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Health-Related Quality of Life and Health Care Use in Cancer Survivors Compared With Patients With Chronic Diseases

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BACKGROUND: The number of cancer survivors is steadily increasing and these patients often experience long-lasting health problems.

To make care for cancer survivors sustainable for the future, it would be relevant to put the effects of cancer in this phase into perspective. Therefore, the authors compared health-related quality of life (HRQOL) and health care use among cancer survivors with that of patients with chronic diseases. **METHODS:** Patients diagnosed at age >18 years with a cancer with a 5-year survival rate >20% and no distant metastases at the time of diagnosis and patients aged >18 years with physician-diagnosed somatic chronic diseases without cancer were sent a questionnaire. HRQOL was measured with the RAND-36, a measure of HRQOL. Self-reported health care use was measured for general practitioner care, specialist care, rehabilitative care, physical therapy, ambulatory mental health care, and occupational health care. **RESULTS:** A total of 601 cancer survivors and 1052 patients with chronic diseases without cancer were included in the current study. Multimorbidity was observed in 63% of the cancer survivors and 61% of the patients with chronic diseases.

The HRQOL of the cancer survivors was significantly better than that of patients with chronic diseases after adjustment for age and sex. For the mental functioning subscale, no significant differences were found between the 2 groups. Cancer survivors were found to be less likely to have visited a general practitioner or cardiologist compared with patients with chronic diseases. **CONCLUSIONS:** When considering physical HRQOL and health care use, cancer survivors appear to fare better than the average patient with chronic diseases. No difference in mental functioning was observed in the current study. *Cancer* 2015;000:000–000. VC 2015 American Cancer Society.

INTRODUCTION

The number of cancer survivors continues to steadily increase, both because more individuals are being diagnosed with cancer¹ and more patients are surviving cancer.² Survivors can be defined as adults living with a cancer diagnosis after primary treatment of cancer through the end of life.³ Due to the effects of cancer and its treatment, cancer survivors often experience physical problems such as pain, fatigue, or musculoskeletal problems, even years after diagnosis.⁴ Moreover, these patients may experience psychosocial problems because they may believe themselves to be more vulnerable because of having (had) a life-threatening disease that may have changed their life and functioning substantially.⁵⁻⁷ Consequently, cancer survivors have been shown to have a reduced physical and mental health-related quality of life (HRQOL) compared with general population samples.⁸⁻¹¹ Because of the health problems that cancer survivors experience, they have higher health care use than the general population.¹² As expected, cancer survivors pay more visits to medical specialists,¹³⁻¹⁶ but surprisingly, one study demonstrated that survivors of breast cancer pay fewer visits to nononcology specialists compared with women in the general population.

¹⁷ Compared with the general population, survivors of colorectal cancer are more often hospitalized,¹⁵ whereas in survivors of breast cancer, the number of hospitalization days is only increased within the first year after diagnosis.¹⁴ Cancer survivors also visit their general practitioner (GP) more frequently.¹⁶⁻²² Among survivors of prostate cancer and Hodgkin lymphoma, this higher frequency even extends beyond 5 years after diagnosis.^{13,18,23,24} Although to our knowledge studies regarding other types of health care use are rare, one study indicated that survivors of colorectal cancer more often use skilled nursing facilities and home care,¹⁵ whereas another demonstrated that cancer survivors visited physical therapists as often as individuals without a history of cancer.²³

Given the increasing number of cancer survivors, it is important to put the HRQOL and health care use of cancer survivors into perspective. Because some authors have proposed that cancer may be considered to be a chronic disease in the survivorship phase,²⁵ it is interesting to examine how cancer survivors compare with patients with chronic diseases. This could help to plan future health care resources.

Some studies have indeed compared cancer survivors with patients with chronic diseases with regard to several domains of HRQOL. They found that the HRQOL of cancer survivors was either equal to²⁶⁻²⁸ or better than^{24,25} that of patients with chronic diseases, but no firm conclusions can be drawn because sample sizes were small,^{28,29} the results were not corrected for differences in age and sex,^{27,29} studies either only examined one type of cancer^{29,30} or did not examine specific domains of HRQOL.²⁶ To the best of our knowledge, only a few studies to date have compared health care use in cancer survivors and patients with chronic diseases. Our research group previously compared the number of GP visits in patients with 1 of 4 chronic diseases (diabetes mellitus, chronic obstructive pulmonary disease [COPD], coronary artery disease, and osteoarthritis) with cancer survivors 2 to 5 years after diagnosis with the same chronic disease.³¹ We found that having had cancer led to an increase in the number of GP visits that was similar to having 1 extra chronic disease. Westert et al studied both primary and secondary health care use, but focused on the first year after diagnosis (ie, before the survivorship phase). They found that, compared with patients with selected chronic diseases, the health care use of patients with cancer

during the first year after diagnosis more often included several types of medical care.³² The objective of the current study was to examine HRQOL and health care use in a sample of cancer survivors and a sample of patients with chronic diseases without cancer. Based on the limited evidence available, we hypothesized that the HRQOL and health care use of cancer survivors would be similar. To account for the finding that many cancer survivors have ≥ 1 chronic diseases, we performed separate analyses for patients with a single disease and those with multimorbidities.

MATERIALS AND METHODS

Study Population

Cancer survivors

Data regarding cancer survivors were collected from the Dutch panelstudy entitled “Panel Living with Cancer.”³³ Patients were randomly selected from the Netherlands Cancer Registry in the winter of 2011 and contacted for participation in the panel.

Inclusion criteria were a physician-based diagnosis of cancer (retrieved from the Netherlands Cancer Registry).

Exclusion criteria were as follows: 1) a diagnosis of cancer before age 18 years; 2) diagnosis of a cancer type with a 5-year survival rate $< 20\%$ (ie, cancer of the pancreas, esophagus, stomach, biliary ducts or gallbladder, liver, lower respiratory tract, central nervous system, or unknown primary location) or distant metastases at the time of diagnosis; 3) being mentally unable to participate or having insufficient mastery of the Dutch language; and 4) being diagnosed with cancer > 15 years ago. Members of the panel received questionnaires (either by regular mail or E-mail) regarding various topics twice a year. Data used in this article were collected in the spring of 2013. Because we did not have data regarding current treatment status for all patients, we defined survivors as those who were at least 2 years from their diagnosis, assuming that after 2 years patients will have finished primary treatment. The “Panel Living with Cancer” is registered with the Dutch Data Protection Authority (registration no.

1435539); all data are collected and handled in accordance with the privacy protection guidelines of the Authority.

Patients with chronic diseases

Data regarding patients with chronic diseases were collected from the National Panel of People with Chronic illness or Disability (NPCD).^{26,34} Participants in this nationwide prospective panelstudy are recruited from random samples of listed patients in general practices in the Netherlands.

Inclusion criteria were a physician-based diagnosis of ≥ 1 somatic chronic diseases (diagnoses were retrieved from the medical files in the GP practice).

Exclusion criteria were as follows: 1) a diagnosis of chronic disease before age 18 years; 2) having a life expectancy < 6 months according to the patient’s GP; 3) being mentally unable to participate or having insufficient mastery of the Dutch language; and 4) being institutionalized and/or not being aware of the diagnosis.

Panel members complete self-reported questionnaires at home twice a year. Data used in the current study were collected in the spring of 2013. Similar to the cancer

survivors, we only selected those patients who were at least 2 years from their diagnosis. The NPCD is registered with the Dutch Data Protection Authority (registration no.

1283171); all data are collected and handled in accordance with the privacy protection guidelines of the Authority.

Measurements

HRQOL

HRQOL was measured using the Dutch version of the RAND-36.³⁵ This questionnaire consists of 8 subscales: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Scores on each scale range from 0 (poor) to 100 (excellent). The reported Cronbach alphas range from .78 to .92 in a general Dutch population sample.³⁶ Values of $>.70$ can be regarded as satisfactory.³⁷

Health care use

We assessed health care use in the following domains: GP care, specialist care, rehabilitative care, physical therapy, ambulatory mental health care, and occupational health care. We asked about the number of contacts with each of these services within the past 12 months for cancer survivors and within 2012 for patients with chronic diseases.

Because the questionnaires for the current study were distributed in the spring of 2013, both periods demonstrated considerable overlap.

GP care

We examined GP care because in the Netherlands the GP in primary care is the gatekeeper to secondary care and therefore is usually the first physician consulted for health problems. In addition, the GP is often involved in programmatic care for patients with chronic diseases. GP care included office visits, home visits, and telephone contacts.

In the Netherlands, when a patient is too ill or disabled to visit the practice, the GP visits the patient at home. Telephone consultations are mostly for follow-up after a practice visit (eg, for discussing laboratory or x-ray results).

Requests for medication refills, which are often made by telephone, were not considered as telephone consultations.

Specialist care

We examined specialist care to determine to what extent nononcology specialists are involved in the care of cancer survivors and patients with chronic diseases. We collected data regarding contacts (outpatient visits or telephone consultations) with the 3 most frequently visited nononcology medical specialists: cardiologists, internists, and surgeons. In the Netherlands, an internist is considered to be a medical specialist.

Rehabilitative care

We examined rehabilitative care because previous research has demonstrated that cancer survivors often report a need for rehabilitative care.³⁸ Rehabilitative care tries

to improve the functioning of patients with an acute or chronic disorder of the musculoskeletal system. It is often multidisciplinary and focuses on physical, mental, and social functioning. Use of rehabilitative care was defined as having ≥ 1 contacts (outpatient visits or telephone consultations) with a rehabilitation medicine specialist or an occupational therapist, or a daytime admission to a rehabilitation center.

Physical therapy

We examined physical therapy because exercise therapy can have beneficial effects on HRQOL in cancer survivors.

The use of physical therapy was defined as having ≥ 1 contacts with a physical or exercise therapist.

Ambulatory mental health care

We examined ambulatory mental health care because cancer survivors may experience psychosocial problems.⁴ The use of ambulatory mental health care was defined as having ≥ 1 contacts with a psychologist, psychiatrist, or social worker.

Occupational health care

We examined occupational health care use because cancer survivors may experience problems continuing or returning to work.⁴¹ The use of occupational health care was defined as having ≥ 1 contacts with an occupational health physician, social worker, psychologist, physical therapist, or nurse.

Chronic diseases

Self-reported diagnosis of the following chronic diseases was registered: diabetes mellitus, asthma/COPD, stroke, severe cardiac problems, high blood pressure, osteoarthritis, rheumatoid arthritis, severe back problems, severe bowel problems, migraine, chronic eczema, or vertigo with falling.

Statistical Analyses

Because many cancer survivors have ≥ 1 chronic diseases in addition to cancer, we compared cancer survivors and those without cancer separately for 1) patients with a single disease (ie, cancer survivors without a chronic disease versus patients with 1 chronic disease [no cancer]) and 2) patients with multimorbidities (ie, cancer survivors with ≥ 1 chronic diseases versus patients with ≥ 2 or more chronic diseases [no cancer]). We did not match groups based on age or sex, but instead controlled for these factors in our models because age and sex may have a different effect in both groups.

We compared these groups with regard to HRQOL, as measured by the different subscales of the RAND-36.

To adjust for potential differences in patient characteristics, we used 2 steps. We first built a multivariate model with each of the 9 scales as dependent variables and cancer/ chronic disease, age, sex, and 2 interaction variables (cancer/chronic disease*age and cancer/chronic disease*sex). In the models for the group with a single disease, we also added time after diagnosis (of either cancer or the chronic disease) and cancer/chronic disease*time after diagnosis.

Age was entered as a categorical variable (18-49 years, 50-64 years, 65-74 years, and >75 years). Time after diagnosis was defined as the duration between the date of

diagnosis in the Netherlands Cancer Registry or medical record in the GP practice and the date of filling in the questionnaire. Time after diagnosis was entered as a categorical variable (2-4 years, 5-9 years, and 10-19 years) In the models for patients with multimorbidities, we did not include time after diagnosis because we only knew the date of diagnosis of either the cancer or the “index disease” (ie, the chronic disease that was the reason patients were invited to the NPCG). We tested the significance of the interaction terms using a Waldtest and deleted terms that resulted in P values $>.05$ from the models. In the second step, we tested the main effects of these variables using a Waldtest, and deleted those that resulted in P values $>.05$. Using these final models, we calculated the adjusted differences (with 95% confidence intervals) between those with cancer and chronic diseases with the margins command. This postestimation command is used after running a regression model and calculates the difference in the subscale of the Short Form 36 (SF-36) Health Survey between 2 groups (in this case patients with cancer and those with chronic diseases), adjusted for all other factors included in the model. Finally, we compared the groups with regard to health care use using chi-square tests. With the exception of GP care, we did not use the number of contacts but rather compared the percentage with at least 1 contact because of the skewed distribution; many patients reported they had no contacts within the last year. To adjust for multiple testing, we adjusted P values using the false discovery rate method.⁴² Missing values in the RAND-36 were replaced as suggested by VanderZee et al.³⁵ For GP, specialist, and occupational health care, complete case analysis was performed. For categories that consisted of multiple variables (rehabilitation, physical therapy, and psychosocial), the values were considered missing if greater than one-half of the variables of a category were missing and patients reported no visits within the nonmissing variables. Analyses were performed using Stata/SE 13.1 software (StataCorp LP, College Station, Tex). According to Dutch legislation, no medical ethical approval was needed for this observational study.

RESULTS

A total of 635 cancer survivors and 1504 patients with chronic diseases were sent a questionnaire; within both groups, approximately 82% of the questionnaires were returned (Fig. 1). Cancer survivors (601 survivors) were most frequently diagnosed with breast cancer (23%), cancer of the gastrointestinal (GI) tract (21%), or cancer of the male genital system (19%). Patients with chronic diseases (1052 patients) were most frequently diagnosed with diabetes mellitus (26%), asthma/COPD (24%), ischemic heart disease (14%), and arthritis (14%).

The age distribution of cancer survivors and patients with chronic diseases was similar, both in the groups with a single disease and in those with multimorbidities (Table 1). In the group with a single disease, the time after diagnosis was found to be shorter in cancer survivors (2-5 years after diagnosis in 57% of survivors) than in those with chronic diseases (2-5 years after diagnosis in 13% of patients) ($P=5.001$). The average HRQOL of cancer survivors, as indicated by the different subscales of the RAND-36, was better than that of patients with chronic diseases, even after controlling for age, sex, and time after diagnosis. This was found both in patients with a single disease and in those with multimorbidities. Only on the mental functioning subscale were no significant differences found between cancer survivors and those with chronic diseases (Tables 2 and 3).³⁵ Differences favoring cancer

survivors were substantially larger on the physical domains (physical functioning and role-physical) than on the mental domains (mental health and role-emotional). In patients with multimorbidities, we found that the effect of being a cancer survivor (vs having chronic disease) varied by sex; differences favoring cancer survivors on the physical and social functioning subscales were considerably larger in female patients compared with male patients (Table 3) (Fig. 2).³⁵ Time after diagnosis was only significant in the models for general health, vitality, and social functioning; patients who were 5 to 10 years from their diagnosis were found to have higher scores on these subscales compared with patients with a shorter or longer time after diagnosis. This effect did not appear to differ between cancer survivors and patients with chronic diseases.

Cancer survivors had fewer GP contacts and were less likely to have had contact with a cardiologist than patients with chronic diseases, but they were more likely to have visited a surgeon during the past year. Post hoc analyses demonstrated that cancer survivors who visited a surgeon were mainly patients with cancers of the breast (35%) or GI tract (41%). In the group of patients with multimorbidities, cancer survivors were less likely to visit an occupational health care provider. Cancer survivors and patients with chronic diseases did not appear to differ with regard to the use of other types of health care within the past year (Table 4).

[FIGURE 1]

[TABLE 1]

[TABLE 2]

[TABLE 3]

DISCUSSION

The results of the current study demonstrate that, although we expected to find no differences, the physical HRQOL of cancer survivors was generally better than that of patients with chronic diseases, whereas the mental HRQOL was similar in both groups. Mean levels of physical and mental HRQOL in cancer survivors without a chronic disease are reported to be at the level of the general population,³⁵ whereas those of cancer survivors with ≥ 1 chronic diseases are somewhat lower. In patients with multimorbidities, we found that differences favoring cancer survivors on the physical and social functioning subscales were considerably larger in female patients than in male patients. This may be due to differences in the types or severity of chronic diseases between men and women, although posthoc no specific diseases could be found that could explain this finding.

Previous studies have also examined HRQOL in cancer survivors and found differences among patients with chronic diseases^{11,12} but, as noted in the introduction, these studies have some limitations. Yost et al³⁰ found similar differences favoring cancer survivors in physical functioning as were found in the current study, but they reported much larger differences in role functioning because of emotional problems and mental health.

Because Yost et al studied a sample of women with breast cancer within 4 years of diagnosis,³⁰ these differing results could be related to differences in the time after diagnosis, cancer type, or sex. In the current study sample, differences in the role-emotional and mental health subscales were similar in men and women, which makes it less likely that the fact that the study by Yost et al³⁰ only included women played a significant role. Other studies found that the HRQOL of cancer survivors and patients with selected chronic diseases was similar.²⁶⁻²⁸ However, 2 of these studies did not control for age, sex, and multimorbidity and the third by Wang et al²⁸ used a general practice visitors sample, thereby excluding patients who did not visit a GP and who most likely had a better HRQOL.

Indeed, Wang et al found that the HRQOL in the total sample of general practice patients was lower than in the general population.²⁸ Their mean scores in cancer survivors also indicated lower HRQOL on all scales compared with the sample in the current study, which may explain why they did not find differences between cancer survivors and patients with chronic diseases.

[FIGURE 2]

[TABLE 4]

With regard to health care use, we found that cancer survivors pay fewer visits to a GP than patients with chronic diseases. In a previous study, we found that having had cancer leads to an increase in GP visits similar to having 1 extra chronic disease.³¹ Because patients with multimorbidities without cancer had on average 1 extra chronic disease compared with patients with multimorbidities with cancer, we would have expected no difference in GP visits. The different findings in both studies may be due to differences in patient selection; in the previous study, we used a different selection of chronic diseases, patients had visited their GP for the chronic disease within the previous 2 years, and the time after diagnosis for both patients with cancer and those with chronic diseases was much shorter. In addition, in the current study, time after diagnosis was much longer for those with chronic diseases than for patients with cancer. However, time after diagnosis was only found to have a significant effect on general health, vitality, and social functioning.

We also found that cancer survivors had more often visited a surgeon within the previous 12 months. Post hoc analyses indicated that these individuals were mainly patients with cancers of the breast or GI tract. Because these patients were >2 years from their diagnosis, these visits were possibly related to follow-up, reconstructive or preventive surgery, or disease recurrence/metastases.

Patients with chronic diseases were more likely to visit a cardiologist, which is not surprising because cardiac disease was common (eg, 14% of these patients had ischemic heart disease). For the other health care providers, health care use was similar in both groups.

A strength of the current study is that we determined both HRQOL and health care use in a broad sample of patients with cancer and chronic diseases. HRQOL was measured with the RAND-36, a widely used and validated instrument. Health care use was self-reported, which may have led to an underestimation.⁴³ However, it is not likely that this underestimation was different between patients with cancer and patients with chronic diseases without cancer. Comorbid chronic conditions also

were self-reported, but for cancer survivors the cancer diagnosis was verified in the cancer registry whereas for patients with chronic diseases at least 1 chronic disease was verified in the patients' medical records; this "index disease" was the indication for inviting patients for panel participation.

Unfortunately, we only knew the date of diagnosis for this "index disease" and not for the other chronic diseases, and therefore the date of diagnosis could not be included in the models for the groups with multimorbidities. We also had no details regarding the severity of the chronic diseases.

However, it would be quite difficult to ascertain the severity of 12 different chronic diseases. Health care use or functioning could be used as a proxy, but we used these as our outcome measures. Finally, for those members from the NPCD who reported a diagnosis of cancer and who therefore were included in the group of cancer survivors, we had no details concerning the cancer stage or type of treatment they had received.

The question remains: where do cancer survivors stand regarding HRQOL and health care use? Cancer survivors generally fare better than the average patient with chronic diseases. The majority of cancer survivors return to a good HRQOL approximately 2 to 15 years after diagnosis.

However, wide variation exists, both within the group of cancer survivors and patients with chronic diseases.

Because our sample size did not permit us to compare different chronic diseases or cancer types, this remains an interesting task for future studies.

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CONFLICT OF INTEREST DISCLOSURES

The authors made no disclosures.

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TABLES AND FIGURES

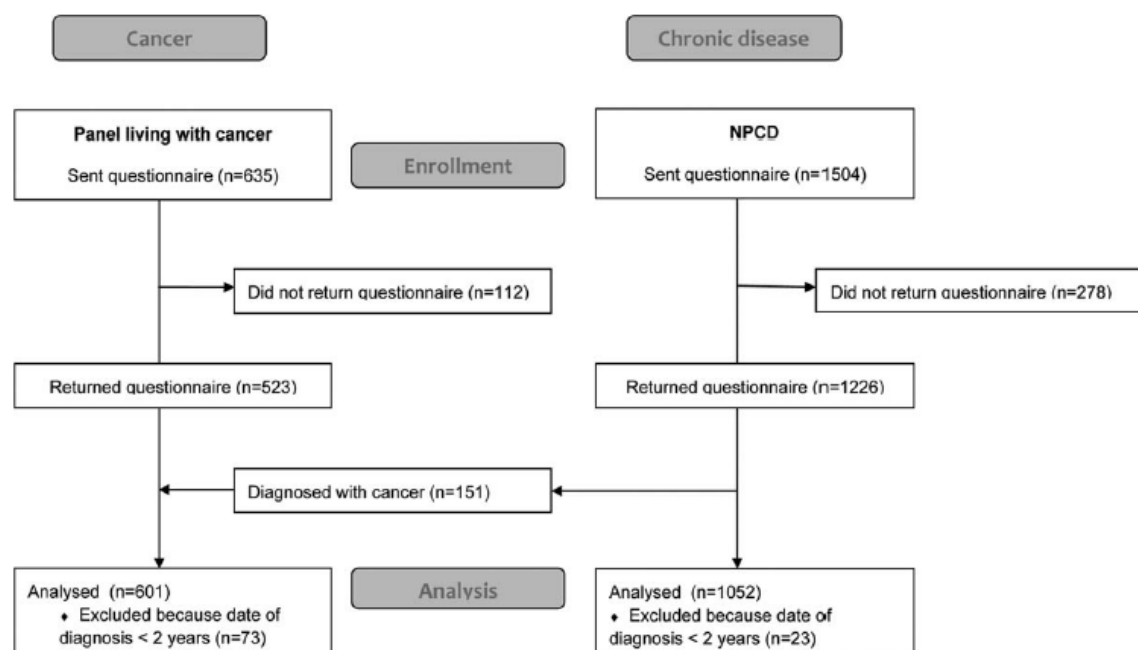


Figure 1. Flow diagram of the inclusion process. NPCD indicates National Panel of People with Chronic illness or Disability.

TABLE 1. Demographic Characteristics of Cancer Survivors and Patients With Chronic Diseases

	Cancer Survivors (n=220)	Patients With Chronic Diseases (n=414)	P	Cancer Survivors (n=381)	Patients With Chronic Diseases (n=638)	P
	Single	Single		Multimorbid	Multimorbid	
Age, y						
18-49	26 (12%)	67 (16%)	.32	24 (6%)	54 (8%)	.33
50-64	79 (36%)	160 (39%)		112 (29%)	211 (33%)	
65-74	70 (32%)	120 (29%)		151 (40%)	233 (37%)	
>75	45 (20%)	67 (16%)		94 (25%)	140 (22%)	
Male sex	115 (52%)	202 (49%)	.44	193 (51%)	289 (45%)	.13
Time after diagnosis, y						
2-4	125 (57%)	54 (13%)	.001			
5-9	72 (33%)	137 (33%)				
10-19	23 (11%)	223 (54%)				
Index disease (physician diagnosed) ^a						
1	GI cancer (25%)	Asthma/COPD (18%)		Breast cancer (23%)	Diabetes (35%)	
2	Breast cancer (23%)	Diabetes (12%)		Male genital cancer (21%)	Asthma/COPD (28%)	
3	Male genital cancer (17%)	Arthritis (11%)		GI cancer (19%)	Ischemic heart disease (18%)	
4	Skin cancer (13%)	Thyroid disorder (10%)		Skin cancer (10%)	Arthritis (16%)	
5	Other (21%)	Ischemic heart disease (9%)		Other (25%)	Thyroid disorder (8%)	
Chronic disease (self-reported) ^b						
1	-	Asthma/COPD (15%)		Hypertension (49%)	Hypertension (57%)	
2	-	Hypertension (13%)		Osteoarthritis (32%)	Osteoarthritis (41%)	
3	-	Diabetes (9%)		Severe back problems (19%)	Diabetes (35%)	
4	-	Osteoarthritis (8%)		Asthma/COPD (17%)	Asthma/COPD (32%)	
5	-	Migraine (7%)		Migraine (17%)	Severe cardiac disease (26%)	
No. of chronic diseases	0	1		1.9 (1.2)	2.9 (1.2)	.001

Abbreviations: COPD, chronic obstructive pulmonary disease; GI, gastrointestinal.

^a Five most common physician-diagnosed diseases that were the reason patients were invited to the panel.

^b Five most common chronic diseases as reported by patients.

TABLE 2. Health-Related QOL of Patients With a Single Disease (Either Cancer or 1 Chronic Disease)

Subscale	Normal Score ^a	Mean (SD)		Difference Cancer-Chronic Disease				Missing	
		Cancer (n=220)	Chronic Disease (n=414)	Uncorrected difference (95% CI)	P	Corrected difference (95% CI)	P	Cancer	Chronic Disease
Physical functioning	77	84 (19)	74 (26)	10.0 (6.0-14.1)	.001	11.3 (7.4-15.1)	.001	9 (4%)	6 (1%)
Role-physical	76	80 (34)	69 (41)	11.1 (4.6-17.5)	.002	11.8 (5.4-18.2)	.001	9 (4%)	10 (2%)
Bodily pain	79	90 (18)	78 (24)	12.1 (8.4-15.7)	.001	12.3 (8.7-15.9)	.001	3 (1%)	11 (3%)
General health	68	67 (20)	59 (21)	7.5 (4.1-10.9)	.001	6.8 (2.8-10.7)	.003	5 (2%)	10 (2%)
Vitality	67	68 (17)	64 (20)	4.1 (1.0-7.2)	.02	4.5 (0.9-8.0)	.03	5 (2%)	10 (2%)
Social functioning	86	85 (20)	81 (22)	4.4 (0.8-7.9)	.03	5.5 (1.3-9.6)	.02	9 (4%)	8 (2%)
Role-emotional	84	88 (28)	82 (35)	6.1 (0.6-11.6)	.042	6.4 (0.9-11.8)	.03	8 (4%)	8 (2%)
Mental health	77	78 (15)	76 (17)	2.0 (-0.7 to 4.7)	.18	1.9 (-0.8 to 4.6)	.20	6 (3%)	10 (2%)

Abbreviations: QOL, quality of life; SD, standard deviation; CI, confidence interval.

^aNormal scores were weighted for age and sex, and only reported for reference.³⁵

TABLE 3. Health-Related QOL of Patients With Multimorbidities (Either Cancer With at Least 1 Chronic Disease or Multiple Chronic Diseases Without Cancer)

Subscale	Normal Score ^a	Mean (SD)		Difference Cancer-Chronic Diseases				Missing		
		Cancer (n=381)	Chronic Disease (n=638)	Uncorrected difference (95% CI)	P	Corrected difference (95% CI)	P	Cancer	Chronic Disease	
Physical functioning	75	69 (26)	59 (28)	9.9 (6.4-13.4)	.001	Male ^b	5.4 (0.6-10.2)	.04	4 (2%)	4 (1%)
						Female	14.6 (10.0-19.3)		.001	6 (3%)
Role-physical	75	62 (42)	49 (43)	13.4 (7.9-19.0)	.001		13.3 (7.8-18.8)	.001	24 (6%)	15 (2%)
Bodily pain	78	76 (24)	64 (26)	12.2 (8.9-15.5)	.001		11.9 (8.6-15.1)	.001	14 (4%)	20 (3%)
General health	67	57 (21)	48 (20)	8.7 (6.1-11.3)	.001		8.6 (5.9-11.2)	.001	6 (2%)	19 (3%)
Vitality	66	60 (20)	55 (20)	5.0 (2.4-7.6)	.001		4.5 (1.9-7.0)	.003	11 (3%)	25 (4%)
Social functioning	86	76 (23)	69 (27)	7.5 (4.2-10.8)	.001	Male ^b	2.1 (-2.5 to 6.8)	.42	3 (2%)	8 (3%)
						Female	11.9 (7.4-16.4)		.001	6 (3%)
Role-emotional	84	77 (38)	70 (42)	6.8 (1.5-12.0)	.02		6.4 (1.2-11.6)	.03	12 (3%)	11 (3%)
Mental health	77	74 (18)	71 (18)	2.7 (0.4-5.1)	.03		2.2 (-0.1 to 4.5)	.08	11 (3%)	24 (4%)

Abbreviations: QOL, quality of life; SD, standard deviation; CI, confidence interval.

^aNormal scores were weighted for age and sex, and only reported for reference.³⁵

^bReported separately for males and females because the interaction between cancer and sex was statistically significant ($P < .05$).

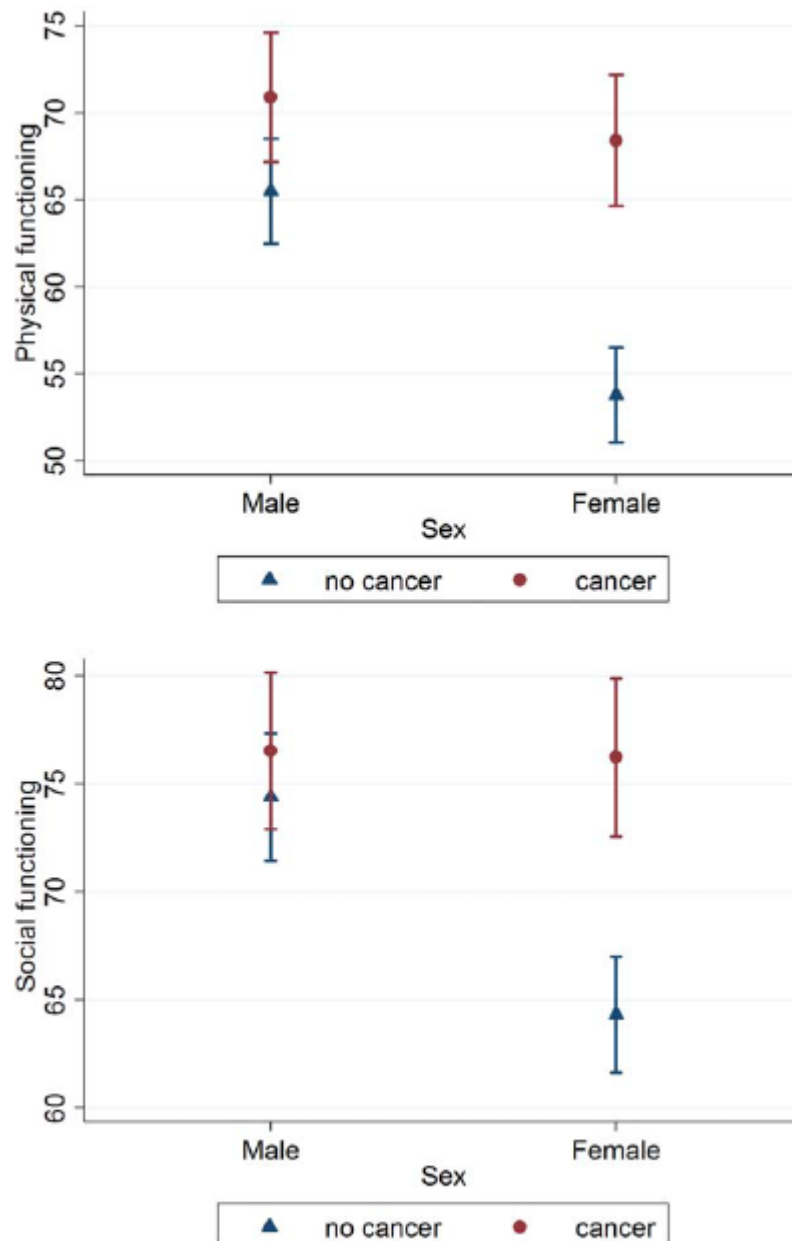


Figure 2. Graphical representation of interaction between cancer and sex on (*Top*) physical functioning and (*Bottom*) social functioning for patients with multimorbidities.

TABLE 4. Number of Visits to Health Care Providers Within the Last Year Stratified by Single Disease (Either Cancer or 1 Chronic Disease) or Multimorbidities (Either Cancer With at Least 1 Chronic Disease or Multiple Chronic Diseases Without Cancer)

	Cancer (n=220)	Chronic Disease (n=414)	<i>P</i>	Cancer (n=381)	Chronic Disease (n=638)	<i>P</i>
	Single	Single		Multimorbidities	Multimorbidities	
GP						
0-1 times	104 (49%)	120 (33%)	.001	95 (27%)	81 (14%)	.001
2-3 times	65 (31%)	109 (30%)		115 (32%)	157 (28%)	
≥4 times	43 (20%)	136 (37%)		149 (42%)	333 (58%)	
Specialist						
Cardiologist	20 (12%)	75 (22%)	.014	71 (24%)	208 (39%)	.001
Surgeon	54 (31%)	39 (12%)	.001	104 (35%)	90 (19%)	.001
Internist	32 (19%)	63 (19%)	1.00	84 (29%)	131 (26%)	.44
Rehabilitation	2 (1%)	20 (5%)	.052	21 (7%)	35 (7%)	.96
Physical therapy	53 (27%)	115 (31%)	.35	136 (40%)	264 (46%)	.10
Occupational health	11 (5%)	21 (5%)	1.00	13 (4%)	45 (7%)	.03
Psychosocial	12 (6%)	29 (8%)	.44	33 (9%)	51 (9%)	.67

Abbreviation: GP, general practitioner.