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(14)化学療法受療肺癌，乳癌及び婦人科癌患者のＱＯＬ

化学療法受療肺癌、乳癌及び婦人科癌患者の QOL

—EORTC QLQ-C30 (version 3.0)の信頼性と妥当性の検討—

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看護管理学分野

要旨：本研究の目的は、European Organization for Research and Treatment of Cancer により開発された EORTC Quality of Life Questionnaire-C30 (version 3.0)の標準中国語版の信頼性，妥当性と適用可能性を検討することである．調査対象は７つの大学附属病院に入院していた婦人科癌（n=17)、肺癌（n=33）および乳癌患者（n=20）であった．９つの多項目尺度に含まれる項目間の相関係数について，項目が属している尺度との相関係数の絶対値は，項目 1, 10, 20 および 25 を除いてすべて 0.4 以上で，属していないほかの尺度との相関係数より高かった．9 つの多項目尺度のうち，８つの Cronbach アルファ係数は 0.70 より大きく、認識機能ＣＦは 0.70 未満であった．各尺度間のピアソン相関係数はほとんど 0.7 未満であった．EORTC QLQ-C30 の尺度は期待された SF-36 の尺度と相関した．異なる転移範囲を持つ患者の間多くの機能尺度と症状症状尺度・項目に有意差が認められた．敏感性の検討では、役割機能、社会機能および吐き気、不眠と食欲不振の得点が経時的に変動した．全般的にはこの標準中国語版が中国婦人科癌、肺癌および乳癌患者の QOL を評価するための有効な調査票だと示唆された．

Keywords: Quality of life, EORTC QLQ-C30, psychometric property, cancer

Introduction

Cancer affects at least 9 million people and causes 5 million deaths worldwide each year. Epidemiological studies show that cancer is the second leading cause of death in most developed countries, and similar trends are

emerging in developing countries as well (WHO, 1995). Advances in cancer treatment have raised the survival rate of cancer patients. Disease of cancer and its treatment, however, cause numerous physical and psychosocial conditions of cancer patients, which may subsequently affect the patients' normal patterns of social activities and their psychosocial and spiritual well being. This, in turn, may interfere with their successful process of cancer treatment. Traditionally, the evaluation of cancer therapies has been focusing on biomedical outcomes such as tumor response, disease-free conditions, overall survival rate, and treatment-related toxicity. While these biomedical parameters remain significant in the process of outcome evaluation, a comprehensive and holistic method of assessment for cancer patients is increasingly needed to measure the impact of cancer treatment on functional and psychosocial health of the patient.

It is commonly believed that the quality of life (QOL) reflects the subjective perceptions of well being in each individual. A concept of QOL was first used in the U.S. shortly after the Second World War in order to designate the view of a better life in which a person has much more to do with than just with financially secured states. The earliest research on QOL in medical field can be traced back to the 1940s. The World Health Organization (WHO) implicitly introduced the concept of QOL into health care field when health was defined as "state of physical, mental, and social well being and not merely the absence of disease or infirmity (WHO, 1947)." Karnofsky and Burchenal (1949) studied quality of life of the oncology population by looking objectively at the functional status of patients. In the 1970s, the WHO (1978) explicitly stated that all individuals have a right to psychosocial care and an adequate quality of life in addition to physical care. In the 1980s, the U.S. Food and Drug Administration (FDA) indicated that the approval of new drugs would require a favorable effect on survival and/or quality of life of patients (Johnson & Temple, 1985). Recently, quality of life has become one of the most important foci in oncology nursing practice and research. Issues related to quality of life have been identified as among the top three priorities for research by the American Oncology Nursing Society (Stetz & Haberman, 1995). Within oncology field, quality of life has been assessed for the following five purposes: First, to describe the nature and extent of functional and psychosocial problems encountered by

patients at various stages in the course of disease trajectory; second, to establish norms of psychosocial morbidity among specific patient groups; third, to monitor quality of life and quality of care with eyes toward improvement of the way in which treatment is delivered; forth, to evaluate the efficacy of alternative medical or psychosocial interventions through clinical trials; fifth and lastly, to screen individual patients for the necessity of psychosocial interventions such as counseling or psychotherapy (Aaronson, 1990).

Although quality of life has become an important indicator to evaluate the treatment outcome, there has been little agreement on the definition of health related QOL. There are as many definitions of the "quality of life" as the number of people who use the term. For example, Donovan et al. (1989) defined quality of life as "a person's subjective sense of well-being derived from current experience of life as a whole." The domains of QOL for cancer patients included at least physical and psychosocial fields, and spiritual and global measures are also recommend to be added (Donovan et al., 1989). Hornquist (1982) described a construct of QOL based on the satisfaction of human needs in six domains: physical, psychological, social, active, marital, and political. Cella and Cherin (1988) proposed a definition of QOL that "refers to patient's appraisal of and satisfaction with their current level of functioning compared to what they perceive to be possible or ideal." Ferrans (1990) reviewed existing definitions of QOL from various disciplines and classified into five broad categories: (1) normal life; (2) happiness/satisfaction; (3) achievement of personal goals; (4) social utility; and (5) natural capacity.

There is now a general agreement on two main points (Aaronson et al., 1991). First, health-related quality of life is a multidimensional concept that includes the broad area of functional status, psychosocial well being, health perceptions, and disease- and treatment-related symptoms. Second, quality of life assessment is essentially subjective. The target individual is the primary source of information on the quality of his or her life, although information from family members and health care personnel may often be useful. The focus is on identifying the subjective experience of the person whose quality of life is in question.

Based on these two points, a great deal of effort has been made by numerous researchers toward

operationalizing quality of life in a multidimensional framework using traditional methods of instrument development. A number of self-administered questionnaires have been developed for patients to quantify their psychosocial health status within a range of discrete domains. Examples include the Functional Living Index-Cancer (FLIC, Schipper H et al., 1984), the Spitzer Quality of Life Index (Spizer WO et al. 1981) and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30, Aaronson NK et al., 1988). These instruments have the following characteristics in common (McCartney & Larson, 1987; Aaronson et al., 1991). (1) These questionnaires have been developed for specific use among cancer populations. (2) They cover an adequate range of QOL domains. (3) Their psychometric testings demonstrate their reliability and validity. (4) They are sufficiently brief but comprehensive to use in clinical research settings. The use of these multidimensional instruments would provide accurate means to capture the subjects' QOL.

This study focused on the quality of life questionnaire (QLQ-C30) developed by the European Organization for Research and Treatment of Cancer (EORTC), an international non-profit organization established in 1962. The aims of the EORTC are to conduct, develop, coordinate and facilitate cancer research projects that have been carried out in Europe by multidisciplinary groups of oncologists and basic scientists. The Quality of Life Study Group in the EORTC was set up in 1980. In 1986, the group initiated a research program to develop an integrated modular approach to evaluate QOL of patients participating in clinical trials of cancer treatment (Fayers et al., 1999). The EORTC QLQ-C30 has been used in a wide range of cancer clinical trials as well as in non-trial studies by a number of research groups. Since the EORTC QLQ-C30 was designed as a core questionnaire for potential use for cancer patients, it was necessary to determine whether its psychometric properties are stable in various cancer populations. The initial test was carried out by the EORTC QOL Study Group with 346 lung cancer patients (Aaronson et al., 1993). Subsequently, another test was conducted by the National Cancer Institute of Canada (NCIC) Clinical Trials Group (CTG) (Osoba et al., 1994) including 535 patients with heterogeneous cancer diagnoses (breast cancer, lung cancer, ovarian cancer, and other cancer) as

well as Norwegian patients with head, neck, and other cancer. The EORTC QLQ-C30 has been translated into various languages and has been tested for its validity and reliability through its replication study on three subgroups of patients from 12 international study sites including English-speaking countries, Northern Europe countries, and Southern Europe countries. Reliability and validity of the translated versions of the EORTC QLQ-C30 were highly consistent across the three subgroups (Anderson, Aaronson, & Wilkin, 1993). The QLQ-C30, (version 2.0) was translated into Standard Chinese (Zhao & Kanda, 2000). The validation of this "Chinese" version have been tested, but reliability and validation of physical and cognitive functioning subclass did not meet the standards. In the version 3.0 of QLQ-C30 first five items are coded with the same response categories as item 6 to 28, namely "Not at all", "A little", "Quite a bit", and "very much" (Fayers et al., 1999).

The aims of this study were to evaluate psychometric properties of the Standard Chinese version of European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire (version 3.0).

Method

Subjects. Gynecological ,lung, and breast cancer patients were recruited from 7 hospitals affiliated with universities in China. Inclusion criteria were a confirmed diagnosis of cancer; aged 18 years or older; an ability to read and write Standard Chinese; and a consent to participate in the study.

Questionnaire. EORTC QLQ-C30 (version 3.0) is a 30-item questionnaire including multi-item subclass and single items that reflect the multidimensionality of the construct of QOL. Subclass and single items in the QLQ-C30 include: five functional subclass (physical, role, cognitive, emotional, and social); three symptom subclass (fatigue, pain, and nausea/vomiting); a global health/QOL subscale; single items for the assessment of additional symptoms commonly reported by cancer patients (dyspnea, appetite loss, sleep disturbance, constipation, and diarrhea); and an item related to the perceived financial impact of cancer and cancer treatment. The two items in the global health/QOL subscale use modified 7-point linear analogue scales. All of the other items are scored on 4-point Likert-type scales ranging from 1 "not at all" to 4 "very much."

The SF-36 is a health survey questionnaire which includes eight general health concepts: Physical

Functioning (PF); role limitations due to physical health problems (Role-Physical, RP); Bodily Pain (BP); General Health perceptions (GH); Vitality (VT); Social Functioning (SF); role limitations due to emotional problems (Role-Emotional, RE); and Mental Health (MH). The SF-36 has been translated into Chinese (Ren et al., 1998). The psychometric analyses found that the Chinese version of the SF-36 satisfied conventional psychometric criteria. All items use 5 or 6-choice response scales.

Data collection. The QLQ C30 was completed by patients before start of treatment, the last day of first course middle time of treatment circle and the last day of a circle. The SF-36 was completed before start of treatment and the last day of first course. The patients were asked to complete the questionnaires before being discharged from the hospital. Sociodemographic and clinical data of the patients were also collected from their medical records at those time.

Statistical analysis. Three approaches were taken to evaluate the construct validity of the QLQ-C30SC. First, a multitrait scaling analysis (Hays, et al., 1998, Stewart, Hays & Ware, 1998) was performed to test item convergent and discriminant validity based on the examination of correlation coefficients among the items and subscales. Correlation of an item with its own subscale was calculated by the correlation of this item with the sum of the other items in the same subscale (overlap-corrected correlation). Item convergent validity was indicated when a Pearson's correlation coefficient between an item and its own subscale was above 0.40. Item discriminant validity was indicated when an item correlated significantly higher with its own subscale as compared with the other subscales (referred to as "scaling success"). The second approach involved examining of the correlations among various subscales in the questionnaire. It was hypothesized that conceptually related subscales such as physical and role functioning subscales would correlate substantially high with each other (Pearson's correlation coefficient $\geqq 0.40$). It was considered as undesirable that a Pearson's correlation coefficient between subscales is too high, such as above 0.70, which would raise a question about the distinctiveness of the concepts being measured by each subscale. In the third approach, known-groups method was used to assess the clinical significance and construct validity. One-way analysis of variance (ANOVA) was

used to test the extent which the scores of the QLQ-C30SC were able to discriminate between subgroups of patients with different extent of disease. The internal consistency of each subscale was assessed by Cronbach's alpha (Cronbach, 1951) coefficient as a part of reliability testing. It was considered to be acceptable as a stable and internally consistent measure when Cronbach's alpha was 0.70 or greater.

Correlation coefficients between EORTC QLQ-C30 and SF-36 were calculated in evaluating the criterion-related validation of this Standard Chinese version.

The sensitivity of QLQ-C30 was tested by comparison of mean scores in four time points.

The Statistical Analysis System (SAS, Version 6.12) for Windows was used to analyze the data.

Results

1) Patients' demographic data. Sixty nine patients were recruited in the study from August 2000 to February 2001, including gynecological cancer patients (n=17), lung cancer patients (n=33), and breast cancer patients (n=20). Because the study is continuing, a complete response group includes 44 patients. The sociodemographic data of the 69 patients are shown in Tables 1. The age of the patients ranged from 24.0 to 70.0 years, with a mean of 50.1 years (SD=12.4). Forty percent of patient was male, and 94% was married. Fifty-nine percent of patients were under the educational level of senior schools. The majority of the patients were office workers (39%) and pensioners (35%). Ninety-one percent of the patients had a child/children. The clinical characteristics of the sample are reported in Table 2. The sample was heterogenous with regard to type of cancer, Karnofsky Performance Status, extent of disease, and treatment received.

2) Reliability and validity of the Standard Chinese version of the EORTC QLQ-C30 (3.0). A raw score of each subscale/item was linearly transformed into a percentage of the maximum score of the subscale/item (each score ranged from 0 to 100). A higher score on the functional subscale represented a higher level of functioning. A higher score on the global health/QOL subscale represented a higher level of QOL. A higher score on the symptom subscale or item represented a higher (more severe) level or incidence of symptom(s).

Table 3 shows the means, standard deviations of each subscale/item and Cronbach's alpha coefficients for the

multi-item subscales of the QLQ-C30. Mean scores of more than 50 were found in the physical, role, emotional cognitive and social functioning subscales, fatigue subscale, the appetite loss item, and the financial impact item. Eight out of nine subscales met the minimal standards of reliability (Cronbach's alpha coefficient>0.70), but cognitive functioning subscale did not meet these standards.

Pearson's correlation coefficients between each item and the subscales are shown in Table 4. The absolute value of Pearson's correlation coefficients ranged from 0.36 to 0.87. Correlation coefficients between an item and its own subscale were significantly higher than the coefficients with the other subscales except item 1, 10, 20 and 25.

Table 5 shows Pearson's correlation coefficients between subscales. All correlation coefficients were lower than 0.70 except fatigue subscale. The fatigue subscale correlated substantially with most of the other subscales, ranging from an absolute value of 0.41 to 0.73. Strong correlation coefficients (Pearson's correlation coefficient r>0.60) were found between the following functioning subscales: role and physical functions (r=0.64), role and social functions (r=0.60), fatigue and physical functions (r=-0.73), and fatigue and emotional functions (r=-0.61).

Pearson's correlation coefficients between subscales of EORTC QLQ-C30 and SF-36 are showed in Table 6. The physical, role, emotional and social functioning subscales, and fatigue and pain subscales of EORTC QLQ-C30 correlated well with similar subscales in SF-36. In addition, some subscales of EORTC QLQ-C30 correlated well with conceptually related scales in SF-36. For example, the correlation coefficients between vitality subscale in SF36 and fatigue and pain subscales in EORTC QLQ-C30 were 0.65, and physical functioning subscale in SF-36 and fatigue subscale in EORTC QLQ-C30 was 0.57.

Table 7 shows the comparison of the mean scores in each subscale between patients with different extent of disease. Significant mean score differences between different extent of disease were found in physical, role, emotional and social functioning subclass, as well as fatigue, nausea/vomiting, pain sleep disturbance and loss of appetite subclass/items.

Table 8 shows the mean scores of QLQ-C30 at different time points. The significant differences were found

in role, social functioning subscales, and nausea/vomiting, sleep disturbance and loss of appetite subscale and items.

Discussion

This study examined the reliability and validity of the Standard Chinese version of the EORTC QLQ-C30 (version 3.0). The multitrait scaling method confirmed that the structure of this version was generally similar to that of the original version. Correlation coefficients of items of concentration and memory in cognitive functioning subscale were 0.36. The other item-subscale correlation coefficients exceeded the criterion of 0.40 for item-convergent validity. Scaling success was not found in four items: one in physical functioning subscale, two in cognitive functioning subscale, and another one in fatigue subscale. Although several subscales in this version correlated significantly with one another, the magnitude of these correlation coefficients among all subscales were modest (r=0.40 to 0.70) except the correlation coefficient between fatigue subscale and physical functioning subscale. These results suggest that the subscales were assessing distinct components of the construct of QOL. Eight out of nine subscales met the minimal standards of reliability (internal consistency), but the cognitive functioning subscales did not meet this standard.

The results of the previous study showed that the physical and cognitive functioning subscales of version 2.0 were in question. The items (from 1 to 5) in the physical functioning subscale have been modified into a 4-point Likert-type scale by Osoba et al.[12] Its preliminary data indicated that a Cronbach's alpha of greater than 0.80 was likely with the new format. The QLQ-C30 version 3.0 adopts 4-point Likert-type scale for the first five items, and it was also translated into Standard Chinese by the author. The result of this study indicated that the Cronbach's alpha of physical functioning subscale was greater than 0.80 (It was 0.67 in version 2.0). Cronbach's alpha coefficient and different factor structure of the cognitive function subscale still didn't meet the standards. The moderate correlations between scales of EORTC QLQ-C30 and SF-36 confirmed the criterion-related validation of EORTC QLQ-C30. But there were not significant correlation between general health perceptions subscale of SF-36 and global quality of life in EORTC QLQ-C30.

The ability of this version to discriminate the different groups of patients was tested by known-group method, which can be taken as evidence of its responsiveness to clinical measures. In this study, most functioning subclass and symptom subclass/items were able to distinguish clearly between subgroups of patients in different disease stages.

The sensitivity of QLQ-C30 is moderately well. The mean scores of two functioning subscales and three symptom subscales/items changed over time.

Conclusions

The results of this study suggested that the Standard Chinese version of EORTC QLQ-C30 (version 3.0) was a valid instrument overall in assessing the QOL of Chinese gynecological, lung and breast cancer patients.

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Table 1. The sociodemographic data of the patients

	N	%
Sample size		
Gynecological Cancer	17	24.3
Lung Cancer	33	47.1
Breast Cancer	20	28.6
Sex		
male	28	40.0
female	42	60.0
Age		
mean	50.1	
SD	12.4	
range	24.0-70.0	
Education (n=68)		
compulsory	5	7.4
junior school	14	20.6
senior school	21	30.9
diploma	16	23.6
university	12	17.6
Occupation (n=68)		
industry	7	10.3
office work	27	39.7
service	7	10.3
pensioner	24	35.3
unemployed	1	1.5
other	2	2.9
Marital status		
single	2	2.9
married	66	94.3
divorced	1	1.4
widowed	1	1.4
Have child (n=69)		
yes	63	91.3
no	6	8.7

Table 2. The clinical data of the patients

	N	%
Type of cancer		
Gynecological cancer	17	24.3
Lung cancer	33	47.1
Breast cancer	20	28.6
KPS		
<=70	41	58.6
>70	29	41.4
Extent of disease		
Local	14	20.0
Local regional	33	47.1
Distance metastasis	23	32.9
Treatment		
Chemotherapy	43	61.4
Chemotherapy+surgery	27	38.6

Table 3. Mean scores and Cronbach's alpha coefficients of each subscale/item in the standard Chinese

	Item no. [a]	Mean (SD)	Cronbach's alpha coefficient [b]
Functioning scales			
Physical (PF)	1 to 5	66.4 (23.7)	0.84
Role (EF)	6, 7	55.5 (35.3)	0.92
Emotional (EF)	21 to 24	67.3 (24.0)	0.83
Cognitive (CF)	20, 25	76.2 (25.0)	0.52
Social (SF)	26, 27	54.5 (32.3)	0.72
Glabal health/Qol (QL2) [c]	29, 30	49.8 (23.3)	0.93
Symptom scales/items [d]			
Fatigue (FA)	10, 12, 18	53.3 (26.1)	0.82
Nausea and vomiting (NV)	14, 15	35.7 (32.1)	0.88
Pain (PA)	9, 19	37.9 (31.2)	0.82
Dyspnoea (DY)	8	32.9 (30.8)	–
Sleep disturbance (SL)	11	45.7 (34.6)	–
Appetite loss (AP)	13	56.7 (33.3)	–
Constipation (CO)	16	40.0 (37.5)	–
Diarrhoea (DI)	17	17.1 (27.1)	–
Financial impact (FI)	28	53.8 (34.2)	–

a Number correspond to the item numbers in the questionnaire.

b Cronbach's alpha coefficients>0.70 indicate adequate scale reliability.

c Scores range from 0 to 100. The higher scores represent higher levels of functioning of QOL..

d Scores range from 0 to 100. The higher scores represent higher levels of symptoms or problems.

Table 4. Pearson's correlation coefficients between the items and subscales in the Standard Chese version of the QLQ C-30

Item		Subscales								
Number [a]	Descriptors [b]	PF	RF2	EF	CF	SF	QL2	FA	NV	PA
1	Strenuous activity	**0.59**	0.65	0.39	0.44	0.50	0.20	−0.65	−0.39	−0.49
2	Long walk	**0.74**	0.58	0.43	0.37	0.35	0.29	−0.70	−0.43	−0.40
3	Short walk	**0.62**	0.35	0.20	0.20	0.31	0.30	−0.48	−0.44	−0.38
4	Stayed in bed/chair	**0.65**	0.49	0.39	0.21	0.29	0.36	−0.58	−0.39	−0.44
5	Needed help eating/dressing/washing	**0.55**	0.40	0.32	0.21	0.41	0.42	−0.37	−0.53	−0.52
6	Limited work	0.66	**0.85**	0.35	0.25	0.58	0.17	−0.54	−0.30	−0.28
7	Limited hobbies	0.57	**0.85**	0.29	0.28	0.57	0.19	−0.49	−0.30	−0.27
21	Tense	0.33	0.23	**0.70**	0.62	0.44	0.17	−0.40	−0.28	−0.45
22	Worried	0.44	0.34	**0.74**	0.43	0.40	0.35	−0.56	−0.35	−0.54
23	Irritable	0.29	0.19	**0.52**	0.45	0.11	0.26	−0.42	−0.24	−0.18
24	Depressed	0.42	0.32	**0.66**	0.43	0.35	0.25	−0.58	−0.43	−0.52
20	Concentration	0.40	0.28	0.45	**0.36**	0.31	0.14	−0.35	−0.29	−0.42
25	Memory	0.22	0.16	0.53	**0.36**	0.32	0.24	−0.41	−0.16	−0.33
26	Family life	0.46	0.53	0.29	0.35	**0.56**	0.20	−0.39	−0.16	−0.43
27	Social life	0.40	0.50	0.42	0.31	**0.56**	0.22	−0.36	−0.22	−0.35
29	Physical condition	0.40	0.21	0.34	0.23	0.21	**0.87**	−0.42	−0.36	−0.44
30	Overall QOL	0.37	0.15	0.28	0.21	0.20	**0.87**	−0.37	−0.25	−0.39
10	Need rest	−0.67	−0.52	−0.53	−0.43	−0.43	−0.32	**0.65**	0.38	0.62
12	Felt weak	−0.48	−0.34	−0.45	−0.27	−0.27	−0.28	**0.63**	0.44	0.36
18	Tired	−0.73	−0.52	−0.60	−0.48	−0.41	−0.45	**0.77**	0.47	0.53
14	Nausea	−0.56	−0.40	−0.46	−0.33	−0.25	−0.31	0.56	**0.78**	0.39
15	Vomiting	−0.49	−0.19	−0.28	−0.20	−0.17	−0.28	0.38	**0.78**	0.38
9	Had pain	−0.57	−0.30	−0.44	−0.37	−0.36	−0.42	0.58	0.38	**0.69**
19	Pain interfered with daily activities	−0.47	−0.22	−0.51	−0.46	−0.42	−0.36	0.49	0.35	**0.69**

a The item number corresponds to the number of each item in the questionnaire.

b The brief item descriptors approximate the questions asked in each item.

c Pearson's correlation coefficients between the subscales and items within the same subscale (corrected for overlap) are in are in bold lettering.

Table 5. Pearson's correlation coefficients among subscales in the standard Chinese version of the QLQ C-30

Subscales	PF	RF2	EF	CF	SF	QL2	FA	NV
RF2	0.64							
EF	0.46	0.33						
CF	0.37	0.27	0.59					
SF	0.48	0.60	0.40	0.38				
QL2	0.40	0.19	0.32	0.23	0.21			
FA	−0.73	−0.54	−0.61	−0.46	−0.43	−0.41		
NV	−0.56	−0.31	−0.39	−0.28	−0.22	−0.31	0.50	
PA	−0.57	−0.29	−0.52	−0.46	−0.43	−0.43	0.59	0.40

The negative values refer to an inverse correlation: e.g., the higher the fatigue, the lower the physical functioning.

Table 6. Comparison of the subscale scores in the QLQ-C30 between the patients in different level of Karnofsky Performance Status (KPS)

subscales/Items	KPS<=70		KPS>70			
	n	mean	n	mean	t*	p
PF	41	58.3	29	77.8	-3.68	0.0005
RF2	41	47.2	29	67.2	-2.43	0.0179
EF	41	61.4	29	75.6	-2.52	0.0143
CF	41	74.0	29	79.3	-0.88	0.3836
SF	41	45.9	29	66.7	-2.77	0.0073
QL2	41	47.2	29	53.4	-1.11	0.2689
FA	41	61.8	29	41.4	3.47	0.0009
NV	41	42.7	29	25.9	2.22	0.0299
PA	41	44.3	29	28.7	2.11	0.0387
DY	41	38.2	29	25.3	1.75	0.0839
SL	41	55.3	29	32.2	2.90	0.0051
AP	41	64.2	29	46.0	2.33	0.0226
DI	41	16.3	29	19.8	-0.32	0.7482
CO	41	42.3	29	36.8	0.60	0.5495
FI	41	58.5	29	47.1	1.38	0.1801

*: t value of t-test

Table 7. Pearson's correlation coefficients of subscales between QLQ-C30 and SF-36

	Subscales of QLQ-C30								
Subscales of SF36	PF	RF2	EF	CF	SF	QL2	FA	NV	PA
PF	0.54	0.51	0.46	0.39	0.29	0.23	−0.57	−0.37	−0.45
RP	0.37	0.45	0.40	0.33	0.37	0.30	−0.52	−0.18	−0.58
BP	0.39	0.18	0.51	0.36	0.38	0.41	−0.45	−0.24	−0.73
GH	0.24	0.26	0.41	0.44	0.30	0.24	−0.28	−0.21	−0.29
VT	0.50	0.32	0.67	0.54	0.44	0.40	−0.65	−0.42	−0.65
SF	0.48	0.54	0.46	0.34	0.64	0.32	−0.50	−0.37	−0.53
RE	0.37	0.34	0.56	0.50	0.36	0.30	−0.46	−0.26	−0.51
MH	0.35	0.32	0.61	0.44	0.29	0.35	−0.42	−0.21	−0.53

PF: physical functioning RP: role-physical BP: bodily pain GH: general health perception
VT: vitality SF: social functioning RE: role-emotional MH: mental health

Table 8. Comprison of mean scores of QLQ-C30 at different time points

	baseline		second		third		forth			
Subscales/items	n	mean	n	mean	n	mean	n	mean	F*	p
PF	69	72.6	69	66.4	53	63.6	44	64.4	1.93	0.1248
RF2	69	69.3	69	55.5	53	46.9	44	46.6	7.19	0.0001
EF	69	64.1	69	67.3	53	66.8	44	62.9	0.44	0.7235
CF	69	75.1	69	76.2	53	75.2	44	72.7	0.20	0.8993
SF	69	59.4	69	54.5	53	48.1	44	43.9	2.90	0.0358
QL2	69	56.8	69	49.8	53	52.0	44	48.9	1.61	0.1879
FA	69	45.4	69	53.3	53	53.2	44	54.0	1.61	0.1873
NV	69	20.5	69	35.7	53	36.2	44	40.9	6.26	0.0004
PA	69	30.0	69	37.9	53	39.6	44	39.4	1.44	0.2313
DY	69	31.9	69	32.9	52	40.4	44	39.4	1.22	0.3025
SL	69	40.6	69	45.7	53	50.9	44	59.1	3.47	0.0168
AP	69	40.6	69	56.7	53	47.2	44	52.3	2.87	0.0372
DI	69	15.5	69	17.1	53	13.8	44	18.2	0.33	0.8054
CO	68	32.8	69	40.0	53	41.5	44	40.2	0.83	0.4804
FI	69	51.7	69	53.8	53	50.3	44	56.8	0.35	0.7891

* F value of ANOVA