

# The Impact of Coping Styles on Psychological Distress and Quality of Life in Korean Patients with Cancer

Jee In Kang, MD, PhD<sup>1</sup>, Hyun Cheol Chung, MD, PhD<sup>2</sup>, Se Joo Kim, MD, PhD<sup>1</sup>,  
Suk Kyoan An, MD, PhD<sup>1</sup>, Kee Namkoong, MD, PhD<sup>1</sup>

<sup>1</sup>Department of Psychiatry and Institute of Behavioral Science in Medicine, Yonsei University College of Medicine, <sup>2</sup>Department of Internal Medicine and Division of Oncology, Yonsei Cancer Center, Yonsei University College of Medicine, Seoul, Korea

**Objectives:** Styles of coping with cancer may affect psychological distress and quality of life in cancer patients. The aim of the current study was to evaluate the impact of mental adjustment styles on distress such as anxiety and depression and various domains of quality of life in Korean cancer patients.

**Methods:** A cross-sectional sample of 169 cancer patients (64 males, 105 females) completed the questionnaires. The Mini-Mental Adjustment to Cancer (Mini-MAC) scale was used to measure individual styles of coping with cancer. Distress and quality of life was assessed using the Hospital Anxiety and Depression Scale (HADS) and the Functional Assessment of Cancer Therapy-General (FACT-G) scale.

**Results:** Higher Anxious Preoccupation (AP) and Hopeless/Helplessness (HH) scores of the Mini-MAC were associated with more severe anxiety and depression symptoms measured using the HADS. AP was the most potent negative predictor for the Physical, Emotional, and Functional Well-Being measured by FACT-G. In addition, HH was found to show significant relation to poor quality of life over all domains of the FACT-G. Fighting Spirit positively predicted Functional Well-Being and overall quality of life (FACT-G total scores) and it negatively predicted depression.

**Conclusion:** The current study showed that adjustment styles such as anxious preoccupation and hopelessness play a crucial role in psychological distress and quality of life in cancer patients. These findings indicate that assessment and intervention of styles of coping with cancer is essential for reducing distress and improving quality of life in patients with cancer.

**Key Words:** Quality of life, Cancer, Mental adjustment, Coping, Distress, Mini-MAC

Received July 6, 2015  
Revised September 17, 2015  
Accepted September 22, 2015

**Correspondence:** Kee Namkoong  
Department of Psychiatry and Institute of Behavioral Science in Medicine, Yonsei University College of Medicine, Yonsei-ro 50-1, Seodaemun-gu, Seoul 03722, Korea  
Tel: +82-2-2228-1620  
Fax: +82-2-313-0891  
E-mail: keen@yuhs.ac

## Introduction

Cancer, the largest cause of death is a fear and threat to people. The diagnosis of cancer, active treatment, palliative care and aftermath of cancer involve a long process of adaptation to many stressful events and threats. Cancer patients experience considerable mental health problems and adverse quality of life throughout the disease course.<sup>1-4)</sup> Mental adjustment and coping styles have been considered as very important determinants of mental health and quality of life<sup>5-7)</sup> and of treatment compliance and survival in cancer patients.<sup>8,9)</sup>

Cancer-related quality of life is an individual's assessment of daily activities and sense of well-being during the disease course. Quality of life in cancer patients is considered as one of the clinical end points and improving quality of life is one of the primary therapeutic goals. Therefore, assessment of quality of life is considered as an important factor in the overall care of patients with cancer. The Functional Assessment of Cancer Therapy-General (FACT-G)<sup>10)</sup> scale, an internationally popular quality of life instrument, is a comprehensive multidimensional self-questionnaire specifically designed for cancer patients.

Mental adjustment to cancer has been defined as individual cognitive and behavioral responses to a threat such as the cancer diagnosis,<sup>11,12)</sup> which covers cognitive appraisal of a threat, willful cognitive or behavioral efforts to manage external or internal demands<sup>13)</sup> and emotional responses to cancer.<sup>14)</sup> For a disease-specific tool evaluating mental adjustment and coping to cancer, the Mini-Mental Adjustment to Cancer (Mini-MAC) scale would allow assessment of psychological responses in the patients who suffer from cancer.<sup>15)</sup> The Mini-MAC scale consists of the following five coping styles: Fighting Spirit (FS), which characterized by a determination to fight the illness and the adoption of an optimistic attitude, Hopeless/Helplessness (HH), which is related to feelings of giving up and engulfment by knowledge of the diagnosis and a pessimistic attitude, Anxious Preoccupation (AP), which characterized by constant preoccupation with cancer and feelings of devastation, anxiety, fear and apprehension, Fatalism (FA), which measure a patient's tendency to accept unavoidable situations such as putting oneself in the hands of God, and Cognitive Avoidance (CA), which is the tendency to block off problem or emotions.<sup>15)</sup>

Previous research suggests that specific mental adjustment styles affect psychological distress and quality of life in cancer patients. A prospective study for patients with head and neck cancer showed that an emotion-oriented coping style may be a positive predictor during radiation treatment.<sup>16)</sup> Hopeless or helpless attitude was reported to be an important variable related to quality of life in patients with breast cancer.<sup>17)</sup> In addition, escape-avoidance coping strategies were shown to be related with significant distress and poorer quality of life in patient with melanoma.<sup>18)</sup>

Because early detection of cancer and great strides in cancer treatment, recent research for patients with cancer has reflected a conceptual shift toward perceiving cancer as a chronic disease. According to this perspective, the use of adaptive coping strategies to deal with the stress of a chronic life-threatening illness seems to be very important for improving quality of life. Accordingly, assessment and intervention of the mental adjustment and coping styles to cancer may be essential for understanding and approaching of psychological problems and quality of life in patients with cancer.

The present study investigated the effects of coping styles measured by the Mini-MAC scale on psychological distress and each domain of quality of life in Korean patients with cancer.

## Methods

### Subjects

A total of 188 cancer patients (72 males, 116 females) were recruited from the outpatient clinic in a tertiary referral hospital in South Korea. They were 1) with a pathologic diagnosis of cancer with any type or stage, 2) 20 to 75 years, 3) aware of the diagnosis, 4) able to understand the study and respond to the scales. To minimize the impact of physical problem on quality of life, patients were excluded if they were applied to the Eastern Cooperative Oncology Group (ECOG)<sup>19)</sup> score 2 or above. Written informed consent was obtained from all subjects prior to the beginning of the study, and the protocol was approved by the Institutional Review Board. Of 188 patients, 19 (11.2%) did not complete the questionnaire. In the final analysis, 169 cancer patients (64 males, 105 females) were included. Demographic data were collected from their medical charts and self-administered questionnaires.

### Assessment

#### Mini-MAC scale

The Mini-MAC scale was used to measure individual coping styles to cancer. The Mini-MAC is a refined, reliable and valid self-administered questionnaire derived from Mental Adjustment to Cancer (MAC), which consists of 29 items using a 4-point Likert scale.<sup>15)</sup> It included the five factors: 4 items for FS, 8 items for HH, 8 items for AP, 5 items for FA, and 4 items for CA. The possible responses to each statement are: (1) 'definitely does not apply to me', (2) 'does not apply to me', (3) 'applies to me', and (4) 'definitely applies to me'. The Mini-MAC has been previously validated for the Korean cancer patients and the Korean version has been shown to have overall good reliability and validity in a Korean sample for original 5 subscales of the Mini-MAC.<sup>20)</sup>

### ECOG performance status scale

The ECOG performance status was evaluated.<sup>19)</sup> It is an observer scale of patients' physical ability rating from 0 (able to carry out all normal activities) to 4 (completely disabled).

### Hospital Anxiety and Depression Scale (HADS)

The HADS was used for the assessment of psychological morbidity.<sup>21)</sup> The HADS consists of 14 items using a 4-point Likert scale (0-3) and reflects two dimensions of depression (7 items) and anxiety (7 items). The HADS has been previously validated for Korean population.<sup>22)</sup>

### Functional Assessment of Cancer Therapy-General (FACT-G)

To measure quality of life in cancer patients, the FACT-G<sup>10)</sup> (Version 4) scale was used. It is a 27-item self-rating questionnaire using a 5-point Likert scale ranging from 0 ("not at all") to 4 ("very much"). The FACT-G covers four primary quality of life domains: Physical Well-Being (7-items), Social/Family Well-Being (7-items), Emotional Well-Being (6-items); and Functional Well-Being (7-items). The Physical Well-Being involves disease-related, treatment-related, and general bodily concerns such as nausea and fatigue. The Social/Family Well-Being reflects the ability to participate in usual family and social activities such as social support and emotional closeness. The Emotional Well-Being includes emotional problems such as anxiety, depression and fear of death. The Functional Well-Being indicates the ability to engage in and perform one's usual routines. The total score for the FACT-G is the summation of the four subscale scores. Higher scores indicate better quality of life.

### Statistical analysis

To identify possible independent variables predicting various domains of quality of life, the differences and relationships between demographic and clinical characteristics were evaluated. Student's t-test was conducted whether there are any differences according to gender. For inter-scale correlation coefficients between the Mini-MAC subscales and the HADS and FACT-G subscales, partial correlation analyses were performed to control the effects of demographic and clinical variables such as duration of illness and cancer stage.

Multiple linear regression models were created for each dimension of the HADS and FACT-G subscales. The optimal regression model was developed through the stepwise procedure. Collinearity diagnostics were performed by using the Variance Inflation Factor (VIF) values. The multicollinearity is to be concerned with any value of VIF > 10. The nominal variables such as the cancer types were entered into the model after the change to dummy variables. The statistical significance was accepted when  $p < 0.05$ . All tests were two-tailed. The data were analyzed using SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA).

## Results

### Characteristics of subjects

The sample was predominantly female (62.1%), with

**Table 1.** Demographic and clinical characteristics of subjects (n = 169)

	Mean ± SD	Number	
Age	53.6 ± 10.4		
Male/Female		64/105	37.9/62.1%
Education			
<7 years		13	7.7%
7-12 years		102	60.3%
>12 years		54	32.0%
Marital status			
Married		142	84.0%
Unmarried		11	6.5%
Divorced		7	4.1%
Widowed		9	5.3%
Employment			
Employed		54	32.0%
Retired		24	14.2%
Unemployed		91	53.8%
Duration of illness (week)	26.7 ± 44.1		
Cancer site			
Breast		74	43.8%
Stomach		51	30.2%
Colorectal		39	23.1%
Other		5	3.0%
Cancer stage			
I		65	38.5%
II		48	28.4%
III		40	23.7%
IV		16	9.5%
ECOG			
0		109	64.5%
1		60	35.5%

SD, standard deviation; ECOG, Eastern Cooperative Oncology Group performance status scale.

**Table 2.** Inter-scale correlation coefficients for the Mini-MAC subscales and the HADS and FACT-G subscales

	HADS-A	HADS-D	PWB	SWB	EWB	FWB
Fighting spirit	-0.230*	-0.294 <sup>†</sup>	0.036	0.197*	0.182*	0.312 <sup>†</sup>
Anxious preoccupation	0.693 <sup>†</sup>	0.689 <sup>†</sup>	-0.364 <sup>†</sup>	-0.211*	-0.683 <sup>†</sup>	-0.466 <sup>†</sup>
Fatalism	-0.356 <sup>†</sup>	-0.403 <sup>†</sup>	0.196*	0.255 <sup>†</sup>	0.361 <sup>†</sup>	0.280 <sup>†</sup>
Hopeless/helplessness	0.543 <sup>†</sup>	0.628 <sup>†</sup>	-0.377 <sup>†</sup>	-0.256 <sup>†</sup>	-0.589 <sup>†</sup>	-0.402 <sup>†</sup>
Cognitive avoidance	0.174*	0.086	0.028	0.020	-0.104	0.076

All tests are two-tailed. The duration of illness and cancer stage were used as control variables.

Mini-MAC, mini-mental adjustment to cancer scale; HADS, hospital anxiety and depression scale; HADS-A, anxiety; HADS-D, depression; FACT-G, functional assessment of cancer therapy-general; PWB, physical well-being; SWB, social/family well-being; EWB, emotional well-being; FWB, functional well-being.

\*p < 0.05; <sup>†</sup>p < 0.001.

**Table 3.** Results from multiple step-wise linear regression for psychological distress measured by HADS as outcome variables

	Unstandardized Coefficients B	Standardized Coefficients Beta	p-value
HADS-anxiety	Adjusted R <sup>2</sup> = 0.476, F = 26.48, p < 0.001		
AP	0.409	0.477	<0.001
HH	0.160	0.182	0.012
FA	-0.213	-0.144	0.020
Cancer type*			
Stomach	2.333	0.301	<0.001
Breast	1.335	0.186	0.013
Others	2.478	0.118	0.046
HADS-depression	Adjusted R <sup>2</sup> = 0.491, F = 41.55, p < 0.001		
AP	0.398	0.435	<0.001
HH	0.264	0.281	<0.001
FS	-0.367	-0.160	0.005
Cancer type*-stomach	1.441	0.174	0.002

HH, hopeless/helplessness; AP, anxious preoccupation; FS, fighting spirit; FA, fatalism; HADS, hospital anxiety and depression scale.

\*Reference=colorectal cancer.

53.6±10.4 years. Most subjects had breast (43.8%), stomach (30.2%), or colorectal (23.1%) cancer. ECOG performance status of all participants was 0 (64.5%) or 1 (35.5%) (Table 1). For gender, there were no significant differences of mental adjustment styles, psychological distress and various domains of quality of life between genders (all p > 0.05).

**Inter-scale relationships between the Mini-MAC subscales and the HADS and FACT-G subscales**

For inter-scale correlations between the Mini-MAC subscales and the HADS and FACT-G subscale after removing

**Table 4.** Results from multiple step-wise linear regression for quality of life measured by FACT-G as outcome variables

	Unstandardized Coefficients B	Standardized Coefficients Beta	p-value
Physical Well-Being	Adjusted R <sup>2</sup> = 0.140, F = 14.66, p < 0.001		
AP	-0.261	-0.248	0.004
HH	-0.207	-0.192	0.026
Social and family Well-Being	Adjusted R <sup>2</sup> = 0.066, F = 6.93, p = 0.001		
HH	-0.206	-0.173	0.033
FA	0.324	0.161	0.048
Emotional Well-Being	Adjusted R <sup>2</sup> = 0.464, F = 37.31, p < 0.001		
AP	-0.465	-0.443	<0.001
HH	-0.232	-0.215	0.004
FA	0.228	0.126	0.042
Duration of illness	0.019	0.186	0.003
Functional Well-Being	Adjusted R <sup>2</sup> = 0.258, F = 12.69, p < 0.001		
AP	-0.439	-0.297	<0.001
FS	0.672	0.181	0.008
HH	-0.244	-0.161	0.046
Cancer type*			
Stomach	-2.172	-0.162	0.017
Others	-5.117	-0.141	0.037
FACT-G-Total	Adjusted R <sup>2</sup> = 0.441, F = 45.20, p < 0.001		
AP	-1.466	-1.466	<0.001
HH	-1.091	-1.091	<0.001
FS	1.818	1.818	0.001

HH, hopeless/helplessness; AP, anxious preoccupation; FS, fighting spirit; FA, fatalism; FACT-G, functional assessment of cancer therapy-general.

\*Reference=colorectal cancer.

the effects of duration of illness and cancer stage, various significant relations were observed (Table 2). Mental adjustment styles of FS, AP, FA and HH, except for CA of the Mini-MAC scale, were significantly related with anxiety and depression of HADS as well as subscales of the FACT-G. CA had positive

relation with HADS-A score, but it had no significant correlations with other factors.

### Multiple step-wise regression analysis for the HADS and the FACT

For the psychiatric aspects measured by the HADS, the multiple step-wise regression analysis showed that AP, HH and FA of the Mini-MAC and cancer type were significant predictors of the HADS-anxiety and AP, HH accounted for 24% of the variance. In addition, AP, HH and FS of the Mini-MAC explained 46% of the variance for depression dimension of the HADS (Table 3).

For the each domains of quality of life measured by the FACT-G, AP and HH accounted for 14% of the Physical Well-Being dimension of the FACT-G. In addition, lower AP and HH and higher FA predict better quality of life in the domain of Emotional Well-Being. In the domain of Functional Well-Being, AP was also a negative predictor which accounted for 17.2%. The three adjustment styles of AP, HH, and FS were predictors with a 44% for the total score of the FACT-G (Table 4).

## Discussion

Our findings indicate that mental adjustment styles in cancer patients play an important role in the psychological morbidity and quality of life. Higher AP and HH subscale scores of the Mini-MAC were closely associated with higher level of anxiety and depression measured by HADS. AP, HH, and FS explained 44% in the model for overall quality of life measured by FACT-G. In particular, AP was the most potent negative predictor for the Physical, Emotional Well-Being, and Functional Well-Being measured by FACT. In addition, HH was found to have negatively significantly related to poor quality of life over all domains of the FACT-G. Hopelessness seems to have importance as the significant predictor of quality of life. FS, active coping style, positively predicted Functional Well-Being and overall quality of life (FACT-G total scores) and it negatively predicted depression.

These results are consistent with previous research findings.<sup>23-25</sup> A study for patients with leukemia reported that patients with worse adjustment styles such as hopelessness suffered from severe psychological distress.<sup>26</sup> A longitudinal

research showed that the influence of optimism and pessimism on quality of life appears to be mediated by coping strategies in patients with breast cancer.<sup>27</sup> It suggested that the two coping styles of FS and HH may be particularly strong mediators for quality of life.

In addition, high FA was positively associated with low distress and emotional and social well-being. Contrary to the previous finding of Watson et al. using the original MAC scale (1994), fatalistic attitudes in the present study was related to be less anxious and more adaptive coping. It can be partially explained by the FA difference between the original MAC and the Mini-MAC. The FA dimension in the original MAC scale may contain heterogeneous nature of the fatalism including a resigned attitude as well as an accepting attitude toward the illness and the future,<sup>15</sup> whereas the present 5 items of the dimension in the Mini-MAC (e.g.; I've had a good life; what's left is a bonus, Since my cancer diagnosis, I now realize how precious life is and I am making the best of it)<sup>20</sup> may reflect positive and accepting attitudes toward the illness and the future.

These coping styles might be important targets for management of distress and quality of life in cancer patients. Our findings suggest that less anxious and less hopeless attitudes and more active and accepting strategies toward cancer are related to lower distress and better quality of life. Accordingly, the intervention for increasing active and optimistic coping strategies such as FS and reducing pessimistic attitudes such as HH and AP would be implemented to enhance quality of life during cancer course. A research for intervention of coping in cancer survivors reported that enhancing coping with treatment side effects by using coping skills training was associated with the improved quality of life in the physical symptom domains.<sup>28</sup> Group-based cognitive behavior stress management for reducing intrusions and anxiety was reported to be a clinically useful intervention to women treated for breast cancer.<sup>29</sup> Therefore, further research of interventions for better coping styles would be helpful to understand the relationships between coping and quality of life in cancer patients.

On the other hand, although CA in cancer patients had a positive relation with anxiety scores, it had no significant correlations with other factors including depression and quality of life. The use of avoidant coping strategies in melanoma

patients was reported to be associated with negative cancer outcome such as shorter survival duration in melanoma patients.<sup>30)</sup> Another study for gynecologic cancer showed that the use of avoidance was associated with poorer well-being among extensively-treated patients.<sup>6)</sup> However, our findings suggest that CA may involve both aspects of the maladaptive coping to miss chances of problem-solving and the adaptive strategy to enable the person to escape from a threatening situation in cancer patients.

Among various domains of quality of life, the Physical Well-Being dimension of the FACT-G had weak association with mental adjustment styles of AP and HH (Adjusted  $R^2$  for AP and HH = 0.140,  $p < 0.001$ ). On the other hands, the Emotional Well-Being dimension seemed to be strongly influenced by mental adjustment styles of AP and HH (Adjusted  $R^2$  for AP and HH = 0.425,  $p < 0.001$ ). Coping strategies seem to be more closely associated with the emotional dimension of quality of life.

Several limitations should be mentioned. First, the present study was performed as a cross-sectional design. Therefore, we could not find directionality of causality between maladaptive coping styles, psychological distress such as anxiety and depression and various domains of quality of life. Our results cannot determine whether HH or AP contribute to poor quality of life or adverse experience of quality of life cause chronic hopelessness and anxiety. Second, our measures for coping styles and quality of life may be underreported or overreported according to various individual characteristics, because they were based on self-report. Finally, certain factors and conditions that might contribute to quality of life (e.g., social support system, pain or comorbid conditions such as diabetes) were not considered.

## Conclusion

The present studies showed that mental adjustment styles and coping patterns may be potent predictive factors for various domains of quality of life in patients with cancer. Our findings suggest that less anxious and less hopeless attitudes and more active coping strategies to deal with cancer are related to lower psychological distress and better quality of life. These findings indicate that assessment and intervention of

the mental adjustment styles and coping strategies to cancer is essential for reducing distress and improving quality of life in patients with cancer. Although our cross-sectional design may not provide the information of causal relationships between certain coping styles, psychological distress such as anxiety and depression and quality of life, it precludes causal conclusions. A longitudinal study which maps the coping responses in relation to medical conditions and quality of life over time will be helpful for determining the impact of patients' coping strategies to cancer.

## Acknowledgments

This work was supported by grants from the Disease Oriented Translational Research of Korea funded by the Ministry of Education, Science, and Technology (HI14C0202). The authors report no conflict of interest.

## References

1. Derogatis LR, Morrow GR, Fetting J, Penman D, Piasefsky S, Schmale AM, et al. The prevalence of psychiatric disorders among cancer patients. *JAMA* 1983;249:751-757.
2. Courtens AM, Stevens FC, Crebolder HF, Philipsen H. Longitudinal study on quality of life and social support in cancer patients. *Cancer Nurs* 1996;19:162-169.
3. Glass RM. Psychiatric disorders among cancer patients. *JAMA* 1983;249:782-783.
4. Andersen BL, Kiecolt-Glaser JK, Glaser R. A biobehavioral model of cancer stress and disease course. *Am Psychol* 1994; 49:389-404.
5. Ayres A, Hoon PW, Franzoni JB, Matheny KB, Cotanch PH, Takayanagi S. Influence of mood and adjustment to cancer on compliance with chemotherapy among breast cancer patients. *J Psychosom Res* 1994;38:393-402.
6. Costanzo ES, Lutgendorf SK, Rothrock NE, Anderson B. Coping and quality of life among women extensively treated for gynecologic cancer. *Psychooncology* 2006;15:132-142.
7. McCaul KD, Sandgren AK, King B, O'Donnell S, Branstetter A, Foreman G. Coping and adjustment to breast cancer. *Psychooncology* 1999;8:230-236.
8. Watson M, Haviland JS, Greer S, Davidson J, Bliss JM. Influence of psychological response on survival in breast cancer: a population-based cohort study. *Lancet* 1999;354:1331-1336.
9. Nakahara Y, Mochizuki Y, Miyamoto Y, Tanaka A, Kawamura T, Sasaki S, et al. Mental state as a possible independent prognostic variable for survival in patients with advanced lung carcinoma. *Cancer* 2002;94:3006-3015.

10. Cella DF, Tulsky DS, Gray G, Sarafian B, Linn E, Bonomi A, et al. The functional assessment of cancer therapy scale: development and validation of the general measure. *J Clin Oncol* 1993;11:570-579.
11. Greer S, Watson M. Mental adjustment to cancer: its measurement and prognostic importance. *Cancer Surv* 1987;6:439-453.
12. Watson M, Greer S, Young J, Inayat Q, Burgess C, Robertson B. Development of a questionnaire measure of adjustment to cancer: the MAC scale. *Psychol Med* 1988;18:203-209.
13. Lazarus RS, Folkman S. *Stress appraisal and coping*. New York: Springer;1984.
14. Watson M, Greer S. Personality and coping. In: Holland JC, Breitbart W, editors. *Psycho-oncology*. New York: Oxford University Press;1998. p.91-98.
15. Watson M, Law M, dos Santos MH, Greer G, John Baruch M, Judith Bliss M. The mini-MAC: further development of the mental adjustment to cancer scale. *J Psychosoc Oncol* 1994;12:33-46.
16. Kohda R, Otsubo T, Kuwakado Y, Tanaka K, Kitahara T, Yoshimura K, et al. Prospective studies on mental status and quality of life in patients with head and neck cancer treated by radiation. *Psychooncology* 2005;14:331-336.
17. Andritsch E, Dietmaier G, Hofmann G, Zloklikovits S, Samonigg H. Global quality of life and its potential predictors in breast cancer patients: an exploratory study. *Support Care Cancer* 2007;15:21-30.
18. Trask PC, Paterson AG, Hayasaka S, Dunn RL, Riba M, Johnson T. Psychosocial characteristics of individuals with non-stage IV melanoma. *J Clin Oncol* 2001;19:2844-2850.
19. Oken MM, Creech RH, Tormey DC, Horton J, Davis TE, McFadden ET, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol* 1982;5:649-655.
20. Kang JI, Chung HC, Kim SJ, Choi HJ, Ahn JB, Jeung HC, et al. Standardization of the Korean version of mini-mental adjustment to cancer (K-Mini-MAC) scale: factor structure, reliability and validity. *Psychooncology* 2008;17:592-597.
21. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361-370.
22. Oh SM, Min KJ, Park DB. A study on the standardization of the hospital anxiety and depression scale for Koreans: a comparison of normal, depressed and anxious groups. *J Korean Neuro-psychiatr Assoc* 1999;38:289-296.
23. Fong TC, Ho RT. Re-examining the factor structure and psychometric properties of the Mini-Mental Adjustment to Cancer Scale in a sample of 364 Chinese cancer patients. *Support Care Cancer* 2015;23:353-358.
24. De Fazio P, Barberi A, Caglioti F, Pierfrancesco T, Piersandro T, Segura-García C. Mental adjustment to cancer: the role of anxious and depressive symptoms under treatment. *Int J Psychiatry Med* 2013;46:375-386.
25. Johansson M, Rydén A, Finizia C. Mental adjustment to cancer and its relation to anxiety, depression, HRQL and survival in patients with laryngeal cancer - a longitudinal study. *BMC Cancer* 2011;11:283.
26. Montgomery C, Pocock M, Titley K, Lloyd K. Predicting psychological distress in patients with leukaemia and lymphoma. *J Psychosom Res* 2003;54:289-292.
27. Schou I, Ekeberg Ø, Ruland CM. The mediating role of appraisal and coping in the relationship between optimism-pessimism and quality of life. *Psychooncology* 2005;14:718-727.
28. Campbell LC, Keefe FJ, Scipio C, McKee DC, Edwards CL, Herman SH, et al. Facilitating research participation and improving quality of life for African American prostate cancer survivors and their intimate partners. A pilot study of telephone-based coping skills training. *Cancer* 2007;109(2 Suppl):414-424.
29. Antoni MH, Wimberly SR, Lechner SC, Kazi A, Sifre T, Urcuyo KR, et al. Reduction of cancer-specific thought intrusions and anxiety symptoms with a stress management intervention among women undergoing treatment for breast cancer. *Am J Psychiatry* 2006;163:1791-1797.
30. Brown JE, Butow PN, Culjak G, Coates AS, Dunn SM. Psychosocial predictors of outcome: time to relapse and survival in patients with early stage melanoma. *Br J Cancer* 2000;83:1448-1453.