Original Article
Temporal decline of social support among colorectal cancer survivors: 1-year prospective study

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Abstract: Objective: To date, very limited research has been conducted regarding the change in social support among cancer survivors after surgery. The present study was conducted to describe the level of perceived social support and to identify its predictors among Chinese colorectal cancer (CRC) survivors during the first year post operation. Methods: Newly diagnosed cases of colorectal cancer aged 18 and above who were admitted for curative surgery in a tertiary care hospital between January 2012 and July 2014 were consecutively recruited. This cohort study included five assessment waves over the first year post surgery (at baseline, 4-6 weeks, 3-months, 6-months and 12-months follow-up) regarding social support level among 189 CRC survivors. ANOVA and linear mixed models were applied to determine the change in social support and its predictors using SPSS version 18.0. Results: Social support level remained relatively stable and high in the first three months post surgery, but decreased significantly at 6 months and then remained low afterwards, displaying an overall decreasing trend over time. Females, lower family income, lack of health insurance and advanced clinical stage of the disease stage negatively associated with social support. Conclusions: These findings suggested that the future intervention programs should commence at the early stage after surgery, despite the fact that it was high before this time point.

Keywords: Perceived social support, colorectal cancer, China, linear mixed model

Introduction

Colorectal cancer (CRC) is one of the most prevalent malignancies worldwide. In China, an estimated 310,244 people were newly diagnosed with CRC in 2011, accounting for 9.20% of overall new cancer cases [1]. Given the advances in screening technologies and treatment modalities, the overall mortality for CRC has declined in recent years [2]. However, CRC survivors often experience significant physical, emotional and social changes following the diagnosis, treatment and treatment-related side effects [3, 4].

Social support, a multidimensional construct including emotional, instrumental and informational aspects [5, 6], is widely acknowledged to be beneficial to cancer survivors [7]. Previous

studies investigating the social support level in cancer survivors were generally consistent to the conclusions that the majority of cancer survivors received high level of social support [8-10]. However, findings from most of these studies were based on cross-sectional study design and social support was measured at one or two time points only (usually at the time of initial detection and treatment). To date, the changes in social support over time among CRC survivors after surgery have never been well described. Only few studies reported decline of social support over time during post-treatment follow-up in breast cancer patients [11, 12], but prior research provided little empirical evidence about social support in CRC survivors. In addition, although a few demographic and clinical predictors of social support including age, income and race were identified in previous

studies [9, 13], researchers emphasized the need of more insights about other attributes of social support [14], so that an appropriate supportive care intervention could be planned and implemented among cancer survivors.

To the best of our knowledge, no study has been ever conducted to investigate the social support and the associated factors among Chinese CRC survivors. Given diverse cultural context, different stressful events and level of self-acceptance [15], the concept of social support varies across regions in cancer patients. Thus, validation and comparison of prior findings about social support across published studies would be less informative and misleading. The lack of information hampers the efforts to suggest effective intervention strategies for this population. The present study was conducted to describe the level of social support and its predictors among Chinese CRC survivors during the first year post operation.

Materials and methods

Study setting and participants

This prospective study was conducted at the Affiliated Hospital of North Sichuan Medical College (NSMC), Sichuan province, China, between January 2012 and July 2014. Patients were eligible to participate if they were aged 18 or above, permanent urban residents of Nanchong, China, newly diagnosed with colorectal cancer and admitted for curative surgery during the mentioned period. Patients diagnosed with other cancers or had significant cognitive impairment or any other psychiatric problems that might interfere with communication were excluded. CRC was diagnosed and confirmed by pathologists. All potential subjects were screened and examined by clinicians for the eligibility. Written informed consent was obtained from each eligible participant before the interview. Participants were free to withdraw from study any time without any consequences towards their treatment. The study content and procedures were reviewed and approved by the Institutional Ethics Review Board (IERB) of North Sichuan Medical College.

Procedures

A face-to-face interview was conducted by trained nurses through a self-administered structured pretested questionnaire among consenting participants prior to surgical operation.

Information was collected on socio-demographic characteristics and other relevant medical history. Individual's satisfaction with available social support was assessed at this time (T1) through self-administered multidimensional scale of perceived social support (MSPSS). During one-year follow-up period, additional four waves of assessments on social support were performed at 4-6 weeks (T2), 3 months (T3), 6 months (T4) and 12 months (T5) post-surgery. The majority of CRC patients (averagely, 85%) were assessed through face-to-face interview with prior appointment at hospital and the rest by telephone contact, which was performed by the same nurses.

Measurements

Clinical and demographic information

Patients' socio-demographic data included age, gender, marital status, education level, occupation, type of health insurance and monthly income. Clinical information such as the stage of cancer was gathered from hospital records or directly from the attending physician.

The multidimensional scale of perceived social support (MSPSS)

The MSPSS [16, 17], which was developed and validated by Zimet *et al.* in 1988, was used to measure the extent to which the social support was perceived by an individual. Having good internal and test-retest reliability, along with robust factorial validity, this scale was proven to be reliable and valid in diverse samples [16, 17]. It included 12 items with a 7-point likert-type scale, ranging from 'very strongly disagree' to 'very strongly agree' for each item. A total score was calculated by summing the results for all items. Scores ranged between 12 and 84, where higher scores indicated higher level of perceived social support. In addition, separate subscales could be used by summing the responses from the items in each of the three dimensions: family (Item 3, 4, 8 and 11), friends (Item 6, 7, 9 and 12) and significant others (Item 1, 2, 5 and 10). The possible scores in the subscales ranged from 4 to 28.

Statistical analysis

Statistical analysis was performed using statistical analysis software SPSS, version 18.0 (IBM, Armonk, NY, USA). One-way repeated-

Table 1. Demographic and clinical characteristics of patients at baseline (n=189)

Characteristics	n (%)
Mean age, years	65.1±10.3
Gender, Female	66 (34.9)
Married	164 (86.8)
Education, Junior high school or lower	71 (37.6)
Retired	77 (40.7)
Total family income: (Chinese Yuan/month)	
<1000	41 (21.7)
1001-3000	73 (38.6)
3001-5000	58 (30.7)
>5000	17 (9.0)
Health insurance status	
Basic medical care or lack of health insurance	145 (76.7)
Free medical care or other commercial health insurance	44 (23.3)
Disease stage II or below	109 (57.9)

measure analysis of variance (ANOVA) was carried out to explore how scores of MSPSS changed over time. *Post hoc* analysis with Bonferroni's correction was then used to compare the scores between two adjacent time points. To examine the impact of socio-demographic and clinical factors on social support, longitudinal linear mixed model [18] was employed by putting scores on MSPSS as dependent variable and time as well as other factors as independent variables in the regression equation. In this model, time was analyzed as a regular categorical predictor with five levels (i.e., five time points: T1, T2, T3, T4 and T5). Socio-demographic and clinical variables were analyzed as time-invariant predictors.

Results

Overall 227 CRC survivors eligible for the study were consecutively identified. Of those, 38 (16.7%) patients refused. The reasons for refusal were enquired and it was found that, 21 subjects did not want to share their perceptions with others, 5 moved out to other places, and 12 did not disclose the reasons. The participants and the non-participants did not differ with respect to age, gender, marital and socioeconomic status. Of 189 subjects responding to the baseline assessment, 17 declined to participate further in the study and 35 (18.5%) died during follow up. Thus, follow-up data were available for 180 (95.2%), 167 (88.4%), 153 (81.0%) and 137 (72.0%) patients at T2, T3, T4 and T5 time point, respectively.

Demographic and clinical characteristics of the patients were shown in **Table 1**. Majority of patients were male, with mean age 65.1 years. Most patients were married and near half of them were retired. About Two-thirds of patients were covered by basic medical care. More than half of patients were diagnosed with stage II or lower grade CRC.

Table 2 presented the mean score of MSPSS and scores on the three subscales at each time point. The total score remained high and relatively stable through T1 to T3. However, a significant drop in score was observed from T3 to T4, but became stable afterwards. The score on the three subscales, including support from family, friends and significant others, displayed a similar trend to that of the total score, with slight variation from T1 to T3 and T4 to T5 but significant decrease was noted from T3 to T4.

As shown in **Table 3**, mixed model analysis indicated a significant effect of time on MSPSS. The mean score on MSPSS at T4 and T5 were, on average, 3.16 and 3.18 points lower than that at T1, respectively. There were no obvious changes of scores on MSPSS at T2 and T3 as comparison to that at T1. Moreover, female CRC survivors reported 1.71 points lower levels of MSPSS than male survivors. The total family income showed a positive association with score on MSPSS over time, with higher score being observed in patients with higher income. Furthermore, compared to those with free medical care or other commercial health insurance, an average of 2.64 points lower level of MSPSS was observed in patients being lack of any kind of health insurance or with basic medical care. In addition, patients with disease stage II or below scored 1.37 points higher than those with disease stage III or above. There was no significant association of factors like age, education and marital status with scores on MSPSS.

Discussion

In this prospective study, we assessed the level of social support and determined the potential

Table 2. Score of perceived social support by time of assessment (n=189)

Social support	T1[a]	T2	T3	T4	T5	p value
Total score	68.5±10.3	68.4±10.9	65.1±9.6	49.2±6.8[**,b]	48.6±7.0	<0.01
Family	24.8±4.3	25.1±4.6	23.5±4.4	19.3±3.6[*]	19.0±3.5	<0.01
Friends	22.4±6.1	22.9±6.4	21.4±6.2	14.9±4.8[**]	14.2±4.4	<0.01
Significant others	21.3±3.2	20.4±3.9	20.2±3.1	15.0±2.3[*]	15.4±2.1	<0.01

[*]P<0.05, [**]P<0.01. a: time point of assessment, T1-T5 denoting before surgery, 4-6 weeks, 3 months, 6 months and 12 months post surgery, respectively. b: *Post hoc* analysis with Bonferroni's correction was conducted to compare scores of two adjacent time points by item.

Table 3. Predictors of perceived social support level as determined by longitudinal linear mixed model (n=189)

	B[a]	95% CI[b]	P value
Time			
T1	Ref		
T2	0.03	-0.08-0.11	0.74
T3	-0.12	-0.24-0.10	0.38
T4	-3.16	-2.58 to -3.74	<0.01
T5	-3.18	-2.56 to -3.90	<0.01
Gender			
Male	Ref		
Female	-1.71	-1.6 to -2. 36	<0.01
Marital status			
Married	Ref		
Others	-0.17	-0.59 -0.25	0.36
Education			
Junior high school or lower	Ref		
High school or above	0.28	-0.06 -0.62	0.09
Total family income			
<1000	Ref		
1001-3000	0.27	0.03-0.51	0.04
3001-5000	0.96	0.44-1.28	<0.01
>5000	1.79	1.49-2.09	<0.01
Health insurance status			
Basic medical care or lack of health insurance	-2.64	-2.16 to -3.12	<0.01
Free medical care or other commercial health insurance	Ref		
Stage of disease			
Stage II or below	1.37	0.65-2.09	0.01
Stage III or above	Ref		

a: regression coefficient. b: confidence interval.

predictors during the first year post surgery in a sample of CRC survivors in Chinese population. Our data showed that social support level remained relatively stable and high in the first three months post surgery, but decreased significantly at 6 months and remained low afterwards, displaying an overall decreasing trend over time. Female gender, lower family income, lack of health insurance and higher clinical stage of the disease were negatively associated with social support. Findings from the present study probably generated valuable insights about the management and prognosis of CRC survivors in China.

In the present study, we observed that CRC patients received higher levels of support just before surgery and the first 3 months post sur-

gery. This was in line with most previous reports. In a cohort questionnaire survey on patients with ovarian malignancies, Zhang et al. reported that 97% of subjects attained good overall social support during the whole period of chemotherapy [19]. Based on a survey of 113 geriatric lung cancer patients who received chemotherapy treatment, Jatoi *et al.* [8] found that the majority of patients reported that they could seek help if they had medication side effects. Fagundes *et al.* also reported [10] that women who were newly diagnosed with breast cancer received higher levels of social support from family and friend than women in benign group. The high levels of social support, as these studies indicated [20], have been connected to low levels of anxiety and depression, and thereby played an important role in facilitating their adaption to cancer diagnosis and treatment.

The level of social support, however, might be transiently higher at the time of initial detection and treatment, and it would experience a natural return to baseline level after an initial boost over time [21]. Consistent to this, we observed in our study an overall decreasing trend during the first year post surgery. Similar findings were also reported by previous prospective studies conducted in other cancer survivors. In a study on women with early stage breast cancer [11], patients reported a persistent decline of perceived social support and satisfaction over time. A study by Thompson et al. [12] also revealed a similar pattern in a consecutive sample of women with breast cancer, where social support was significantly higher at baseline and then declined over time. The levels of social support observed in these studies might provide valuable insights for appropriate interventions among cancer survivors.

Notably, we observed that, six months following definitive surgery (T4), social support showed a significant decline as comparison to that at 3 months (T3), and remained relatively stable before T3 and after T4. This suggested that it might be a potentially important time period in which patients seemed particularly vulnerable to experiencing impaired social support. It was, therefore, necessary to identify potential factors that might have led to this outcome. During this time, postoperative complications usually subside and incisions heal [22]. Therefore, the need for fulltime care and attention from health

providers or caregivers seemed less during this phase [23]. Previous reports from clinicians and cancer patients also indicated that several months after the surgery, interactions with healthcare personnel and other support providers significantly decreased [24]. In addition, due to the continuing time management pressure and high demand of constant medical care in post-surgery patients, caregivers of these patients, as demonstrated in previous studies [25, 26], were at higher risk of developing poor psychosocial and physical outcomes over time. Thus, it was quite difficult for them to provide sustainable high level of support to patients as expected. However, some researches specifically indicated that the availability and quality of social support were associated with patients' worry about cancer progression and survival [27, 28]. Findings from the present study could provide valuable guidance regarding the timing of initiation of an intervention for CRC patients.

In the present study, we found that female, lower family income and higher disease stage were negatively with social support, which was consistent with previous reports [29]. Moreover, insurance coverage had been shown to be an important factor influencing social support in CRC patients. Patients without health insurance had to pay for the treatment cost by themselves, and the cost could only be partially reimbursed for those covered by basic medical care when they became ill and were admitted to the hospital [30]. This further led to huge financial burden for most families.

There were some limitations in the present study. As participants were selected through a hospital-based nonrandom sampling in a single urban area, they were not representative of all Chinese CRC survivors. So generalization of the study findings to draw conclusion about all CRC survivors was not recommended and any extrapolation of the results beyond the study population should be done with caution. Moreover, in the present study, we focused on the social support in CRC survivors and did not have a concurrent control group for comparison. So it remained unclear whether the decline of social support in CRC survivors was of concern. Given the high level at baseline, it was possible that it still remained at higher level as comparison to those without cancer. In addition, we did not examine whether the decline in

social support would lead to functional impairment and poor quality life in cancer patients. Future research is needed to provide insights into such associations.

In conclusion, the findings of this study indicated that although CRC survivors received high level of social support at very earlier stage after surgery, they were likely to experience a significant decline at 6 months. Lower family income, lack of health insurance and female gender were negatively associated with social support over time. These findings suggested that the future intervention programs should commence not later than 6 months post surgery, despite the fact that it was high before this time point.

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Disclosure of conflict of interest

None.

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