

Quality of life estimate in stomach, colon, and rectal cancer patients in a hospital in China

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Abstract The objective of this study was to investigate the outcome and coping patterns of patients with stomach, colon, and rectal cancer in a hospital in China. Health-related quality of life was assessed in 118 stomach, colon, and rectal cancer patients in Chinese People's Liberation Army General Hospital, Beijing, China, using the generic version of the European Organization for Research and Treatment of Cancer Quality of Life (QOL) Questionnaire Core 30 Items, Self-rated Anxiety Scores (SAS), Self-rated Depression Scores (SDS), Medical Coping Modes of Questionnaire (MCMQ), and Social Support Requirement Scale (SSRS) questionnaires. The overall QOL was 50.7 ± 6.5 , 48.1 ± 7.7 , and 47.6 ± 6.4 , respectively, for stomach, colon, and rectal cancer groups. Correlations between QOL and SAS and SDS in stomach cancer patients were significantly higher than observed in the cohort of colon or rectal cancer patients (Spearman coefficient of 0.366 and 0.129, respectively). Cluster analysis of MCMQ data revealed four identifiable patterns (resign, confront, avoid-confront, and avoid-resign) of coping in the study group. Subjective support was significantly higher than objective support ($p < 0.05$); however, extent of using the support was significantly lower than either objective ($p < 0.05$) or subjective support ($p < 0.01$). SAS and SDS were negatively correlated to SSRS scores ($p < 0.01$ and $p < 0.05$, respectively). Stomach, colon, and rectal cancer patients had anxiety and depression stemming from their cancer diagnosis and postdiagnosis treatment, and sex dependency was prevalent in SSRS response. Coping patterns were reliable indicators of psychosocial side effects in patients with stomach, colon, and rectal cancers.

Keywords Cancer · Oncology · Quality of life · SAS · SAD · MCMQ

Introduction

Stomach, colon, and rectal cancers are some of the most common cancers globally, with an estimated 1,304,200 and 919,100 new cases and 785,000 and 561,700 deaths in males and females, respectively [1]. Developments of better diagnostic technique and therapeutic improvements have resulted in improved disease-free survivability [2], and hence, quality of life (QOL) has become an important outcome measure for this patient cohort [3].

QOL refers to a multidimensional estimate of a patient's physical, emotional, and social functioning [1]. Assessment of QOL in cancer patients and implementation of policy changes to tackle the gray areas have an obvious potential to improve a patient's adaptability to life after cancer diagnosis and treatment [4, 5]. Previous studies comparing QOL between cancer survivors and healthy controls have shown that cancer survivors face ongoing problems related to the cancer disease [6, 7], inclusive of reduction in energy, weight loss, and psychological distress [8].

Compared with other forms of cancer, there is a relative paucity of studies that have investigated QOL in gastroesophageal cancers [7]. Most often, the studies reported have focused on specific function status [9–11] and not on the overall QOL of the patients. Because of limited sample size, previous studies could not estimate the effects of gender and sex on QOL outcome measures [12, 13].

Since traditional clinical end points are mainly focused on the biological and physiological outcomes of the patients, their ability in capturing the impact on patients' quality of life and how well they are coping with their disease is compromised. Overall, quality of life estimate is largely a goal-oriented, patient-centric approach and one of

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task analysis. Hence, our goal of the current study was to evaluate the changes of cancer-related quality of life and its clinical, demographic, and socioeconomic determinants using a repeated measures framework. More specifically, the major objective of our study was to investigate the outcome and coping patterns of patients with stomach, colon, and rectal cancers, as assessed by the generic version of the European Organization for Research and Treatment of Cancer (EORTC), Self-rated Anxiety Scores (SAS), Self-rated Depression Scores (SDS), Medical Coping Modes of Questionnaire (MCMQ), and Social Support Requirement Scale (SSRS) questionnaires. Whereas SAS and SDS rating indicated level of anxiety and depression, respectively, in the study population, MCMQ helped us understand the psychometric properties of the patient population in coping with cancer. On the other hand, the SSRS rating helped us understand how the perceived social support influenced the subjective well-being of the enrolled cancer patients.

Materials and methods

Study population

Between March 2011 to June 2011, 118 (34 stomach cancers, 47 colon cancers, 37 rectal cancers) cancer patients attending the Department of Surgical Oncology and Department of Medicine Oncology in Chinese People's Liberation Army (PLA) General Hospital, Beijing, China, were enrolled in the study. Inclusion criteria for the patients were (1) 18 years or older, (2) physical and mental competence to communicate with the interviewers, (3) an Eastern Cooperative Oncology Group performance status between 0 and 2 [14], and (4) on active treatment for either adjuvant or palliative intent. All enrolled patients had to sign a written consent to participate in the study, which was approved by the Institutional Review Board and the Ethics Committee for Human Research at the PLA General Hospital, Beijing, China.

Data collection

Two trained investigators conducted the interview-based cross sectional survey of the target population. The interviews were conducted within a few days to weeks after the diagnosis of cancer, in most cases during their first hospitalization due to cancer. Baseline data, inclusive of patient's age, sex, marital status, education level, employment status, spiritual inclination, time since confirmed diagnosis, duration of hospitalization, and source of healthcare expenses, were derived from structured face-to-face interviews. All study participants were given elaborate information describing the purpose of the study together with different

questionnaires (for details see below). All participants completely responded to all questionnaires.

Outcome measures

QOL was assessed using the Quality of Life Questionnaire Core 30 Items (QLQ-C30) of the EORTC [15, 16]. The QLQ-C30 is a validated, self-reporting cancer-specific measure of health-related QOL. The EORTC QLQ-C30 was composed of five functional scales that evaluated physical, role, emotional, cognitive and social functions, and one global health status/QOL scale. High functional scores represent a better functioning/QOL.

All subjects filled SAS [17, 18] and SDS [19] forms. SDS and SAS forms were comprised of 20 declarative sentences and 20 sections, respectively. The gross score in each case was multiplied by 1.25 and rounded off to obtain standard SDS and SAS rating.

The MCMQ [20, 21], a 19-item factor analytically derived questionnaire designed to assess coping pattern, was used to assess coping pattern of the enrolled subjects with cancer. Perceived social support was assessed using SSRS [22, 23].

Data analysis

Demographic and clinical characteristics were tested by one-way analysis of variance for continuous variables. EORTC QLQ-C30 scoring was performed according to the EORTC scoring manual [16]. Scores were linearly transformed to a 0–100 scale. QOL, SAS, SDS, and SSRS scores were compared among different cohorts of stomach, colon, and rectal cancer patients were done using the Spearman test. A $p < 0.05$ was considered statistically significant.

MCMQ data were subjected to cluster analyses to group subjects with equivalent coping patterns [24]. SYSTAT program was used to determine the squared Euclidean distance. Ward's method was used to order the data into hierarchical clusters. It was ensured that the clustering strategy produced clusters, with individual means significantly greater than cumulative mean across the sample.

Results

Characteristics of the study population

The baseline characteristics of the enrolled subjects are summarized in Table 1. The mean age at diagnosis of the patients were 54 ± 13 , 49 ± 12 , and 54 ± 13 years for the stomach, colon, and rectal cancer groups, respectively. The patient cohort in each group had significantly ($p < 0.05$) more male subjects. Otherwise, no significant differences

in age, marital status (data not shown), and place of residence (data not shown) were found in the three groups ($p > 0.05$). Interestingly, cost of care for all the enrolled patients was significant ($p < 0.0018$) from personal resources (taking into account personal or partial personal expenditures, Table 1). A majority of the patients had less than 10 years of formal education (primary and middle school) in each of the stomach, colon, and rectal cancer groups (Table 2). A vast majority of enrolled patients were employed at the time of diagnosis (Table 2) and hence highlight the cost of burden of stomach, colon, and rectal cancers on society. There was no significant spiritual inclination ($p > 0.05$) among the enrolled subjects.

Outcome measures

Table 3 presents the outcome measures assessed among the different groups. Most of the patients in each of the three cohorts were either optimistic about outcome or were well coordinated ($p < 0.001$). The mean score for the global health status and overall QOL was 50.7 ± 6.5 , 48.1 ± 7.7 , and 47.6 ± 6.4 , respectively, for stomach, colon, and rectal cancer groups.

Statistical analysis revealed a Spearman coefficient of 0.366 and 0.129 (Fig. 1a; upper and lower panels), respectively, between QOL score and SAS and between QOL score and SDS in stomach cancer patients. This correlation was significantly higher than observed in the cohort of colon or rectal cancer patients ($p < 0.05$) (Fig. 1b, c; upper and lower panels).

Analysis of the MCMQ was done using the SYSTAT program to calculate a squared Euclidean distance. We subsequently used the Ward's method to rank the answers into hierarchical clusters. The data were then ordered so as to ensure each data point commenced at one end of the hierarchy cluster, and the process was continued until all data could be classified into one major group. The analysis revealed four identifiable patterns (resign, confront, avoid–confront, and avoid–resign) of coping among the entire population in the current study (Fig. 2 and Table 3).

Social support invoked by the patients

The total mean score of SSRS was 44.3 ± 7.7 , 44.5 ± 7.5 , and 42.6 ± 9.3 , respectively for stomach, colon, and rectal cancer groups. Subjective support was significantly higher than objective support ($p < 0.05$); however, extent of using the support was significantly lower than either objective ($p < 0.05$) or subjective support ($p < 0.01$) (Table 3).

Sociodemographic characteristics influenced the level of social support available to the cancer patients. While men had comparatively higher total, objective, and subjective support than women, they were less inclined than women in the extent of using the available support. Similar trend was observed in patients with less than 10 years of formal education (had lower intent of using the support), whereas employed patients had significantly higher amount of SSRS scores ($p < 0.05$) than retired, students, or peasants (Tables 2 and 3).

Table 1 Baseline sociodemographic characteristics of the study population

Characteristics	Stomach cancer	Colon cancer	Rectal cancer
No. of patients	34	47	37
Sex			
Female	6	19	11
Male	28	28	26
Age at diagnosis (years)			
<40	6	10	5
41–50	6	11	10
51–60	12	19	11
≥61	10	7	11
Mean \pm SD (years)	54 ± 13	49 ± 12	54 ± 13
Time since confirmed diagnosis, mean \pm SD (months)	7.4 ± 18.4	9.2 ± 14.3	5.8 ± 7.8
Duration of hospitalization, mean \pm SD (months)	3.2 ± 3.4	6 ± 5.5	3.9 ± 5
Source of healthcare expenses			
Personal	47 %	46.8 %	37.8 %
Partial personnel	20.5 %	36.2 %	48.7 %
Health insurance	32.5 %	14.9 %	10.8 %
Public expenses	0 %	2.1 %	2.7 %

SD standard deviation

Table 2 Social skills and employment status of the study population

Social skills			
	Stomach cancer	Colon cancer	Rectal cancer
Education			
Primary school	6 %	4.2 %	13.6 %
Middle school	52.9 %	44.7 %	32.4 %
Junior college	23.5 %	29.8 %	35.1 %
University	17.6 %	21.3 %	18.9 %
Employment status			
Retired	3	4	4
Peasant	4	2	0
Worker	25	36	32
Military	1	2	1
Healthcare	1	2	0
Student	0	1	0
Spiritual inclination			
Yes	3	3	2
No	31	44	35

As expected, SAS were negatively correlated to SSRS scores ($p<0.01$) while positively correlated to the scores of negative coping ($p<0.001$). Similarly, SDS were negatively correlated to the SSRS scores ($p<0.05$).

Discussion

As intensive research combined with improved therapeutics continues to increase overall survival rate in stomach, colon, and rectal cancer patients, the ensuing needs of long-term survivors require specific competence and design [25]. One advantage of QOL assessment is that it provides the directions needed for more efficient treatment of cancer patients. In addition, it has been shown that QOL assessments in cancer patient may contribute to improved treatment and can be of prognostic value [26–31]. Our rationale for adapting the QLQ-C30 for the current study were (a) The QLQ-C30 is comprehensively designed specifically to assess the QOL in cancer patients and for specific treatment measurements; (b) the questionnaire is available in Chinese and has been validated for use in cancer patients in China; and (c) it has been validated in approximately 3,000 studies worldwide (<http://groups.eortc.be/qol/>). Our results suggest that stomach, colon, and rectal cancer patients have concerns (anxiety and depression) stemming from their cancer diagnosis and postdiagnosis treatment. Of note, even though the overall patients enrolled for the current study ($n=118$) was fairly high, most of our analyses were conducted on stomach, colon, and rectal cancer subsamples, which had 34, 47, and 37 patients, respectively.

Table 3 Analysis of global health status outcome measures in the study population

Global health status						
	Stomach $n=34$ No. of respondents	Cancer Score (mean \pm SD)	Colon $n=47$ No. of respondents	Cancer Score (mean \pm SD)	Rectal $n=37$ No. of respondents	Cancer Score (mean \pm SD)
Attitude to disease						
Not well coordinated	0 (0 %)	na	1 (2.1 %)	na	0 (0 %)	na
Unwillingly coordinated	1 (2.9 %)	na	0 (0 %)	na	0 (0 %)	na
Normally coordinated	1 (2.9 %)	na	2 (4.2 %)	na	1 (2.7 %)	na
Well coordinated	11 (32.4 %)	na	20 (42.6 %)	na	19 (51.4 %)	na
Optimistic about outcome	21 (61.8 %)	na	24 (51.1 %)	na	17 (45.9 %)	na
Global health status/quality of life (QOL)	34	50.7 \pm 6.5	47	48.1 \pm 7.7	37	47.6 \pm 6.4
Self-rated Anxiety Scores (SAS)	34	32.6 \pm 7.0	47	31.2 \pm 6.1	37	32.9 \pm 8.3
Self-rated Depression Scores (SDS)	34	38.8 \pm 9.3	47	37.2 \pm 10	37	37.6 \pm 8.3
MCMQ	34		47		37	
Confront		20.4 \pm 3.1		19.0 \pm 2		19.7 \pm 2.3
Avoid		17.4 \pm 2.4		18 \pm 2.1		17.7 \pm 2.6
Resign		14.2 \pm 2.1		13.8 \pm 1.6		14.1 \pm 1.3
Social Support Requirement Scale (SSRS)	34	44.3 \pm 7.7	47	44.5 \pm 7.5	37	42.6 \pm 9.3
Objective support		10.9 \pm 3.0		10.3 \pm 3.3		10 \pm 4.4
Subjective support		26.5 \pm 4.9		26.6 \pm 5.1		25.2 \pm 5.7

EORTC QLQ-C30 scoring was performed according to the EORTC scoring manual. Scores were linearly transformed to a 0–100 scale. QOL, SAS, SDS, and SSRS scores were compared among different cohorts of stomach, colon, and rectal cancer patients using the Spearman test. MCMQ data were subjected to cluster analyses to group subjects with equivalent coping patterns.

SD standard deviation, na not applicable

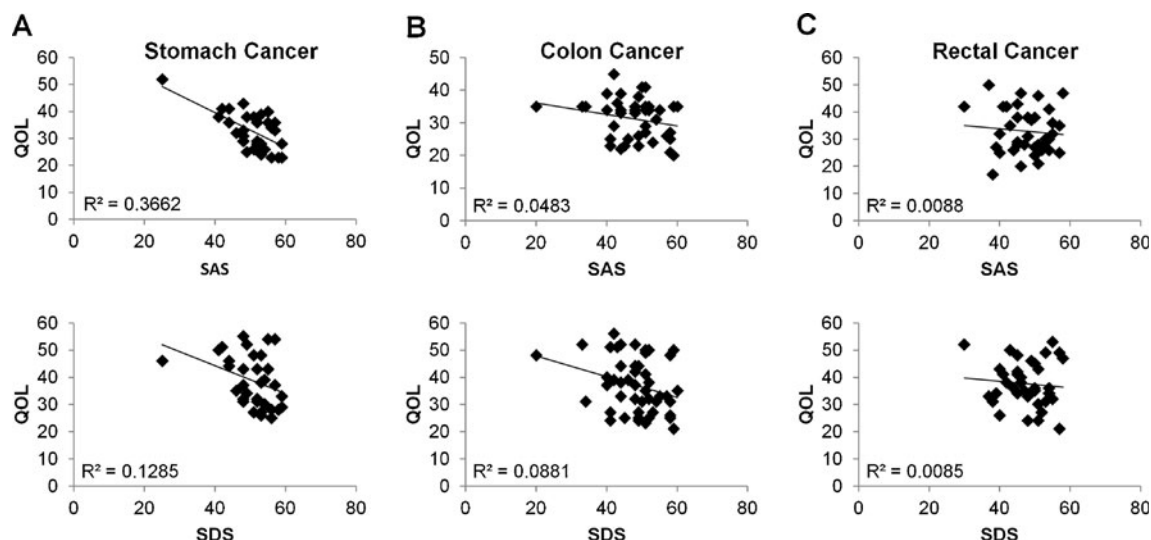
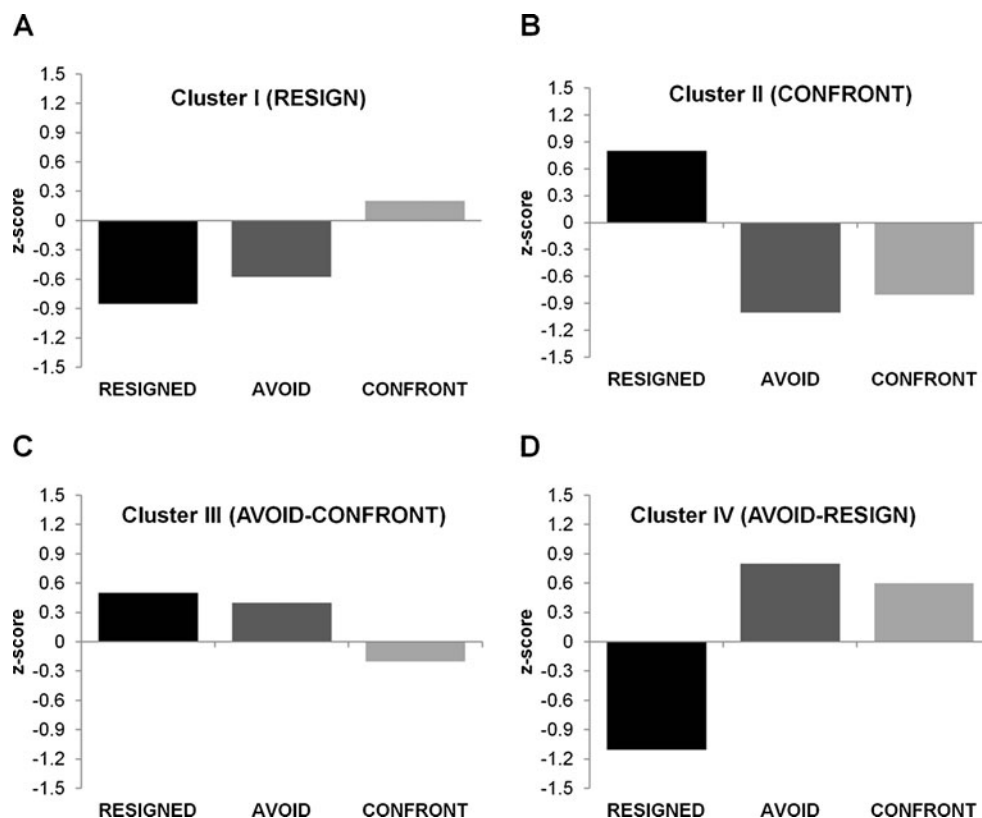


Fig. 1 Correlation between QOL score and SAS (upper panel) and SDS (lower panel) in stomach (a), colon (b), and rectal (c) cancer subjects involved in the study

An earlier longitudinal assessment of QOL in colorectal cancer survivors over a 10-year period had shown that attitude to disease was dependent on age [3]. We did not observe a similar trend in our study. For SSRS responses, we saw a sex dependency. In our study, coping patterns were reliable indicators of psychosocial side effects in patients with stomach, colon, and rectal cancers.

Both generic and disease-specific questionnaires have been applied to evaluate quality of life in cancer patients [32]. Disease-specific questionnaires have the obvious advantage of generating more respondents than generic instruments [33]; however, generic questionnaires have wider applicability across different interventions and conditions. Additionally, we have employed a series of other instruments

Fig. 2 Cluster analysis of MCMQ questionnaire. Z-score readings for resigned (a), confrontive (b), avoidant-confrontive (c), avoidant-resigned, and (d) coping clusters



to query socioepidemiological outcome in our study, lending relevance to the findings.

One of the most important limitations of our study was the absence of results adjusted to social or demographic and clinical factors. Another limitation of our study was that there was no longitudinal assessment of QOL before and after treatment for any patient. It is thus difficult to decipher the relationship between impaired SAS and social anxiety disorder (SAD) scores and pre-diagnosis status of these subjects. Yet, another potential limitation was that all patients were from the same hospital, which can potentially skew the data analysis and do not count as a true representation of a particular niche [34–40]. The time period of our study was also not ideal to infer definitive conclusions because the recurrence phase for stomach, colon, and rectal cancers occur between years 1 and 5 [2]. However, we are pursuing the enrolled subjects and the long-term consequence on QOL will be reported after the completion of the study. Strengths of our study design and results obtained were the high response rate and the application of multiple well-established instruments to assess health outcome in stomach, colon, and rectal cancer patients.

In conclusion, our results provide evidence for a positive correlation between quality of life or some aspects of quality of life measurements and SAS and SAD scores. It is important to develop high-quality baseline or pretreatment data for correct establishment of prognostic criteria for treating stomach, colon, and rectal cancer patients. It is however apparent that any methodological approach will be successful only if it invokes sociodemographic characteristics into the regimen. Of note, since QOL is a subjective variable, differences in culture, education, spiritual inclination, and social environment might have impact on the overall results. Hence, it is of paramount important to forge international collaborations to examine QOL in patients of multiple race and cultural backgrounds.

Conflict of interest None.

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