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Original Article

The Relationship between Social Support and Quality of Life: Evidence from a Prospective Study in Chinese Patients with Esophageal Carcinoma

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Abstract

Background: We aimed to evaluate the levels of social support in patients with postoperative esophageal carcinoma and potential effect of social support on generic and EC-specific quality of life.

Methods: Overall, 803 Chinese patients with EC were recruited in the high-incidence region- Linzhou in Henan, China for the observation study. We obtained data on European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), disease-specific score of European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-OES18 (The QLQ-OES18), and social support evaluation score at home visits by a specially trained research team.

Results: Aging and low education were negatively predicted total social support scores. A significant correlation (P = 0.000, 9 = 0.000) was found between QOL physical function and either the subjective or the objective dimensions in social supportive system. OES18 eating difficulty was significantly associated with objective support including family intimacy, friendship and community support (P = 0.016, P = 0.001).

Conclusions: The social support team should endorse quality care as integrating community-care management in post-esophagus recovery and meet the need of individual health quality of life. The elders, educational levels and rural farmers are significant to challenge the social supportive delivery in the current model of esophagus cancer care.

Keywords: Esophageal cancer, Quality of life, Social support, Community

Introduction

Esophageal cancer has been well known to be a common disease in China and generally causes higher health care costs and crude mortality rate of 37.39/1 00,000 after age and gender adjustments (1-2). Many epidemiological studies showed the high incidence and mortality from cancer of the esophagus among the inhabitants around Tri-provincial (Henan, Hebei and Shanxi) region in North China (3-4). The optimum management in carcinoma of the esophagus is systematic in selection, which is based on critical assessments of the patient's general health, disease stage and consequent responses to intervention. Although various rates and mortality in treatments were reported in

different surveys, 5-year survival after surgery arranges between 10% and 30% (5-6).

In China, despite effective early detection and new treatment methods have increased the number of esophagus cancer survivors in recent years, esophagus cancer continues to be lethal among the suspected population in Henan, Hebei and Shanxi regions especially the city of Linzhou and its subsidiary counties. The prospective study on the assessment of quality of life (QOL) among the patients with esophageal carcinoma indicated a negative impact of esophagectomy on QOL and this effect is transient for patients who survive for two or more years (7). Unfortunately, survivorship is often associated with lingering fears and adjustment problems such as extreme pain, dumping syndrome, reflux symptoms, aphonia, worrying about social functioning, and unbidden thoughts about the cancer and its treatment. Such quality of life concerns have led to an increasing interest among health care teams in the identification of factors that affect long-term adjustment.

According to Lepore's model of social constraints and cognitive processing of traumatic events, people with cancer will feel socially constrained and more likely to be distressed by intrusive thought about their disturbed condition (8-9). It is necessary for social health network to disclose patient's thoughts and feelings, copy behaviors and psychological adjustment to experience specifically a transaction or exchange of social-emotional resources towards the well-being enhancement. The concept of social support has been used in many studies involved health problems and treatment particularly in cancer (10-13). As a major influencing factor in emotional adaption onto severe diseases, adequate social support provides perceived feeling that captivates someone by sharing worries or problems. Effective support from social assets and perceived support has been connected to low levels of anxiety and depression, prompt social adjustment and elevated self-esteem. Accurate data pertinent to the impact of social support on short and long term QOL can inform patients and health care team in management decisions.

The purpose of this study was to examine the relationship between social support and QOL using a valid cancer specific questionnaire in a cohort of Chinese patients with esophageal carcinoma treated in the city of Linzhou in Henan.

Materials and Methods

Between February 2010 and May 2012, 1422 patients with squamous cell carcinoma and adenocarcinoma of the esophagus underwent esophagectomy at the high-EC prevalence region-the cities of Linzhou and Xinxiang. All tumors were staged by the TNM classification system of the American Joint Committee (14) and computed tomography and/or magnetic resonance imaging were used exclude distant metastases. To be eligible for the health study, subjects had to have the carcinoma at stage I or II (A and B) of the esophagus, survived postoperatively for 3 months and currently were at home care were eligible for the study. Additionally, to be feasible for the social support evaluation and QOL process, those eligible subjects need to be able to understand or communicate for the content of the questionnaire, have no concurrent malignancies, have no serious cognitive and psychological disorders. All subjects provided written informed consent for participation. The interview team contained one oncologist, two clinical psychologists, two qualified social worker and two health research instructors. We conducted the test for the interrater reliability coefficients with 0.93, indicating a good homogeneity and consistency of recording through the interviews.

Social support evaluation scale (SSES)

The current measure on social support was published previously (15-16). It was developed based upon the widely used multidimensional scales of perceived social support. It has demonstrated a good reliability and validity in psychometric properties. The modified Chinese version of the scale designed to measure information on the amount of perceived social support and evaluate their satisfaction with it by 10 items across three dimensions including subjective, objective issues and willing level in acceptance. In our study, the Cronbach's α coefficient average was 0.779 for the

eight subscales. For the total support scale, alphas were 0.794.

QOL Assessment

Quality of life was measured with European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30 and QLQ-OES18) (17-18). These two scales were widely utilized for a decade among Chinese cancer patients in clinical settings and the normative values presented can be compared to assess QOL scores of Chinese cancer patients, which demonstrated a reasonable adequacy. In the scale, 30 items cover 15 domains and describe response categories with higher scores indicating poorer QOL. The categories contain functioning, symptoms (fatigue, pain and nausea/vomiting), and distresses (low appetite, insomnia, diarrhea, constipation, breathing difficulty and financial difficulty). The QLQ-OES18 is well known in evaluating health quality levels in esophageal cancer patients, concerns on the global quality-of-life as well as relevant symptoms appearances such as dysphagia, eating restrictions, reflux, and esophageal pain.

Statistical analyses

The general data descriptions on all study variables for the patients were represented as percent, and mean with standard deviation (mean ± SD). For analysis of differences among continuous variables, independent-samples Student's *t*-tests were used. In the analysis of qualitative results, mean social support evaluation scales, QOL and OES18 scores were presented with 95% confidence intervals and the Spearman's test was used for correlation tests. Multiple linear regression analyses were conducted for the effect of social supports on quality-of-life outcomes. Statistical analyses were performed with the use of SPSS (Version 16.0) with $P < 0.05$ as statistically significant.

Ethical approval

Ethical approval was obtained from the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (IRB No: FWA00007304). The protocol, informed consent document and questionnaire for participants were reviewed and approved. Written consents were obtained from the participants, all of them were interviewed in person by investigators, and items and response choices were read and explained if necessary.

Results

Study population characteristics

A total of 803 subjects (561 men and 242 women) were recruited after medical consultation and analyzed on the first outpatient visit. The social demographic status and clinical situation at present were shown for these study patients (Table 1).

The average mean age of the patients (561 men and 242 women between 24 to 92 years old) in the study was (62.6 ± 11.9) years with (60.7 ± 10.7) years in men and (64.6 ± 12.8) years in women. Most of the patients were Han (97.9%). Of these patients, 590 (73.5%) lived in rural counties, 83 (10.3%) in township levels and 130 (16.2%) lived in urban cities; 698 (86.9%) were married and lived with spouse. The average time after the EC occurrence was (22.8 ± 4.3) mo and overall average period after esophagectomy was (4.9 ± 0.8) mo.

Scores of social support evaluation for EC patients

Levels of social support for the esophageal cancer patients are shown in Table 2.

As indicated, there were strong trends revealing total support significantly increased at young age, highermonthly income, higher education, increased interval after cancer occurrence and comorbid conditions. However, the total support measure did not change significantly across marital status, occupations, type of payment and difference residence locations. Separate scores and analysis were also carried out for the domain subscales of the support dimensions (Table 3). There was no significantly different effect on the willing level of acceptance among the categorized supportive components.

Table 1: Sociodemographic and clinical esophageal cancer-related characteristics in 803 postoperative survivors

Characteristics	n (%)	Characteristics	n (%)or Mmean±SD
Sociodemographic		**Type of payment**	
Gender		At public expense	20 (2.49)
Male	561 (69.9)	Health insurance	722 (89.9)
Female	242 (30.1)	Self-payment	61 (7.6)
Age (yr)		**Clinical characteristics**	
<50	81 (10.1)	**Histologic diagnosis**	
50-59	264 (32.9)	Squamous cell carci-	762 (94.9)
60-69	299 (37.2)	Adenocarcinoma	41 (5.1)
70-79	101 (12.6)	**Tumor length**	3.2 ± 0.4
≥80	58 (7.2)	**Distance from incisors**	35.7 ± 6.4
Ethnicity		**Dysphagia grade**	3.4 ± 0.4
Han	786 (97.9)	**Karnofsky score**	78.4 ± 1.3
Other	17 (2.1)	**BMI (kg/m2)**[c]	
Marital status		<20	275 (34.3)
Have spouses	698 (86.9)	20-25	414 (51.5)
No spouses	105 (13.1)	25-30	95 (11.8)
Living status		>30	19 (2.4)
Living alone	46 (5.7)	**Pathologic stage in TNM**	
Living with family	757 (94.3)	I	4 (0.5)
Education		IIA	369 (46.0)
Illiterate	196 (24.4)	IIB	205 (25.5)
≤ Elementary	267 (33.3)	III	223 (27.8)
<High school	216 (26.9)	IV	2 (0.2)
≥High school	109 (13.6)	Comorbid disease	1.47(0.2)
College or above	15 (1.8)	**No. comorbid conditions**[d]	
Occupation[b]		0	445 (55.4)
White-collar	172 (21.4)	1	141 (17.6)
Blue-collar	39 (4.9)	2	115 (14.3)
Rural farmer	592(73.7)	3	84 (10.5)
Monthly Income (¥)[a]		4 or more	18 (2.2)
<500	242 (30.1)		
500-1000	351 (43.7)		
≥1000	210 (26.2)		

Note: Abbreviations: SD= standard deviation; BMI=body mass index.

A: According to *HENAN STATISTICAL YEAR BOOK 2013*, an annual statistical publication that fully reflect the development of economy and society of Henan. The low income is <500 RMB/month/person, the middle income is 500 ~ 1000 RMB/month/person and the high income is ≥1000 RMB/month/person.

B: There are some Chinese cultures in which the white-collar refers to civil service like teacher, lawyer, doctors et al, and the blue-collar refers to people work in factory.

C: The category in the study is established referencing the health status of local inhabitants, on the basis of WHO.

D: Comorbidcondition, it refers to some chronic disease exist with the esophageal cancer at the same time. Such as hypertension, diabetes, cardiovascular, respiratory disease and so on.1, 2, 3 et al refer to number of those concomitant disease

Table 2: Social support evaluation scores from 803 postoperative esophageal Cancer survivors （n, %）

Items	Score									
	1	2	3	4	5	6	7	8	9	10
Sense of competence	—	—	—	55(6.9)	89(11.1)	172(21.4)	219(27.3)	140(17.5)	70(8.7)	58(7.1)
Sense of maintenance	—	—	—	67(8.4)	95(11.8)	167(20.8)	194(24.2)	108(13.4)	95(11.8)	77(9.6)
Sense of comfort	—	—	—	79(9.9)	102(12.7)	127(15.8)	145(18.1)	123(15.3)	95(11.8)	132(16.4)
Family intimacy	64(8.0)	116(14.4)	264(32.9)	359((44.7)	—	—	—	—	—	—
Extended family support	84(10.5)	222(27.6)	230(28.6)	267(33.3)	—	—	—	—	—	—
Friendship support	140(17.4)	131(16.3)	350(43.6)	182(22.7)	—	—	—	—	—	—
Community support	134(16.7)	243(30.3)	241(30.0)	185(23.0	—	—	—	—	—	—
Level in acceptance	—	—	32(4.0)	40(5.0)	89(11.1)	125(15.6)	174(21.7)	152(18.8)	106(13.2)	85(10.6)

Table 3: Factors distribution related to social support evaluation scores from poster operative esophageal Cancer survivor (mean, 95% Cl)

Variable	Subjective			Objective				Level in acceptance	Total of Social support
	Sense of competence	Sense of maintenance	Sense of comfort	Family inti-macy	Extended family support	Friendship support	Community support		
Total score	10	10	10	4	4	4	4	10	56
<50	8.0(7.1-8.9)	7.6(6.5-8.7)	7.3(6.1-8.5)	3.0(2.2-3.8)	2.8(1.7-3.9)	2.5(1.6-3.4)	2.4(1.6-3.2)	7.5(5.3-9.7)	41.1(37.8-44.4)
50-59	8.0(7.2-8.8)	7.8(7.0-8.6)	7.2(6.2-8.2)	3.0(2.2-3.8)	2.7(1.7-3.7)	2.5(1.7-3.3)	2.2(1.5-2.9)	7.4(5.2-9.6)	40.8(37.4-44.2)
60-69	8.0(7.3-8.7)	7.8 (6.9-8.7)	7.0(6.0-8.0)	2.9(2.2-3.6)	2.7(1.7-3.7)	2.3(1.5-3.1)	2.1(1.5-2.7)	7.6(5.5-9.7)	40.4(36.9-43.9)
70-79	7.6(6.9-8.3)	7.5(6.7-9.4)	6.8(5.8-7.8)	2.7(2.2-3.2)	2.5(1.6-3.4)	2.3(1.6-3.0)	2.2(1.5-2.9)	7.8(5.9-9.7)	39.4(35.8-43.0)
≥80	6.5(4.9-8.1)	6.0(4.7-7.3)	6.2(5.4-7.0)	2.7(2.3-3.1)	2.3(1.4-3.2)	2.0(1.2-2.8)	2.2(1.2-3.2)	7.6(6.3-8.9)	35.5(31.8-39.2)
P value	0.02	0.01	0.01	0.04	0.03	0.02	0.04	0.46	0.01
≤ Elementary	7.6(6.9-8.3)	7.5(6.8-8.2)	6.8(5.9-7.7)	2.7(2.4-3.0)	2.5(2.2-2.8)	2.3(2.1-2.5)	2.2(1.8-2.6)	7.7(6.9-8.5)	39.3(36.0-42.6)
<High school	8.1(7.4-8.8)	7.8(6.9-8.7)	7.0(6.0-8.0)	2.9(2.6-3.2)	2.7(2.4-3.0)	2.3(2.0-2.6)	2.1(1.9-2.3)	7.5(6.8-8.2)	40.4(37.5-43.3)
≥High school	8.0(7.2-8.8)	7.7(6.8-8.6)	7.2(6.3-8.1)	3.0(2.7-3.3)	2.7(2.4-3.0)	2.5(2.2-2.8)	2.2(2.0-2.4)	7.8(7.1-8.5)	41.1(37.7-44.5)
College or above	8.0(7.2-8.8)	7.9(6.9-8.9)	8.0(6.8-9.3)	3.0(2.8-3.2)	2.8(2.4-3.2)	2.5(2.3-2.7)	2.4(2.1-2.7)	8.3(7.5-9.1)	42.7(38.8-46.6)
P value	0.005	0.005	0.002	0.01	0.03	0.002	0.04	0.142	0.005
<500	6.0(5.5-6.5)	6.2(5.7-6.7)	6.2(5.6-6.8)	2.0(1.8-2.2)	2.1(1.9-2.3)	2.1(1.9-2.3)	2.1(1.8-2.4)	7.3(6.6-8.0)	34.0(30.0-38.0)
500-1000	6.9(6.1-7.7)	6.6(6.0-7.2)	6.5(5.8-7.2)	2.2(1.9-2.5)	2.3(1.9-2.7)	2.3(1.9-2.7)	2.2(1.9-2.5)	7.7(6.9-8.5)	36.7(32.8-40.6)
≧1000	7.1(6.5-7.7)	7.4(6.7-8.1)	7.5(6.8-8.2)	2.2(2.0-2.4)	2.4(2.1-2.7)	2.3(2.0-2.6)	2.2(1.8-2.6)	7.9(7.1-8.7)	38.8(34.0-43.6)
P value	0.01	0.01	0.01	0.04	0.05	0.04	0.06	0.46	0.02
≤24	6.9(6.2-7.6)	6.6(6.0-7.2)	6.5(5.9-7.1)	2.3(2.0-2.6)	2.3(2.0-2.6)	2.3(2.0-2.6)	2.1(1.9-2.3)	7.7(6.9-8.5)	36.6(32.9-40.3)
25-60	6.4(5.8-7.0)	6.2(5.7-6.7)	6.3(5.7-6.9)	2.2(1.9-2.5)	2.1(1.9-2.3)	2.1(1.9-2.3)	2.2(1.9-2.5)	7.2(6.6-7.8)	34.7(30.8-38.6)
>60	6.1(5.5-6.7)	6.0(5.4-6.6)	5.7(5.2-6.2)	2.4(2.1-2.7)	2.2(2.0-2.4)	2.3(2.1-2.5)	2.1(1.9-2.3)	7.7(6.8-8.6)	34.5(31.4-37.6)
P value	0.02	0.03	0.01	0.12	0.06	0.19	0.23	0.26	0.04
0	6.5(5.9-7.1)	6.5(5.8-7.2)	5.9(5.3-6.5)	2.3(2.0-2.6)	2.3(1.8-2.8)	2.0(1.7-2.3)	2.2(1.8-2.6)	7.5(5.4-9.6)	34.8(31.8-37.8)
1	6.6(6.0-7.2)	6.5(5.7-7.3)	6.0(5.4-6.6)	2.4(2.1-2.7)	2.1(1.9-2.3)	2.2(1.9-2.5)	2.0(1.8-2.2)	7.4(6.5-8.3)	39.3(36.0-42.6)
2	6.8(6.1-7.5)	6.6(6.0-7.2)	6.3(5.4-7.2)	2.3(2.0-2.6)	2.0(1.8-2.2)	2.3(2.0-2.6)	2.2(1.9-2.5)	7.5(6.8-8.2)	40.4(37.5-43.3)
3	7.1(6.4-7.8)	6.6(5.8-7.4)	6.3(5.7-6.9)	2.4(2.1-2.7)	2.2(1.9-2.5)	2.1(1.9-2.3)	2.3(2.0-2.6)	7.6(6.9-8.3)	41.1(37.7-44.5)
4 or more	7.5(6.7-8.3)	6.9(6.2-7.6)	6.5(5.9-7.1)	2.5(2.2-2.8)	2.2(1.9-2.5)	2.2(2.0-2.4)	2.1(1.9-2.3)	7.6(7.0-8.2)	42.7(38.8-46.6)
P value	0.006	0.01	0.005	0.14	0.17	0.13	0.16	0.09	0.02

The time of EC occurrence and severity of comorbid status had no significant effect for the objective senses in the population.

Comparison of QLQ-C30 scores with reference values recommended by EORTC

The comparison analysis based upon Wilcoxon test was shown in Table 4. The results indicated that the scores for the physical, role, emotional and social functions were significantly lower than the norms, whereas the score for cognitive function was similar with the norms. There were higher symptom scores in nausea and vomiting, diarrhea, insomnia, constipation, appetite loss and financial difficulties than the reference scores. The global health status scored lower than the norms.

QLQ-OES18 scores of the poster operative esophageal cancer survivors

Among all the functional dimensions (dysphagia, eating difficulty, reflux, and pain), the dysphagia function score was the highest, and the speech troublesome scored the lowest of all of the six single symptom items (trouble with saliva, choking, dry mouth, taste, cough and speech).

Correlation between social support and QOL-OES18

Table 5 presents partial correlations for social subscales and QOL-OES18 subscales. A significant positive correlation for the physical function measures was obtained for two kinds of social support subscale (with the exception of level in acceptance), and for total support sore, whereas the eating problem and reflux difficulty were negatively correlated with objective (family intimacy and friendship as well as extended family supports) and total social support in the patients. No significant correlation between global health status and social support subscale except level in acceptance was seen.

Table 4: Bivariate Analyses of EORTC QLQ-C30 scales among poster operative esophageal cancer survivors compared to reference values

Variables	Ref. values± SD	Mean ± SD in study	Rank value in ref.	Rank value in study	Z	*P* values
Functional scales						
Physical function	85.2 ± 19.9	75.7 ± 18.1	307.4	219.4	2.36	0.011
Role function	75.8 ± 17.1	70.5 ± 19.1	968.7	874.3	2.17	0.014
Emotional function	82.8 ± 19.4	69.4 ± 16.9	917.9	681.3	3.91	<0.001
Cognitive function	86.5 ± 19.6	81.5 ± 18.7	981.6	894.1	1.83	0.06
Social function	85.8 ± 19.8	67.5 ± 17.9	942.7	786.7	4.17	<0.001
Symptom scales						
Fatigue	42.1 ± 38.1	44.7 ± 39.9	945.2	981.4	-0.98	0.36
Nausea and vomiting	6.2 ± 11.8	19.4 ± 20.1	952.7	1106.7	-3.27	0.001
Pain	30.8 ± 28.9	33.2 ± 27.4	908.3	936.6	-1.53	0.086
Dyspnea	14.3 ± 15.1	16.9 ± 17.7	962.3	989.4	-0.76	0.42
Diarrhea	13.9 ± 14.4	20.9 ± 16.5	944.6	1096.8	-2.14	0.013
Appetite loss	11.1 ± 12.8	28.4 ± 22.9	930.8	1164.2	-4.26	<0.001
Constipation	10.7 ±13.4	17.1 ± 19.5	968.1	1098.2	-2.07	0.015
Insomnia	30.6 ± 9.4	38.0 ± 27.5	936.7	1104.6	-2.03	0.02
Financial difficulties	13.5 ± 4.3	39.2 ± 24.4	914.2	125.3	-4.99	<0.001
Global health status	75.3 ± 9.5	57.2 ± 18.7	928.5	702.4	4.08	<0.001

Table 5: Partial correlations between social support subscales and QOL /OES18 subscales

Variables	Subjective support	Objective support	Level in acceptance	Total score
QLQ-C30				
Physical function	0.276	0.276	-	0.285
Role function	-	0.135	-	-
Emotional function	-	-	0.079	-
Cognitive function	-	-	0.159	-
Social function	-0.87	-	0.106	-
Pain	-	-	0.101	-
Appetite loss	-	-	-	-
Financial difficulties	-0.174	-	-	-0.157
Global health status	-	-	-0.116	-
OES18				
Eating	-	-0.11	-0.14	-0.111
Reflux	-	-0.103	-	-0.079

Note: Subjective support: represents senses of social competence, social maintenance and comfort./Objective support: includes family intimacy, extended family support and friendship support./ Variables that were not significantly correlated with each support in the univariate cross tabulations (data not shown) are presented as '-'; these variables were not included in the mode.

Discussion

One of the main concerns after esophagectomy is the deterioration of health-related quality of life, which is reflected, in physical function, esophageal cancer-related symptoms and malnutrition status as well as social function (19). The QOL levels were significantly deteriorated after surgery in majority of short-term survivors but not among long-term subjects (20, 21). Our study demonstrated that even in the long-term survivors, the risk of QOL deterioration is severe and needs a greater attention in the clinical settings. Our results show that there are strong correlation between QOL physical function and either the subjective (competence, comfort and maintenance) or the objective dimensions (family and friendship as well as community supports). In addition, subjective support is also negatively associated with QOL symptom scale- financial difficulty. In mapping esophagus cancer-specific measure by OES18 and social support, out current findings suggest the occurrences of two of OES18 complications – eating difficulty and reflux symptom are significantly associated with objective dimension – family and friendship support. Overall, it appears that different dimension supports are an important predictor of QOL physical function scale and function dimension of esophagus cancer care, indicating a need for satisfaction of social competence, comfort and maintenance, enhancement of family and friendship supports to facilitate QOL and cancer-related function recovery in the patients after surgery.

Because there are some Chinese cultures in categories of patients' social characters, some division standard are defined especially in the study. In "Marriage statue": it can be classified "Have spouses" and "No spouses". In the other hand, there also should be "Living statue": Living alone and Living with the family. In Occupation, the white-collar refers to civil service like teacher, lawyer, doctor et al, and the blue-collar refers to people work in factory. As to "Type of payment", it is grouped "at public expense", "Health insurance"; and "Self-payment".

Our findings suggest the overall difference in social support scores across the demographic and social status. Firstly, the aging was negatively associated with the total social support score, independent of education level, marriages status, type of payment and risky lifestyle. Second, the major concern in community care may be lack of family supportive availability because of the fast growing age population, family members 'job relocation due to economic reform and development in China. As a result, family members' support and friendship support are gradually decreased for the

elder patients. It highlights that the elder is social support-oriented group in esophagus cancer care.

The educational levels, occupational kinds and monthly income are the major predictors of socioeconomic circumstances for the total social support. It is the high prevalence of socially disadvantaged individuals with lower educational levels or rural farmers among the patients with esophagus cancer because of the high-incidence esophagus carcinoma in township and rural sides. It is recognized that health disparities in provider resources and networks distribution between urban and rural areas have been steadily increasing in China. Although community-based health insurance was reestablished in rural areas in 2002 and an annual subsidy of $ 1.25–2.50 to the premium for each participant of farmers by the Chinese government, only about 50% of farmers are covered under the insurance. The patients likely did not access the care that is necessarily adequate to them in preventing inappropriate health behaviors and failed to obtain as adequate objective social support as white-collar group. It is demanding for community-care service to expand its prepayment system for those rural residents without health insurance. Although the service quality and organizational dimension of public health providers in cancer care are advantaged (20-21), urban patients with esophagus cancer, compared with suburban and rural settings have relatively lower score in subjective social support- sense of competence, comfort and social role maintenance. It seems due to lack of interpersonal trust, risky lifestyle, more mental comorbidities and other urban sprawl- related threats. However, our results do not analyze patient satisfaction with their treatment care and concomitant relationship with patient providers. The patients with esophagus cancer who had short term of onset were associated with higher total social support and subjective support than those courses lasted more than 24 months. It suggested a better handling of severe complications in community health centers in short-term after esophagectomy and long-course sicker patients require family that is more concrete, friends and community supports. Previous reports indicated that the risk of complications is more likely related to the skills of the professional teams including surgeon, social worker and caregiver. Thus, measurement of esophagus malignance-related quality of life is concomitant with evaluation of subjective cognitive with the quality of social support. However, the long-term prognosis and QOL are limited in literatures. It is necessary to have a prospective investigation in answering whether SS was an independent predictor of a better 2-year prognosis and QOL after adjusted tumor stage and comorbidity. In addition, the objects in this study are almost in the North of Henan province, the majority of them are rural patients with lower education level is another shortcoming. Therefore, we must expand the sample selection area, and increase the typical and representative of the objects as soon as possible in the further development.

The results, presented in Table 6, show that QLQ-C30 global health status is negatively associated with duration after occurrence and positively correlated with household income in patients with esophagus cancer.

In addition, OES18-eating difficulty is strongly linked to duration after occurrence and household income. It is not surprising that objective aspects in family intimacy and extended support, friendship and community support show strong correlations with QLQ-C30 global health scale and OES18 eating difficulty. The findings suggest that individual shortage of social perceptions especially in family and friend support have a negative influence on global QOL scale and daily eating symptom in the patients.

List of abbreviation

EC： Esophageal carcinoma

EORTC QLQ-C30：European Organization for Research and Treatment of Cancer Quality of Life Questionnaire

The QLQ-OES18： European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-OES18

Table 6: The Multiple linear regression analysis of global health status and eating difficulty (n=803)

Variables	R	Δ R2	B	Beta	*P* values
Global health status					
Subjective support	0.368	0.178	1.16	0.242	<0.001
Objective support	0.652	0.377	1.33	0.131	<0.001
Duration after occurrence	0.384	0.149	-0.921	-0.142	<0.001
Household Income	0.226	0.104	-1.05	-0.176	<0.001
OES18-Eating					
Objective support	0.587	0.281	-0.677	-0.086	0.016
level in acceptance	0.623	0.303	-0.971	-0.115	0.001
Duration after occurrence	0.264	0.117	-0.749	-0.097	0.008
Household Income	0.317	0.136	-0.841	-0.109	0.002

Note:B = unstandardized beta coefficients; Beta = standardized beta coefficients; R = proportion of additional variance

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Reference

1. Lin Y, Totsuka Y, He Y, Kikuchi S, Qiao Y, Ueda J, Wei W, Inoue M, Tanaka H (2013). Epidemiology of esophageal cancer in Japan and China. *J Epidemiol*, 23 (4):233-242.
2. Yang CS (1980). Research on esophageal cancer in China: a review. *Cancer Res*, 40 (8):2633-2644.
3. Cheng XBS, Duan GC (2013). Incidence, Survival and Prevalence of Esophageal and Gastric Cancer in Linzhou City from 2003 to 2009. *Asian Pac J Cancer P*, 14 (10):6031-6034.
4. Song PI, Liang H, Fan JH, Wei WQ, Wang GQ, Qiao YL (2011). Long-term survival after esophagectomy for early esophageal squamous cell carcinoma in Linxian, China. *J Surg Oncol*, 104 (2):176-180.
5. Lu J, Tao H, Song D, Chen C (2013). Recurrence risk model for esophageal cancer after radical surgery. *Chinese J Cancer Res*, 25 (5):549-555.
6. Nurkin SJ, Nava HR, Yendamuri S, LeVea CM, Nwogu CE, Groman A, Wilding G, Bain AJ, Hochwald SN, Khushalani NI (2014). Outcomes of endoscopic resection for high-grade dysplasia and esophageal cancer. *Surg Endos*, 28 (4):1090-1095.
7. Xu HY, Du ZD, Zhou L, Yu M, Ding ZY, Lu Y (2014). Safety and efficacy of radiation and chemoradiation in patients over 70 years old with inoperable esophageal squamous cell carcinoma. *Oncol Lett*, 7 (1):260-266.
8. Lepore SJ, Glaser DB, Roberts KJ (2008). On the positive relation between received social support and negative affect: a test of the triage and self-esteem threat models in women with breast cancer. *Psycho-oncol*, 17 (12):1210-1215.
9. Lepore SJ, Buzaglo JS, Lieberman MA, Golant M, Davey A (2011). Standard versus prosocial online support groups for distressed breast cancer survivors: a randomized controlled trial. *BMC Cancer*, 11 (1):379.
10. Roick J, Keszte J, Danker H, Meister E, Vogel H, Jenzewski E, Horn I, Singer S (2014). Social Integration and its Relevance for Quality of Life after Laryngectomy. *Laryngo Rhino Otol,* 93(5), 321-326.
11. Tsangaris E, Johnson J, Taylor R, Fern L, Bryant-Lukosius D, Barr R, Fraser G, Klassen A (2014). Identifying the supportive care needs of adolescent and young adult survivors of cancer: a qualitative analysis and systematic literature review. *Support Care Cancer*, 22(4), 947-959.
12. Norton E (2015). The application of humanization theory to health-promoting practice. *Perspect Public Heal*, 135(3), 133-137.

13. Rehse B, Pukrop R (2003). Effects of psychosocial interventions on quality of life in adult cancer patients: meta analysis of 37 published controlled outcome studies. *Patient Educ Couns*, 50 (2):179-186.
14. Rice TW, Blackstone EH (2013). Esophageal Cancer Staging: Past, Present, and Future. *Thorac Surg Clin*, 23 (4):461-469.
15. Xiao Y, Zhao N, Wang H, Zhang J, He Q, Su D, Zhao M, Wang L, Zhang X, Hu R (2013). Association between socioeconomic status and obesity in a Chinese adult population. *BMC Public Heal*, 13 (1):355.
16. Xiao J, Chen P, Li X, Zhuang X, Lu Q, Gao Y (2012). Survey of patients with chronic hepatitis B to identify factors that influence quality of life. *J Chinese Liver Diseases,* 20 (9):649-653. [Chinese]
17. Wan CH (1999). Assessment of quality of life. Yun Nan Da Xue Chu Ban She, Kun Ming, pp:224-227 [Chinese].
18. Yang J, Wei WQ, Niu J, He YT, Liu ZC, Song GH, Zhao de L QY, Yang C (2011). Estimating the costs of esophageal cancer screening, early diagnosis and treatment in three high risk areas in China. *Asian Pac J Cancer P*, 12 (5):1245-1250.
19. Lin JY, Wang MS, Dong LP, Xu DW, Wang Y, Li XL, Li XM (2012). Influence of Personal Character on Quality of Life of Patients with Esophageal Cancer in North Henan Province and Influencing Factors. *Asian Pac J Cancer P,* 13 (11):5415-5420.
20. Zeng J, Liu JS (2012). Quality of life after three kinds of esophagectomy for cancer. *World J Gastroenterol,* 18(36), 5106-5113.
21. Liu M, Shi X, Guo X, Yao W, Liu Y, Zhao K, Jiang GL (2012). Long-term outcome of irradiation with or without chemotherapy for esophageal squamous cell carcinoma: a final report on a prospective trial. *Radiat Oncol,* 7:142.