant hospital care (Karnofsky performance status (KPS) <40), an earlier cancer diagnosis, inability to communicate in Swedish, and participation in an ongoing randomised trial for patients with localised prostate cancer ($n=59$). Patients who were shown to have a benign breast tumour ($n=42$) were excluded. Of the eligible patients, ($n=760$), 224 (76%) with breast cancer, 142 (64%) with GI cancer (colorectal, $n=105$ and gastric cancer, $n=37$), and 119 patients (49%) with prostate cancer were included, using a procedure approved by the local Research Ethics Committee.

In addition to the 42 women who were excluded due to a benign breast tumour 69 (14%) of 485 included cancer patients failed to complete the trial. They were equally distributed between the randomised groups (IS $n=34$, control $n=35$). Five of those were excluded due to an erroneous cancer diagnosis ($n=2$), senility ($n=1$), KPS <40 ($n=1$), or inclusion $\geqslant 3$ months from diagnosis ($n=1$). One patient died before information about randomisation. 16 patients discontinued participation before information about randomisation, and 47 failed to complete the measures. Thus, a total of 416 patients were included in the present analyses (Fig. 1). There were no differences between the IS and control groups (Chi-square or *t*-test) with regard to baseline demographic and medical data (Table 1).

2.2. Randomisation

Patients were randomised (computer-generated allocation schedule) to one of four alternatives: (1) individual support (IS), starting at diagnosis; (2) group rehabilitation (GR), starting 3 months after diagnosis; (3) a combination of individual support and group rehabilitation (ISGR), and (4) standard care (SC). Randomisation was stratified for diagnosis and stage of disease. The present analyses are based on data from the first 3 months after inclusion, before the rehabilitation intervention was implemented. Thus, comparisons are made between two groups, i.e. patients randomised to IS (IS + ISGR) and patients randomised to a control condition (SC + GR).

2.3. The individual support intervention (IS)

The IS started as soon as possible after randomisation and consisted of: intensified primary healthcare, nutritional support (NS) and individual psychological support (IPS).

The intensified primary healthcare meant that each patient was referred by the project staff to the ordinary home-care nurse. The patient's GP was also informed about the cancer diagnosis and the referral to the home-care nurse [19]. An extended information routine was implemented: GPs and home-care nurses received copies of the medical record each time the patient was dis-

charged from hospital, or had visited a specialist outpatient clinic. Education in cancer care was arranged during the course of the trial. Home-care nurses and GPs were educated in diagnostics and treatments of the cancer diagnoses, as well as in pain, nausea and diet management, psychosocial support and care in the final stage of life. A total of twelve seminars were arranged on 27 occasions. In addition, home-care nurses with patients randomised to IS were offered regular supervision by an oncology team including a dietician, psychologist, physiotherapist, urotherapist and a specialist nurse. The nurses were invited to participate in open

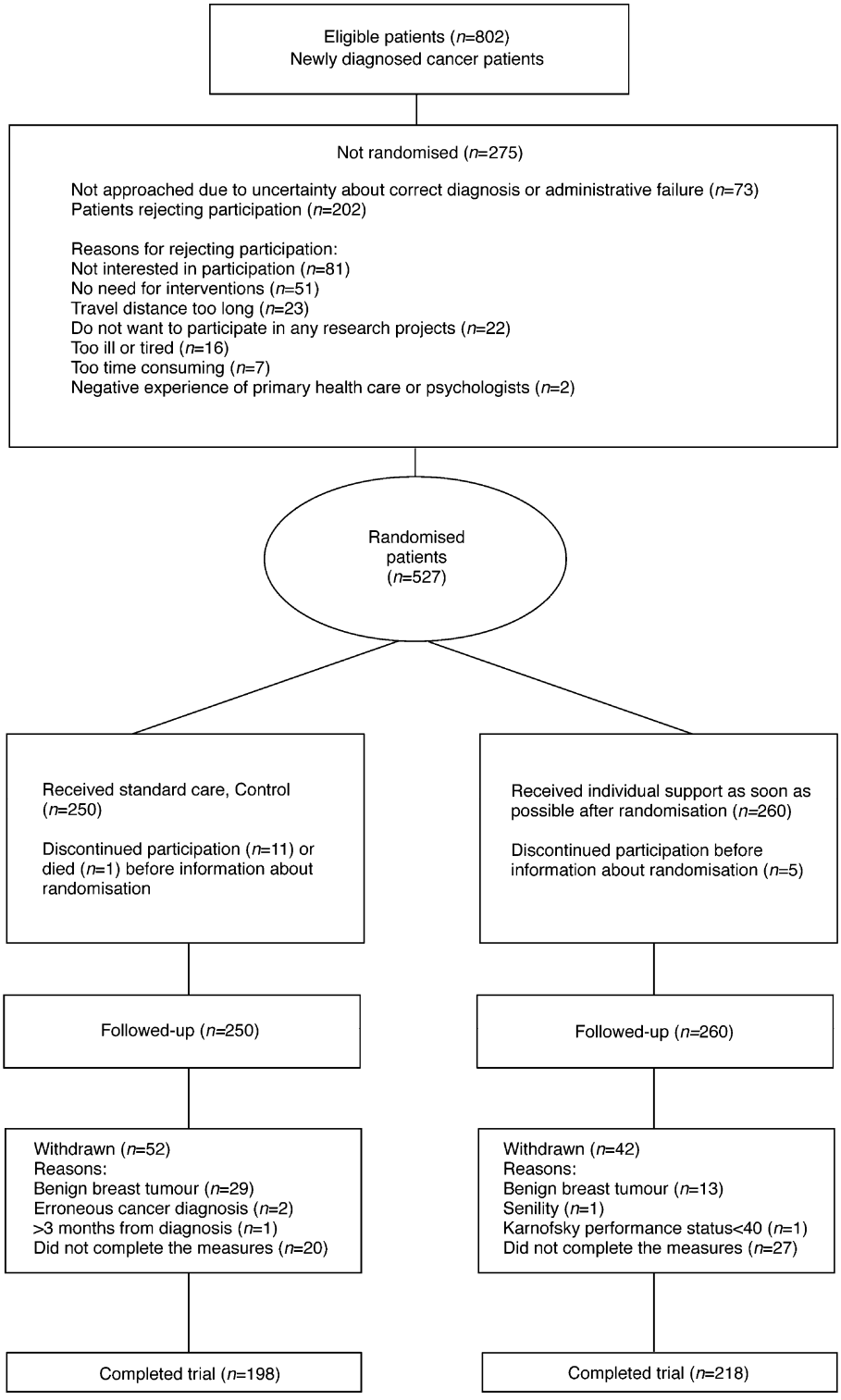

Fig. 1. Participant flow.

supervision groups regularly. In addition, all nurses had the possibility to contact the oncology team, during the day Monday to Friday every week during the project period.

Patients with GI cancer also received nutritional support. A dietician made a dietary assessment (24-h recall) as soon as possible after diagnosis. After the interview, the dietician gave nutritional advice both immediately and after calculation of the dietary intake. When needed, patients received prescriptions for supplements and nutritional enrichment. All patients were followed regularly, and the next interview was scheduled 2–3 months later.

IPS meant that all patients were contacted by a project psychologist. Current problems as defined jointly by the patient and the psychologist were the focus of the intervention. Techniques used were derived from cognitive behaviour therapy, including relaxation techniques, identification and challenging of negative automatic thoughts, and activity scheduling and daily planning [18,25,26]. If no problems were identified, the contact was terminated, but the patient could call the psychologist, should problems arise. The number of psychologist contacts varied between one and 24 with a median of three contacts.

Table 1
Baseline demographic and medical characteristics of the study sample

	Control $n=198$	IS $n=218$
Age (years) mean (S.D.)	63.3 (13.2)	63.0 (12.5)
Days I-PS/D[a] mean (S.D.)	−4.9 (40.1)	−8.9 (48.2)
Sex		
Female, *n* (%)	111 (56)	128 (59)
Male, *n* (%)	87 (44)	90 (41)
Breast cancer	89 (45)	106 (49)
Advanced disease,[b] *n* (%)	7 (8)	16 (15)
Radiotherapy, *n* (%)	79 (89)	97 (92)
Chemotherapy, *n* (%)	16 (18)	31 (29)
⩾70 years, *n* (%)	18 (20)	19 (18)
Weight loss, *n* (%)	13 (15)	16 (15)
HADS, mean (S.D.)	11.0 (8.1)	10.4 (9.0)
GI cancer[c]	63 (32)	60 (28)
Advanced disease,[b] *n* (%)	19 (30)	17 (28)
Radiotherapy, *n* (%)	14 (22)	12 (20)
Chemotherapy, *n* (%)	22 (35)	18 (30)
⩾70 years, *n* (%)	36 (57)	32 (53)
Weight loss, *n* (%)	46 (73)	46 (77)
HADS, mean (S.D.)	9.1 (7.1)	9.5 (7.6)
Prostate cancer	46 (23)	52 (24)
Advanced disease,[b] *n* (%)	15 (33)	16 (31)
Surgery, *n* (%)	7 (15)	4 (8)
Radiotherapy, *n* (%)	8 (17)	7 (13)
Hormonal therapy, *n* (%)	11 (24)	16 (31)
⩾70 years, *n* (%)	25 (54)	31 (60)
Weight loss, *n* (%)	13 (28)	13 (25)
HADS, mean (S.D.)	8.5 (7.5)	6.8 (4.7)
Deceased during the study period *n* (%)	4 (2)	6 (3)

HADS, Hospital Anxiety and Depression Scale; S.D., standard deviation.

[a] Days I-PS/D = days between inclusion and completed primary surgery/confirmed diagnoses.

[b] Advanced disease. Breast cancer = T3-T4 and/or ⩾7 positive axillary lymph nodes or M1; colorectal cancer = Dukes' D; gastric cancer = M1; prostate cancer T4, N+ or M1.

[c] Control = 15 gastric and 48 colorectal cancer. IS = 15 gastric and 45 colorectal cancer.

2.4. Measures

2.4.1. Utilisation of specialist care

Data on patient utilisation of inpatient specialist care were obtained from the Uppsala County Council Patient Administration System. This register includes data from the three county hospitals that provide surgical, urological, oncological and other kinds of specialist care. Analyses were made of visits to outpatient clinics and admissions for all reasons from the day of inclusion in the project and the following 3 months. The length of stay was calculated for each admission as follows: The days of admission and discharge were counted as 1 day in all, but no days were counted if admission and discharge took place on the same day [27]. The length of stay of each admission was summed to obtain days of hospitalisation per patient.

2.4.2. Background data

Data on patients' age at inclusion, diagnosis, stage and dates of diagnosis and primary treatment were collected from the medical records. Patients were classified in terms of age in one group <70 years (younger) and one $\geqslant 70$ years (older).

2.4.3. Potential confounding variables

A variable was constructed by subtracting the date of inclusion from the date of completed primary surgery or diagnosis (Days I-PS/D) (Table 1). This variable was included as a covariate in the statistical analyses, adjusting for the fact that some patients were included before diagnosis and/or primary treatment and others were included after this. For patients with prostate cancer, completed primary treatment is difficult to define due to the wide range of treatment options [28]. Thus, only the number of days between inclusion and confirmed diagnosis was calculated for this diagnostic group. There was no statistically significant difference between the IS and control groups with regard to Days I-PS/D (Table 1).

2.4.3.1. Weight loss. All patients reported their normal weight and their weight in kg at inclusion. A 'Continuous weight loss' variable (normal weight minus weight at inclusion) was constructed. There was no correlation between the dependent variables and the weight

loss variable for older patients, but significant negative correlations for younger patients ($r=-0.3$ to 0.2, $n=255$, $P<0.01$). Due to this heterogeneity, a dichotomous 'Weight loss' (yes/no) variable was created. This was included as an independent blocking variable in the analyses of covariance [29]. The reason for this adjustment for weight Loss is that the administered nutritional support was adapted to patients' nutritional status.

2.4.3.2. Anxiety and depression. Anxiety and depression at inclusion were assessed by the Hospital Anxiety and Depression Scale (HADS) [30,31]. The HADS is a self-assessment instrument consisting of two subscales measuring anxiety and depression. The total score varies from 0 to 21 for both subscales. The HADS has been used widely in research [31]. In the present study, the patients' total score on the HADS was used as a covariate in the analyses of covariance, since more psychological support was given to patients with more reported problems. The HADS score was significantly related to the number of psychologist contacts ($r=0.32$, $n=201$, $P<0.001$).

2.4.4. Statistical analyses

The statistical analyses were completed on an intention-to-treat basis with the Statistica software package for Macintosh (StatSoft Inc.). The variables number of admissions (NoA) and days of hospitalisation (DoH) were positively skewed and extreme z scores were identified. Therefore, NoA was subjected to a square-root transformation and DoH to a log transformation. This increased normality and resulted in acceptable z scores, $\leqslant 3.32$ for NoA and $\leqslant 3.33$ for DoH. ANCOVA was used to analyse the effects of randomisation (IS/control) and age ($<70/\geqslant 70$ years) on the NoA, DoH and number of visits (NoV) to outpatient clinics, adjusting for Weight loss (yes/no), Anxiety/depression (total HADS score) and Days I-PS/D. Tukey's honestly significant difference test was used for comparisons between means in case of significant interactions. A P value less than 0.05 was considered to be statistically significant. The statistically significant findings for NoA and DoH (Table 3) include median, mean and standard deviation of the untransformed variable, whereas means mentioned in the text refer to the transformed variable. Given the NoA in the control group and unequal variances in the IS and control groups, the study had an 80% power on a 5% level of significance (two-sided tests) to detect a difference of 0.4 (older patients) and 0.3 (younger patients). The corresponding figures for DoH were 6 and 2, respectively. The variables acute admissions and acute visits were not appropriate for analysis of covariance due to the low number of patients experiencing such events (acute admissions $n=43$ of 416; acute visits, $n=66$ of 416). Thus, these variables were dichotomised (acute admissions yes/no, and acute visits yes/no) and analysed by the Chi-square test for younger and older patients separately.

3. Results

3.1. The impact of confounding variables

The bivariate correlations between the dependent variables and potential confounders are presented in Table 2. ANCOVA revealed that Days I-PS/D provided a highly significant adjustment for NoA and DoH (Beta = 0.39, $t=8.4$, $P<0.001$, and Beta = 0.34, $t=7.29$, $P<0.001$). In addition, the blocking Weight loss variable provided statistically significant adjustments of NoA, DoH and NoV. In addition, the interaction between Weight loss and age (younger/older) was statistically significant for NoA and DoH ($F=6.26$, degree of freedom (df) = 1/406, $P<0.05$, and $F=6.58$, df = 1/406, $P<0.05$) and marginally significant for NoV ($F=3.44$, df = 1/406, $P<0.07$). This suggests that the adjustment for Weight loss was effective mainly for younger patients, since younger patients with no Weight loss had a significantly higher mean NoA, DoH and NoV compared with other subgroups. Anxiety/depression did not provide a significant adjustment of any of the dependent variables.

3.2. Effects of individual support on number of admissions and days of hospitalisation

The specialist clinics in Uppsala county recorded 344 admissions among the study patients during the first 3 months after inclusion. The mean NoA for older IS patients was lower than the mean for the older control patients, and also lower than the means of the subgroups of younger patients, which did not differ among each other (Table 3). No main effects of randomisation (IS/control) ($P=0.08$) or age (younger/older) ($P=0.9$) were found after adjustment for covariates and the

Table 2
Correlations between number of admissions (NoA), days of hospitalisation (DoH) and number of visits (NoV) (dependent variables), anxiety/depression and days between inclusion and primary surgery/diagnoses (days I-PS/D) (covariates), and weight loss (blocking variable), $n=416$

	Anxiety/ depression	Days I-PS/D	Weight loss (Yes = 1, No = 0)
NoA	$r=0.10$*	$r=0.44$***	$r_{pb}=-0.22$***
DoH	$r=0.05$	$r=0.38$***	$r_{pb}=-0.11$*
NoV	$r=0.05$	$r=0.07$	$r_{pb}=-0.22$***
Anxiety/depression		$r=0.12$*	$r_{pb}=0.12$*
Days I-PS/D			$r_{pb}=-0.13$**

*$P<0.05$, **$P<0.01$, ***$P<0.001$. r = Pearson product-moment correlation coefficient; r_{pb} = Point-biserial correlation coefficient.

Table 3
Number of admissions (NoA), days of hospitalisation (DoH) and acute admissions and diagnoses for subgroups of patients according to randomisation (IS/control) and age (younger/older)

	IS		Control	
	Patients <70 years $n=136$	Patients ⩾70 years $n=82$	Patients <70 years $n=119$	Patients ⩾70 years $n=79$
NoA	133	36	106	69
Median	1	0	1	1
Mean	1.0	0.4[a]	0.9	0.9
S.D.	1.0	0.6	0.8	1.0
DoH	603	311	429	704
Median	3	0	2	3
Mean	4.4	3.8[b]	3.6	8.9
S.D.	5.9	8.8	4.9	18.8
Acute admissions	18	5[c]	15	14
Median (range)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–2)
Patients with acute admissions (n)	15	4[c]	12	12
Diagnoses, *n* (%)				
Breast cancer	87 (64)	19 (23)	71 (60)	18 (23)
GI cancer	28 (21)	32 (39)	27 (23)	36 (46)
Prostate cancer	21 (15)	31 (38)	21 (18)	25 (32)

GI, gastrointestinal; S.D., standard deviation.
[a] The mean NoA for older IS patients is significantly lower than the means for remaining subgroups. Tukey HSD, $P<0.01$.
[b] The mean DoH for older IS patients is significantly lower than the mean for older Control patients. Tukey HSD, $P<0.01$.
[c] The proportion of older IS patients with acute admission is smaller compared with older control patients. Chi-squared = 4.78, $P<0.05$.

blocking variable. However, the interaction between randomisation (IS/control) and age (younger/older) was statistically significant (F = 4.48, df = 1/406, $P=0.03$).

The 344 admissions resulted in a total of 2047 DoH. Older IS patients had a lower DoH mean than did older control patients, whereas there were no statistically significant differences between the groups of younger patients (Table 3). Again, a statistically significant interaction between randomisation (IS/control) and age (younger/older) was found after adjustment for covariates and the blocking variable (F = 6.68, df = 1/406, p = 0.01). No main effects were found of randomisation (IS/control) ($P=0.14$) or age (younger/older) ($P=0.16$).

Only 4 of 82 older IS patients had utilised acute admissions compared with 12 of 79 among the older control patients (Chi-squared = 4.78, $P<0.05$) (Table 3), but there were no differences between the subgroups of younger patients.

3.3. Effects of individual support on number of visits to outpatient clinics

There were no effects of IS on NoV (Table 4). However, younger patients had a significantly higher mean NoV ($m=13.1$) compared with the older patients ($m=6.4$) (F = 25.0, df = 1/406, $P=0.001$). 10 of 82 older

Table 4
Number of visits (NoV) and acute visits to outpatient clinics for subgroups according to randomisation (IS/control) and age (younger/older)

	IS		Control	
	Patients <70 years $n=136$	Patients ⩾70 years $n=82$	Patients <70 years $n=119$	Patients ⩾70 years $n=79$
NoV	1820	555	1533	476
Median	9	2.5	9	3
Mean	13.4	6.8	12.9	6.0
S.D.	11.2	8.8	11.5	7.0
Acute visits	27	13	26	31
Median (range)	0 (0–7)	0 (0–3)	0 (0–5)	0 (0–2)
Patients with acute visits (*n*)	18	10[a]	16	22

S.D., standard deviation.
[a] The portion of older IS patients with acute visits is smaller than that of older control patients (Chi-squared = 6.2, $P<0.05$).

IS patients had made acute visits to the outpatient clinics compared with 22 of 79 among the older control patients (Chi-squared = 6.19, $P < 0.05$) (Table 4), whereas subgroups of younger patients did not differ in this respect.

4. Discussion

We found that IS was associated with a lower utilisation of inpatient specialist care among older patients ($\geqslant 70$ years). The number of admissions recorded for this group of IS patients was significantly lower than that for older control patients and was also lower than both groups of younger patients. Furthermore, the number of DoH among the older IS patients was reduced to a level comparable to that of the younger patients. It should also be noted that the older control group spent the most days in hospital even though their mean number of admissions was equal to that of the younger patient groups. Among the older patients, the number of days spent in specialist clinics due to admissions within 3 months after inclusion by the IS patients was 393 days less than for the control patients. This is a substantial difference that suggests significant savings with regard to both the workload and costs for the specialist clinics.

The number of acute hospital admissions and acute visits to the outpatient clinics were also affected by the IS intervention. The proportion of older IS patients who utilised this was smaller compared with older control patients. Even if utilisation of acute specialist care was rare, the reduced need for this type of services must be considered an improvement for this group of patients.

Days between inclusion and primary surgery/diagnoses and Weight loss provided significant adjustments of NoA and DoH. However, there was an unexpected interaction between Weight loss and age since younger patients with no Weight loss had the highest utilisation of specialist care. This contrasts with earlier findings demonstrating that weight loss and malnutrition as well as older age are accompanied by a lowered performance status and an increased need for inpatient care [4,12,32,33]. We therefore explored the distribution of diagnoses among younger patients with no weight loss. This subgroup included 141 (75%) breast cancer patients out of a total of 187 patients. Thus, the adjustment for Weight loss should probably be interpreted mainly as an adjustment for a high utilisation of specialist care among younger breast cancer patients.

Our analyses were designed to evaluate the effect of the Intensified primary healthcare on cancer patients' utilisation of medical services. Such analyses require an adjustment for the effect of the IPS and the NS since the IS comprised all three types of support. Thus, we adjusted for the effects of weight loss and psychological distress, considered as the main targets for the IPS and the NS, respectively. However, there is a need for further exploration of the effects of additional factors, such as availability of support from significant others, on cancer patients' utilisation of specialist care to improve the possibility of offering cancer patients care that is tailored to their individual needs.

Data on quality of life were collected by the European Organization for Research and Treatment of Cancer – Quality of Life Core 30 questionnaire (EORTC-QLQ C30) [34] (version 1) at inclusion and at 3-months follow-up. These data have recently been analysed (data not shown), indicating that the IS and Control groups improved to a similar extent between inclusion and 3 months. Thus, there is no indication that the reduced utilisation of inpatient specialist care has negatively affected the quality of life in the IS group.

It is reasonable to believe that improved care for patients by home-care nurses and GPs through extended information, education in cancer care and possibilities to discuss patients' problems with an oncology team, provides a means of reducing the utilisation of specialist care among elderly cancer patients. Thus, implementations such as the present intensified primary healthcare programme should be cost-effective strategies to improve the co-operation between home-care, primary healthcare and specialist clinics.

Acknowledgements

This research was made possible by a grant from the Swedish Cancer Society and from The Swedish Foundation for Health Care Sciences and Allergy Research. We thank Odd Hellström at Uppsala University Hospital for excellent services in providing data from the Uppsala County Council Patient Administration System. We also thank Ulf Billstedt for skilled computer programming.

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