

Original Article

Perceived social support and its impact on depression and health-related quality of life: a comparison between cancer patients and general population

Hyosang Yoo^{1,†}, Dong Wook Shin^{1,2,†}, Ansuk Jeong³, So Young Kim^{4,5},
Hyung-kook Yang⁴, Jun Suk Kim¹, Ji Eun Lee¹, Jae Hwan Oh⁶,
Eun-Cheol Park⁷, Keeho Park⁴, and Jong-Hyock Park^{4,8,*}

¹Department of Family Medicine, Seoul National University Hospital, Seoul, ²Department of Family Medicine & Supportive Care Center, Samsung Medical Center, Seoul, ³Department of Psychology, University of Utah Asia Campus, Incheon, ⁴Division of Cancer Policy, National Cancer Center, Goyang, ⁵Office for Public Healthcare, Chungbuk National University Hospital, Cheongju, ⁶Center for Colorectal Cancer, National Cancer Center, Goyang, ⁷Department of Preventive Medicine & Institute of Health Services Research, Yonsei University School of Medicine, Seoul, and ⁸College of Medicine/Graduate School of Health Science Business Convergence, Chungbuk National University, Cheongju, South Korea

*For reprints and all correspondence: Jong-Hyock Park, College of Medicine/Graduate School of Health Science Business Convergence, Chungbuk National University, Cheongju 361-763, South Korea; Division of Cancer Policy and Management, National Cancer Control Research Institute, National Cancer Center, Goyang-si 410-769, South Korea. E-mail: jonghyock@gmail.com; whitemiso@ncc.re.kr

[†]These authors contributed equally as first author.

Received 17 October 2016; Editorial Decision 24 April 2017; Accepted 10 May 2017

Abstract

Objective: It is well known that cancer patients' perception of social support is associated with their depressive symptoms and health-related quality of life. However, there have been little studies that compared the variates of cancer patients with the general population. We sought to compare differences in the level of perceived social support and the impact of perceived social support on depressive symptoms and health-related quality of life between cancer survivors and the general population.

Methods: Data were collected from 1818 cancer patients treated at the National Cancer Center and regional cancer centers in South Korea. The control group of the general population was composed of 2000 individuals without cancer from community.

Results: Cancer patients reported significantly higher level of perceived social support than the general population, while they reported lower health-related quality of life and were more susceptible to depression. The positive associations of higher perceived social support with lower depressive symptoms, as well as with higher health-related quality of life, were stronger among cancer patients than among the general population.

Conclusions: The interaction effect suggests that the impact of social support would be stronger among cancer patients than the general public. Thus, it would be beneficial to pay attention to providing social support to cancer patients, particularly to those who are more vulnerable. Furthermore, investigation of the most effective and efficient methods to deliver social support interventions would be worthwhile.

Key words: cancer patients, general population, perceived social support, depressive symptoms, health-related quality of life

Introduction

It is well known that cancer patients experience more distressed psychologically and are more deteriorated in health-related quality of life (HRQOL) than healthy people do (1,2). Depression of cancer patients is known to give negative influence to treatment compliance, symptom control, hospitalization period and length of survival (3,4).

At the same time, positive impacts that social support can have on people with illness cannot be overemphasized. Cancer patients, in particular, showed higher quality of life (5,6) and lower depression (7–9), when they perceived more social support. Although the exact mechanism linking social support with health-related outcomes remains unclear, social support seems to play an important role in living with cancer (10,11).

Specifically, by comparing cancer patients with the general population without cancer, the potentially different roles of the perception of social support can be examined. Until recently, however, few studies have tried to answer this type of question and have examined differences in the associations of social support with depressive symptoms and/or with HRQOL (from below) among cancer patients vs. in the general population.

The current study, therefore, aims to answer the question of whether cancer patients' perception of social support yields different results from that of the general population. By comparing potentially diverse interactions and associations of social support, depression and HRQOL between people with or without cancer, we hope to understand better the specific role of social support in cancer patients.

Methods

Participants

Data for the current study is part of a larger survey that was carried out in 2009 by the National Cancer Center of South Korea. The larger survey consisted of cancer patients' experiences, including perceived social support, depression and HRQOL, as well as demographic, socioeconomic and medical aspects.

Cancer patient participants were recruited from the National Cancer Center Headquarter and its nine regional cancer centers throughout the nation. The inclusion criteria for the larger survey were: (i) being adult (i.e. at least 18 years old); and (ii) having used inpatient or outpatient clinic at least in 1 of the 10 participating cancer centers. We employed quota sampling method to reflect the distributions of cancer types common to Koreans, as well as gender and age. At each site, we aimed to recruit 200 patients, 80% of which is made up of six major types of cancer among Koreans (i.e. stomach, lung, liver, colorectal, breast and cervical cancers), leaving the other 20% for other types of cancer (12).

Cancer patients who provided written form of informed consent to participate were interviewed and completed the survey questionnaire being assisted by trained interviewers. Over the period of 2 months, a total of 1956 cancer patients from the 10 participating cancer centers completed the questionnaire. To match with the general population, 1818 cases that met the age criterion (i.e. 40 years of age or older) were analyzed for the current study. Their medical records complemented the questionnaire in terms of the histological

and Surveillance Epidemiology and End Results (SEER) stage information.

The general population sample was selected from the nation-wide survey, 'Awareness of Quality of Cancer Treatment among the General Population in Korea,' between November and December in 2012. The survey was also conducted through face-to-face interviews at the participants' homes by trained interviewers. The questionnaire included perceived social support, depression and HRQOL, as well as demographic, socioeconomic and medical information of the participants, which makes it comparable to the cancer patient survey. The participants were included if they were 40 years of age or older, considering the potentially limited experience of cancer care under the age of 40. We employed a stratified probability sampling technique from South Korean population, using a two-stage systematic sampling method: After stratifying by the region, we systematically extracted samples according to the population ratio. The sampling error within 95% confidence interval was $\pm 2.2\%$. Trained interviewers from professional research company visited the identified households and checked if there was a person eligible for participation. Among 4851 eligible participants contacted, a total of 2000 individuals without cancer signed written informed consents and completed the interview (response rate = 41.2%). Absence of cancer history was confirmed by self-report. The major reasons for refusal were lack of time (54%), concern about privacy (25%) and inconvenience (17%). This study was approved by the Institutional Review Board of the National Cancer Center (IRB No. NCCNCS-08-150 for cancer survivor survey and NCCNCS-12-635 for general population survey).

Measurements

Perceived Social Support: Duke-UNC Functional Social Support Questionnaire (FSSQ from below) was used to measure each individual's perception of the amount and the type of social support (13). The Korean version of DUKE-UNC is reported to have high reliability and moderate validity (14). Eight items from the DUKE-UNC FSSQ, which consists of two sub-scales, Confidant support and Affective support, were used to compute the average social support score (15). The Confidant support (five items) sub-scale concerns the relationships with whom important matters in life are discussed and shared (e.g. 'I get chances to talk to someone I trust about my personal or family problems'). The Affective support (three items) concerns the emotional aspect of support and care (e.g. 'I get love and affection'). Responses to each question are scored on a 5-point scale (from 1 'much less than I would like' to 5 'as much as I would like'), yielding a total score from 8 to 40. The average of the total score was used for the analyses in the current study. Higher scores suggest higher levels of perceived social support.

Depressive symptoms

The Patient Health Questionnaire (PHQ-9) is a 9-item self-report questionnaire designed to screen, diagnose, monitor and assess the severity of depression (16). The validity of the PHQ-9 is established among Korean population (17). For each item, patients rate the severity of the symptoms over the past two weeks. The items address loss of interest, depressed mood, changes in sleep, energy, appetite, or eating habit, guilt or worthlessness, concentration, feeling

slowdown or restlessness, and suicidal ideation. Each item is rated on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day).

Quality of life

The European Organization for Research and Treatment of Cancer's Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) is an integrated system for assessing HRQOL of cancer patients. This 30-item questionnaire reflects the multi-dimensionality of the Quality of Life construct. The Korean version of the EORTC QLQ-C30 (version 3.0), validated for Korean sample (18), was used for the survey. Focusing on the patients' experiences over the past four weeks, the EORTC QLQ-C30 includes five functional scales (physical, role, emotional, cognitive and social), three symptom scales (fatigue, nausea and vomiting, and pain), a global health status and quality of life scale, and six single items to assess additional symptoms commonly reported by cancer patients (dyspnea, sleep disturbance, appetite loss, constipation, diarrhea and financial difficulties). Most items are responded on a 4-point Likert scale, from 1 (not at all) to 4 (very much); and two items of the global health/QOL scale uses 7-point Likert scale. Domain scores were calculated according to the EORTC QLQ-C30 scoring manual (19).

Statistical analyses

The characteristics of cancer patients ($n = 1818$) and the general population ($n = 2000$) were analyzed by comparing the means and the frequencies with t -tests and χ^2 -tests, respectively. Differences in perceived social support, mental health and HRQOL were evaluated with Analysis of Covariance (ANCOVA), controlling for age, gender, marital status, education level, monthly income, employment status, smoking status and alcohol consumption. Comparisons within the cancer patient group, according to SEER, were also conducted with ANCOVA.

Associations between perceived social support and depressive symptoms and HRQOL were tested in the two groups by Multivariate Linear Regression Analysis. In addition, interactions between perceived social support and depressive symptoms and HRQOL were tested. All statistical analyses were performed with STATA version 13.0 (Stata Corporation, College Station, Texas, USA).

Results

The baseline characteristics of cancer patients and the general population are described in Table 1. Compared with the general population, cancer patients were older (59.9 vs. 52.7 years, $P < 0.001$), more likely to be unmarried (15.0% vs. 5.6%, $P < 0.001$) and less educated (less than high school: 31.1% vs. 16.4%, $P < 0.001$). Current smokers and current drinkers were more common in the general population than among cancer patients (Table 1).

Cancer patients reported significantly higher levels of depression (5.94 vs. 3.02, $P < 0.001$) and lower levels of overall HRQOL (52.4 vs. 61.5, $P < 0.001$). Specifically, cancer patients had significantly lower scores on all functional scale domains: physical (70.3 vs. 87.4), role (71.6 vs. 90.3), emotional (73.4 vs. 85.3) and cognitive (77.5 vs. 86.8) functioning ($P < 0.001$ for all domains). Cancer patients had significantly higher scores on all of the symptom scales, fatigue, nausea and vomiting, pain and dyspnea, sleep disturbance and appetite loss, constipation, diarrhea and financial problems ($P < 0.01$ for all domains). Cancer patients of more advanced cancer

stages had significantly more depressive symptoms than the general population and significantly lower scores on almost all functional scale domains except for cognitive functioning and global quality of life (Table 2).

Cancer patients reported significantly higher levels of perceived social support than the general population (30.68 vs. 24.55, $P < 0.001$). There was no significant difference in perceived social support within the cancer patient group according to the cancer stages (Table 3).

In both groups, higher perceived social support was associated with lower depressive symptom scores ($P < 0.001$). A significant interaction was found between depressive symptoms and perceived social support ($P < 0.001$), suggesting that the association was stronger in the cancer patient group. Similarly, higher perceived social support was related to higher HRQOL, which was stronger in the cancer patient group than in the general population on almost all functional scale domains ($P < 0.05$), except for emotional and cognitive functioning (Fig. 1).

Discussion

The current study is the first study to examine the difference in the perceived social support between cancer patients of varying stages and individuals without cancer in the general population. We aimed to investigate its association with depressive symptoms and HRQOL. Our study found that cancer patients perceive higher levels of social support, which in turn has stronger protective effects on depressive symptoms and HRQOL than in the general population. Cancer patients also reported higher levels of depressive symptoms and lower levels of HRQOL than the general population. In addition, cancer patients of more advanced cancer stages reported more depressive symptoms and lower levels of HRQOL. While there are some contradictory findings, depression may be particularly common and severe among patients with advanced cancer stage due to the increased symptoms, including pain and physical disability (20). It is consistent with the previous studies which found that advanced cancer stages were related with lower quality of life (21).

It is also consistent with the literature (8) that cancer patients reported significantly higher level of perceived social support than the general population. This difference might derive from cancer patients having more occasions to receive encouragement and care from friends, colleagues and family members than the general population would. The same principle could have been applied to the different cancer stages if people of more advanced cancer stage had not accumulated negative transactions with people around them over the long course of the treatment (5,22).

Not surprisingly (5,7,10,23), lower level of perceived social support was associated with higher depressive symptoms and with lower HRQOL in both groups. Interestingly, these associations that the perceived social support has both with depressive symptoms and with HRQOL were stronger among cancer patients than in the general population. Previous studies have reported mixed results. In a Dutch study, the relationship between social support and depressive symptoms was not generally different among cancer patients from the general population (8). Still, when the subdomains were examined, the lack of problem-focused emotional support had differing effects on depression. In another study that investigated such chronic diseases as diabetes mellitus, lung disease, cardiac disease, arthritis and cancer, buffering effects of social support on depressive symptoms differed across the diseases (24). All those taken into

Table 1. Characteristics of study population

Variables	General population (N = 2000) N/%	Cancer survivors (N = 1818) N/%	P value*
Age, year (Mean, SD)	52.72 (7.63)	59.98 (10.43)	<0.0001
Sex			
Male	991 (49.55)	966 (53.14)	0.0269
Female	1009 (50.45)	852 (46.86)	
Marital status			
Unmarried	112 (5.60)	272 (14.98)	<0.0001
Married	1888 (94.40)	1544 (85.02)	
Education			
Less than high school	323 (16.15)	564 (31.09)	<0.0001
High school and above	1677 (83.85)	1250 (68.91)	
Monthly income			
<2 million KRW	328 (16.40)	1328 (73.05)	<0.0001
≥2 million KRW	1672 (83.60)	490 (26.95)	
Employment status			
Not employed	53 (2.65)	198 (11.14)	<0.0001
Employed	1947 (97.35)	1580 (88.86)	
Smoking			
Non-smoker or past	1403 (70.15)	1692 (93.07)	<0.0001
Current smoker	597 (29.85)	126 (6.93)	
Alcohol assumption			
Non-or past smoker	560 (28.00)	1652 (90.87)	<0.0001
Current drinker	1440 (72.00)	166 (9.13)	
Cancer stage			
<i>In situ</i> and local		699 (38.45)	
Regional		690 (37.95)	
Distant		320 (17.60)	
Recur		17 (0.93)	
Cancer type			
Stomach		359 (19.75)	
Lung		240 (13.20)	
Liver		116 (6.38)	
Colon		281 (15.46)	
Cervix		329 (18.10)	
Breast		40 (2.20)	
Others		453 (24.92)	
Years since diagnosis (Mean, SD)		2.32 (2.98)	

KRW, Korean Won; SD, standard deviation.

*P values were determined by Student's *t*-test for continuous variables and χ^2 -test for categorical variables.

consideration, our findings suggest that cancer patients are more likely to suffer from depressive symptoms and lower quality of life when perceiving social support was decreasing.

The results of the current study have important implications for care of cancer patients. The interaction effect suggests that the impact of both social support and the lack thereof would be stronger among cancer patients than the general public. Thus, it would be beneficial to pay attention to providing social support, particularly for those more vulnerable, including those who are unmarried, less educated and of low income (5). Furthermore, investigation of the most effective and efficient methods to deliver social support interventions would be worthwhile. For example, the medium of counseling, including face-to-face, phone and online, can be an important topic. In the process, individual patient's coping style might matter, and thus needs attention as well so that the interventions can be tailored to the individual's needs (21,25,26).

The current study confirms the findings of previous studies and contributes to the literature by using a large sample of a wealth of clinical variables. As a result, we were able to examine a broader

range of outcomes, including social support, depressive symptoms and HRQOL in a larger group of cancer patients and the general population than prior studies (8). There are several limitations, however, to the current study. First, it is cross-sectional study, and thus causality is not determinable. Future prospective studies may enable us to properly assess the direction of the relationships of interest. Second, perceived social support was measured only once at the survey period in cancer patients, and thus the findings do not reflect possible changes over time since cancer diagnosis. As the sources of support, as well as the contents of support transaction, may vary according to the progression of cancer treatment, longitudinal and prospective investigations of the long-term effects of varied levels of social support are necessary.

In conclusion, cancer patients experience higher levels of perceived social support than the general population, while they are more susceptible to depression and lower quality of life. Even the positive effect of social support was stronger among cancer patients than in the general population. Therefore more academic and clinical attention is called for those with higher risks of lacking social support.

Table 2. Comparison of depression (PHQ-9) and EORTC QLQ-C30 between general population and cancer survivors

	General population LS mean (SE)	Cancer survivors					
		All LS mean (SE)	P value ^a	By cancer stage			P value ^b
				Localized LS mean (SE)	Regional LS mean (SE)	Distant LS mean (SE)	
Depression (PHQ-9)	3.02 (0.12)	5.94 (0.13)	<0.001	6.02 (0.21)	6.25 (0.21)	7.45 (0.30)	<0.001
EORTC QLQ-C30							
Functional scale							
Physical (PF)	87.35 (0.53)	70.30 (0.58)	<0.001	69.87 (0.91)	67.78 (0.90)	62.31 (1.29)	<0.001
Role (RF)	90.26 (0.65)	71.64 (0.70)	<0.001	71.53 (1.15)	70.69 (1.15)	63.24 (1.64)	<0.001
Emotional (EF)	85.30 (0.57)	73.40 (0.62)	<0.001	73.89 (0.97)	73.12 (0.96)	69.58 (1.38)	0.034
Cognitive (CF)	86.82 (0.54)	77.46 (0.59)	<0.001	76.53 (0.92)	74.87 (0.91)	74.08 (1.30)	0.247
Social (SF)	91.78 (0.61)	73.27 (0.67)	<0.001	73.14 (1.10)	69.68 (1.10)	65.59 (1.57)	<0.001
Global quality of life (QOL)	61.46 (0.51)	52.40 (0.56)	<0.001	52.22 (0.86)	49.03 (0.86)	48.02 (1.22)	0.006
Symptom scale							
Fatigue (FA)	22.15 (0.64)	42.33 (0.69)	<0.001	42.03 (1.08)	45.61 (1.07)	47.78 (1.53)	0.005
Nausea and vomiting (NV)	6.03 (0.54)	15.07 (0.59)	<0.001	15.16 (0.97)	16.56 (0.97)	16.05 (1.38)	0.593
Pain (PA)	9.30 (0.63)	22.84 (0.68)	<0.001	23.56 (1.13)	23.86 (1.12)	31.15 (1.60)	<0.001
Dyspnea (DY)	10.95 (0.68)	21.20 (0.74)	<0.001	20.93 (1.18)	22.53 (1.17)	30.04 (1.68)	<0.001
Sleep disturbance (SL)	14.53 (0.74)	26.32 (0.81)	<0.001	26.57 (1.30)	28.3 (1.29)	29.35 (1.85)	0.424
Appetite Loss (AP)	12.49 (0.75)	25.55 (0.81)	<0.001	25.7 (1.32)	29.44 (1.32)	33.31 (1.88)	0.003
Constipation (CO)	14.25 (0.72)	19.92 (0.78)	<0.001	20.73 (1.20)	21.88 (1.20)	22.58 (1.71)	0.642
Diarrhea (DI)	8.59 (0.59)	13.75 (0.64)	<0.001	14.93 (0.98)	15.26 (0.98)	10.9 (1.40)	0.027
Financial problem (FI)	9.43 (0.70)	33.04 (0.76)	<0.001	35.64 (1.28)	37.14 (1.27)	44.47 (1.81)	<0.001

LS mean, least square mean; SE, standard error; EORTC QLQ-C30, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 items.

^aP values were determined by ANCOVA, comparing general population and cancer survivors.

^bP values were determined by ANCOVA, comparing cancer stage.

Table 3. Comparison of social support (Duke-UNC FSSQ) between general population and cancer survivors

	General population LS mean (SE)	Cancer survivors					
		All LS mean (SE)	P value ^a	By cancer stage			P value ^b
				Localized LS mean (SE)	Regional LS mean (SE)	Distant LS mean (SE)	
Duke-UNC FSSQ	24.55 (0.18)	30.68 (0.19)	<0.001	29.90 (0.28)	30.46 (0.28)	29.66 (0.40)	0.200
Confidant support							
Chance to talk to someone about problems at work or housework	3.14 (0.02)	3.78 (0.03)	<0.001	3.69 (0.04)	3.78 (0.04)	3.61 (0.06)	0.082
Chances to talk to someone about personal and family matters	3.09 (0.02)	3.80 (0.03)	<0.001	3.70 (0.04)	3.76 (0.04)	3.70 (0.06)	0.609
Chance to talk about money matters	2.91 (0.03)	3.57 (0.03)	<0.001	3.50 (0.04)	3.50 (0.04)	3.39 (0.06)	0.390
Invitations to go out with other people	3.07 (0.03)	3.66 (0.03)	<0.001	3.56 (0.05)	3.58 (0.05)	3.28 (0.07)	0.001
Advice about important things in life	3.03 (0.02)	3.69 (0.03)	<0.001	3.61 (0.04)	3.63 (0.04)	3.55 (0.06)	0.601
—Mean score of confidant support	3.05 (0.02)	3.70 (0.02)	<0.001	3.61 (0.03)	3.65 (0.03)	3.51 (0.05)	0.108
Affective support							
People care about me	3.12 (0.02)	4.03 (0.03)	<0.001	3.91 (0.04)	4.04 (0.04)	3.96 (0.05)	0.119
Love and affection	3.06 (0.02)	4.08 (0.03)	<0.001	3.93 (0.04)	4.09 (0.04)	4.08 (0.05)	0.019
Help when sick in bed	3.08 (0.02)	4.06 (0.03)	<0.001	3.95 (0.04)	4.04 (0.04)	4.06 (0.06)	0.220
Mean score of affective support	3.09 (0.02)	4.05 (0.02)	<0.001	3.93 (0.03)	4.06 (0.03)	4.03 (0.05)	0.056
Remaining single items							
Visits with friends and relatives	3.05 (0.03)	3.69 (0.03)	<0.001	3.55 (0.04)	3.72 (0.04)	3.60 (0.07)	0.041
Instrumental support/help around the house	2.90 (0.03)	3.64 (0.03)	<0.001	3.50 (0.05)	3.64 (0.05)	3.66 (0.07)	0.099
Praise for a good job	2.98 (0.03)	3.69 (0.03)	<0.001	3.65 (0.04)	3.66 (0.04)	3.66 (0.06)	0.980

Duke-UNC FSSQ, DUKE-UNC Functional Social Support Questionnaire.

^aP values were determined by ANCOVA, comparing general population and cancer survivors.

^bP values were determined by ANCOVA, comparing cancer stage.

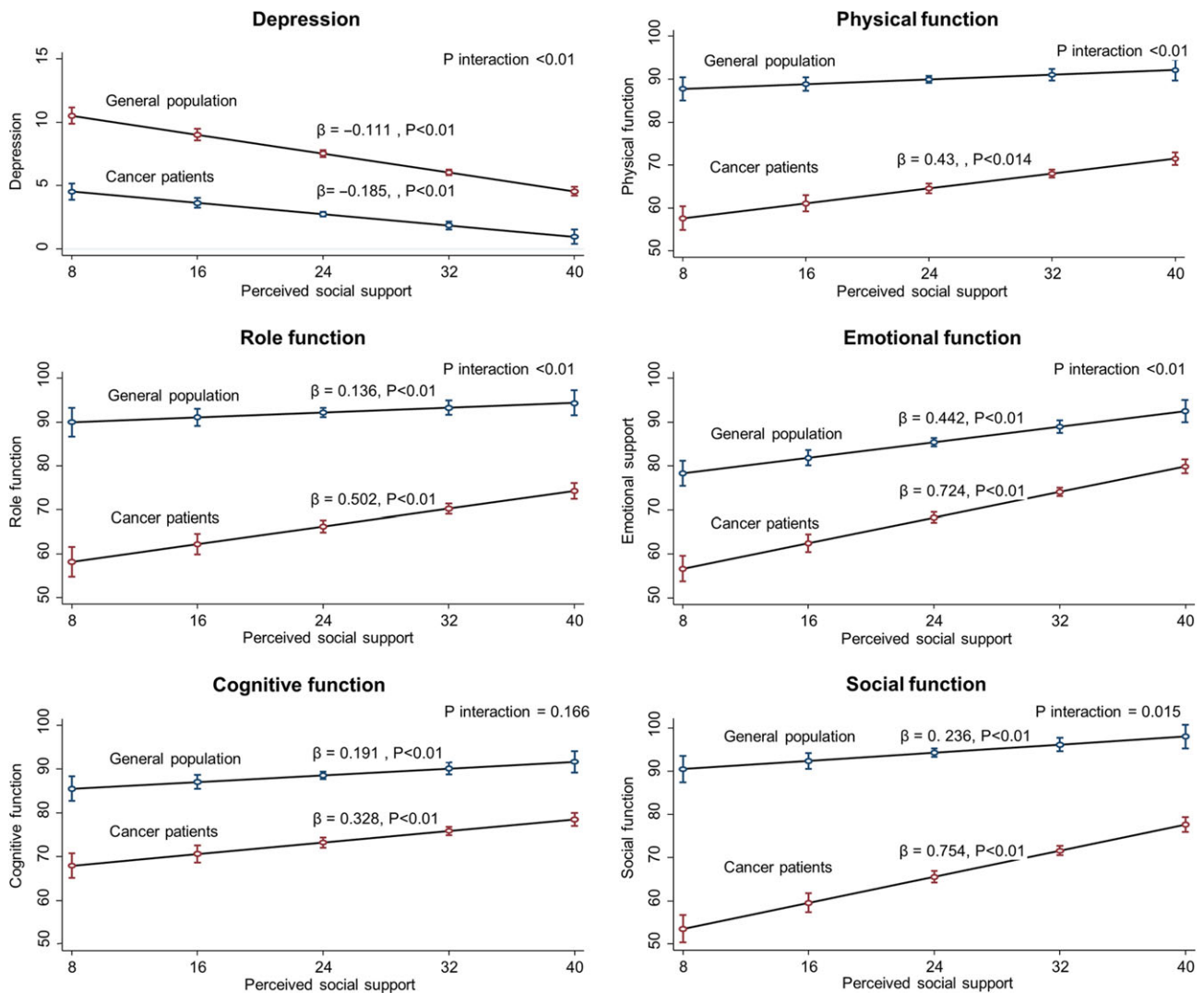


Figure 1. Depiction of interaction between the two groups (cancer survivors vs. general population) for prediction of depression and functional scales by perceived social support.

Acknowledgements

Data collection: The following 10 Korean national or regional cancer centers (in alphabetical order) participated in data collection and manuscript preparation for this study: National Cancer Center (Goyang), Busan Regional Cancer Center, Chungbuk Regional Cancer Center, Daegu-Gyeongbuk Regional Cancer Center, Daejeon Regional Cancer Center, Gangwon Regional Cancer Center, Gyeongnam Regional Cancer Center, Jeju Regional Cancer Center, Jeonbuk Regional Cancer Center and Jeonnam Regional Cancer Center.

Funding

Financial support for this study was provided by a grant from the National Cancer Center of Korea (No. 0910191); the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIP, No. 2016R1A2B4011045); the National R&D Program for Cancer Control (No. 1020010).

Conflict of interest statement

None declared.

References

- Ahles TA, Saykin AJ, Furstenberg CT, et al. Quality of life of long-term survivors of breast cancer and lymphoma treated with standard-dose chemotherapy or local therapy. *J Clin Oncol* 2005;23:4399-405.
- Lee J-A, Kim S-Y, Kim Y, et al. Comparison of health-related quality of life between cancer survivors treated in designated cancer centers and the general public in Korea. *Jpn J Clin Oncol* 2014;44:141-52.
- Butler LD, Koopman C, Cordova MJ, Garlan RW, DiMiceli S, Spiegel D. Psychological distress and pain significantly increase before death in metastatic breast cancer patients. *Psychosom Med* 2003;65:416-26.
- Petticrew M, Bell R, Hunter D. Influence of psychological coping on survival and recurrence in people with cancer: systematic review. *Br Med J* 2002;325:1066.
- Eom CS, Shin DW, Kim SY, et al. Impact of perceived social support on the mental health and health-related quality of life in cancer patients: results from a nationwide, multicenter survey in South Korea. *Psychooncology* 2013;22:1283-90.
- Sultan S, Fisher DA, Voils CI, Kinney AY, Sandler RS, Provenzale D. Impact of functional support on health-related quality of life in patients with colorectal cancer. *Cancer*. 2004;101:2737-43.

7. Hann D, Baker F, Denniston M, et al. The influence of social support on depressive symptoms in cancer patients: age and gender differences. *J Psychosom Res* 2002;52:279–83.
8. Schroevers MJ, Ranchor AV, Sanderman R. The role of social support and self-esteem in the presence and course of depressive symptoms: a comparison of cancer patients and individuals from the general population. *Soc Sci Med* 2003;57:375–85.
9. Smith EM, Gomm SA, Dickens CM. Assessing the independent contribution to quality of life from anxiety and depression in patients with advanced cancer. *Palliat Med* 2003;17:509–13.
10. Cobb S. Presidential Address-1976. Social support as a moderator of life stress. *Psychosom Med* 1976;38:300–14.
11. Cohen SHH. Positive events and social supports as buffers of life change stress. *J Appl Soc Psychol* 1983;13:99–125.
12. Yang HK, Shin DW, Park JH, et al. The association between perceived social support and continued smoking in cancer survivors. *Jpn J Clin Oncol* 2013;43:45–54.
13. Broadhead WE, Gehlbach SH, de Gruy FV, Kaplan BH. The Duke-UNC functional social support questionnaire. Measurement of social support in family medicine patients. *Med Care* 1988;26:709–23.
14. Suh SY, Im IY, Lee SH, et al. A study for the development of Korean version of the Duke-UNC functional social support questionnaire. *J Korean Acad Fam Med* 1997;18:250–60.
15. Broadhead WE, Kaplan BH. Social support and the cancer patient. Implications for future research and clinical care. *Cancer* 1991;67:794–9.
16. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.
17. Han C, Jo SA, Kwak JH, et al. Validation of the patient health questionnaire-9 Korean version in the elderly population: the Ansan geriatric study. *Compr Psychiatry* 2008;49:218–23.
18. Yun YH, Park YS, Lee ES, et al. Validation of the Korean version of the EORTC QLQ-C30. *Qual Life Res* 2004;13:863–8.
19. Fayers PAN, Bjordal K, et al. *The EORTC QLQ-C30 Scoring Manual*. Brussels, Belgium: European Organisation for Research and Treatment of Cancer, 2001.
20. Buccheri G. Depressive reactions to lung cancer are common and often followed by a poor outcome. *Eur Respir J* 1998;11:173–8.
21. Kershaw TNL, Kritpracha C, et al. Coping strategies and quality of life in women with advanced breast cancer and their family caregivers. *Psychol Health* 2004;19:139–55.
22. Lepore SJ. Expressive writing moderates the relation between intrusive thoughts and depressive symptoms. *J Pers Soc Psychol* 1997;73:1030–7.
23. Karnell LH, Christensen AJ, Rosenthal EL, Magnuson JS, Funk GF. Influence of social support on health-related quality of life outcomes in head and neck cancer. *Head Neck* 2007;29:143–6.
24. Penninx BW, van Tilburg T, Kriegsman DM, Deeg DJ, Boeke AJ, van Eijk JT. Effects of social support and personal coping resources on mortality in older age: the Longitudinal Aging Study Amsterdam. *Am J Epidemiol* 1997;146:510–9.
25. Kiss A, Meryn S. Effect of sex and gender on psychosocial aspects of prostate and breast cancer. *BMJ* 2001;323:1055–8.
26. Miller SM. Monitoring versus blunting styles of coping with cancer influence the information patients want and need about their disease. Implications for cancer screening and management. *Cancer* 1995;76:167–77.