

# Psychological Stress and Coping in Recently Discharged Postsurgical Cancer Patients

Ai Taniguchi<sup>1</sup>, Michiyo Mizuno<sup>2</sup>

<sup>1</sup>Department of Nursing, Tsukuba Medical Center Hospital, Tsukuba, Ibaraki, Japan, <sup>2</sup>Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki, Japan



**Corresponding author:** Michiyo Mizuno, RN, PhD

Professor, Faculty of Medicine

University of Tsukuba

Address: 1-1-1 Tennoudai Tsukuba-city

Ibaraki, 305-8575, Japan

Tel/Fax: +81-29-853-8247

E-Mail: michiyo0611@md.tsukuba.ac.jp

Received: October 09, 2015, Accepted: December 22, 2015

## ABSTRACT

**Objective:** Cancer patients and survivors need to cope with various stressful situations and problems even after treatment. In this study, we sought to investigate psychological stress and coping in recently discharged postsurgical cancer patients.

**Methods:** A mail-in questionnaire survey about stress response, perceived illness-related demands, and coping strategies and styles was administered to postsurgical Japanese cancer patients. The questionnaires were returned a week after the patients' discharge from the hospital. Descriptive and nonparametric statistical analyses were used. **Results:** Forty-two patients completed the questionnaire; their average age was 58.1 years, and 61.9% were female. The stress response scale-18 (SRS-18) score was lower than that reported among the general population. The proportion of patients who were concentrating coping on social support or positive reappraisal

was high. The scores for problem- and emotion-focused coping were nearly identical. SRS-18 scores were weakly correlated with those for emotion-focused coping ( $r = 0.38$ ,  $P = 0.014$ ). The demographic data were not significantly associated with any of the stress or coping variables. However, SRS-18 scores for patients who had adjuvant therapy and physical, functional disorders were significantly higher than those for patients who did not ( $P = 0.004$  and  $P = 0.008$ , respectively).

**Conclusions:** Most of the patients had a low-stress response and used appropriate coping strategies. However, the findings suggest that attention must be paid to stress-coping in patients who have a physical, functional disorder as well as in those receiving adjuvant therapy.

**Key words:** Coping, postsurgical cancer patients, stress

## Introduction

Although the impact of diagnosis and treatment lessens with time in postsurgical cancer patients, the problems they

face with their daily lives and recuperation after having just left the hospital are varied. Stanton *et al.*<sup>[1]</sup> referred

### Access this article online

#### Quick Response Code:



Website: [www.apjon.org](http://www.apjon.org)

DOI:  
10.4103/2347-5625.177394

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**Cite this article as:** Taniguchi A, Mizuno M. Psychological stress and coping in recently discharged postsurgical cancer patients. *Asia Pac J Oncol Nurs* 2016;3:176-82.

to the transition from the period of cancer diagnosis and medical treatment to survivorship as the “reentry phase” in the trajectory of cancer. During this phase, patients feel or recognize vulnerability, fear of cancer recurrence, threat to self-esteem and sexuality, social stigma, or change of roles. Even so, they need to adjust themselves to cancer through coping with several problems such as symptom burden, emotional distress, and returning to work. To understand the needs of recently discharged postsurgical cancer patients, this study investigated the characteristics of these patients’ psychological stress and coping strategies.

### Conceptual framework

The average length of stay in a Japanese General Hospital was 17.2 days in 2013 and 16.8 days in 2014.<sup>[2]</sup> During the past few decades, the length of hospitalization has been decreasing year wise, including for cancer patients. All postsurgical cancer patients leaving the hospital are not necessarily realizing their own recovery; far from it – many of them face problems in their daily lives and recuperation. In a study examining adjustment over the year following the completion of treatment for breast cancer, two-third of the participants reported experiencing contextual life stress.<sup>[3]</sup> In Japan, it has been told that declining length of hospitalization is stressful to patients and their families. However, we could not find enough material research outcomes to confirm whether declining hospital duration influenced the stress experienced by cancer patients. In this study, we were interested to investigate the stress-coping of recently discharged postsurgical cancer patients on the basis of the concept of psychological stress.

According to Lazarus and Folkman, “psychological stress is a particular relationship between the person and the environment that is, appraised by the person as taxing and exceeding his or her resources and endangering his or her well-being.”<sup>[4]</sup> For most people, cancer diagnosis is an event that threatens life. Thus, people who are diagnosed as having cancer must have experiences that tax and exceed their resources as well as endanger their well-being. Although the impact of diagnosis and surgical treatment on physical and psychological functioning tends to lessen with time,<sup>[5]</sup> patients just after discharge do not fully recover all at once and may still be unstable. Therefore, they may be unable to apply the resources that they were using before having cancer and may appraise their well-being as being endangered. Stressful encounters after discharge are not only a cancer-related incident but also a daily hazard. In a study that examined global- and cancer-specific stress, general- and cancer-specific coping, and emotional adjustment at diagnosis and post surgery in women with breast cancer, global appraisal of stress was the strongest and most consistent predictor of adjustment.<sup>[6]</sup> To understand the stressful experiences of recently discharged patients, it may be useful to investigate stressful encounters

in contextual life from the two aspects of global- and cancer-specific stress.

Stressful experiences are constructed as person–environment transactions created initially by an individual’s appraisal of the stressor and subsequently influenced by ongoing appraisals of available coping resources, effectiveness of coping behaviors, and additional aspects.<sup>[7]</sup> If cancer patients recognize their having undergone surgery as an opportunity for recovery and can effectively cope with cancer-related issues such as symptoms and psychosocial demands, their stress-appraisal may positively change gradually. From the standpoint of stress-coping theory, Folkman argued that hope is essential for people who are coping with serious and prolonged psychological stress.<sup>[8]</sup> Surgical treatment can indeed provide cancer patients with hope to live. To adapt to cancer, however, the subsequent stress-coping process needs to advance effectively.

Several study findings have shown associations between cancer adaptation and coping. For example, coping strategies such as self-blame and behavioral disengagement were associated with poor adjustment while acceptance and humor were associated with good adjustment;<sup>[9]</sup> emotional processing coping style was associated with poor adjustment while hope, benefit finding, and cancer-related social support were associated with good adjustment;<sup>[9]</sup> and approach coping was related to positive health behavior changes, whereas avoidance coping was related to negative health behavior changes.<sup>[10]</sup> The coping strategies are generally divided into two types: Problem-focused and emotion-focused on those functions.<sup>[11]</sup> Problem-focused coping embraces a wide array of problem-oriented strategies while emotion-focused coping is aimed at regulating the emotions linked to the stressful situation. Theoretically, problem- and emotion-focused coping can both facilitate and impede each other during the coping process.<sup>[4]</sup> Cancer patients’ stress-coping processes should be understood in light of strategies of both problem- and emotion-focused coping. Coping style refers to a more enduring, trait-like predisposition for coping with different stressful events in a similar fashion.<sup>[12]</sup> Investigating what coping strategies and styles postsurgical cancer patients tend to adopt after discharge may be useful to understand their stress-coping.

In a study based on a transactional model of stress, large proportions of cancer patients’ psychosocial outcomes such as anxiety, depression, and quality of life were predicted by clinical factors, demographic characteristics, and earlier levels of psychosocial outcomes.<sup>[13]</sup> Clinical factors and demographic characteristics are significant as environmental elements during person–environment transactions in stress and coping processes. For example, a study that identified trajectories of adjustment in cancer patients by using treatment type as a predictor suggested that cancer treatment, baseline health, and age may influence

long-term patterns of psychological adjustment.<sup>[14]</sup> Although the patients focused on in this study were postsurgical cancer patients, assessing whether clinical factors other than surgical treatment and demographic characteristics were relevant to their stress responses and coping strategies is important to understanding their stress-coping situation.

### **Purpose of the study**

The purpose of this cross-sectional study was to identify the characteristics of psychological stress and coping in recently discharged postsurgical cancer patients. Their stress response, perceived illness-related demands and coping strategies and styles were investigated, and the relationships between those variables and the differences in those variables in terms of stressful encounters, clinical information, and demographic characteristics were assessed using nonparametric methods.

## **Methods**

### **Sample and procedures**

The sample consisted of cancer patients who had undergone surgery at three surgical wards at a University Hospital in Japan. The eligibility criteria were age  $\geq 20$  years, awareness of cancer diagnosis, and newly diagnosed cancer, and the exclusion criteria were history of psychiatric disorder or affective disqualification based on a head nurse's judgment. The patients were recruited by a research nurse over a 4-month period starting in July 2012. All received a questionnaire and provided written informed consent to participate in the study, and all were recruited before being discharged from the hospital. The questionnaire was completed anonymously within 1 week of discharge and returned by mail. Approval for this study was obtained from the Research Ethics Committee of the Hospital in which the survey was conducted.

### **Ethics**

This study was carefully conducted to protect participants' rights in terms of both privacy and confidentiality. The proposal was sent to the institutional review board (IRB) and gain its approval before the start of the study.

### **Study measures**

As indicators of psychological stress, patients' stress responses and perceived demands related to their illness were examined. The anxiety and negative emotions that patients feel in stressful encounters during their daily life were measured as the stress response. Patients' demands made as their recovery from cancer progressed and as they reconstructed their own lives after surgery were measured as illness-related demands. A person appraises what the situation signifies for his or her personal well-being. When patients return home, they can encounter various events.

This study did not restrict a stressful encounter to cancer but asked patients about the encounters that had recently made them the most stressed and what coping strategies they had used to deal with or overcome that stress. Coping was identified in terms of coping strategies and styles. Study measures used for this study were as follows.

Stress responses were measured using SRS-18, which was developed in Japan as a scale to measure stress response to daily life.<sup>[15]</sup> SRS-18 contains 18 items (e.g., "feeling uneasy," "feeling sad," "getting quick-tempered," "poor powers of concentration") assessed using a 4-point (0-3) scale and is composed of three subscales: Anxiety and depression, displeasure and anger, and apathy. SRS-18 has standard scores, which were calculated using a sample of 3841 people from the general population, and contains the following four grades: Modest, normal, slightly high, and high. A higher grade indicates a more stressful response.<sup>[15]</sup> The internal consistency of the scales ran from  $\alpha = 0.82$  to  $0.88$  in the general population.<sup>[15]</sup> The Cronbach alpha in the present study was  $0.92$ . When the goodness-of-fit for a three-factor structure model was assessed using structural equation models, the values of the goodness-of-fit index and the adjusted goodness-of-fit index were  $0.91$  and  $0.89$ , respectively, which indicated a good fit.<sup>[15]</sup>

Patients' perceived illness-related demands were measured using the questionnaire on the Demands of Illness (Q-Demands), which was developed in Japan to measure the demands associated with the illness after surgery for cancer.<sup>[16]</sup> The questionnaire is composed of 16 items assessing demands including "managing my own daily activities according to my physical condition," "communicating my own needs to my family/friends," "establishing a lifestyle that adapts to my present state," and "understanding what medical information I actually need." The items were presented using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." Higher scores indicated a greater perception of demands. A previous study on patients with cancer of the gastrointestinal tract and other cancer sites confirmed that the instrument exhibited strong internal consistency ( $\alpha = 0.77$ ).<sup>[17]</sup> The Cronbach alpha in the study was  $0.80$ .

Coping strategies were measured using the stress coping inventory (SCI), which was developed for Japanese patients on the basis of the stress-coping theory proposed by Lazarus.<sup>[17]</sup> SCI is used to measure a person's trait-like predisposition to cope with stressful events. Respondents were first asked to use simple words to describe the most stressful event that they had recently experienced and next to answer 64 questions about how they felt, thought, and behaved in response to that stressful event. In the analytic stage, the stressful events that they mentioned were classified as cancer-specific or noncancer-related. Those items were

formatted using a 3-point scale ranging from “agree” to “disagree” and were divided into two coping functions, problem-focused and emotion-focused, and 8 coping styles: Planful problem solving, confrontive coping, seeking social support, accepting responsibility, self-controlling, escape-avoidance, distancing, and positive reappraisal. When the total scores for problem-focused and emotion-focused coping methods for each respondent are compared, a higher score indicates a more dominant tendency in the respondent. The total scores in each coping style were converted into 5-point grades, which ranged from “strongly having that trait tendency” to “scarcely having that trait tendency,” according to the allocation set up on SCI. A higher grade indicates an increased tendency to use that coping style. Given a standardized sample of adults in a general population, people who were allocated a grade of 4 or 5 yielded 15.9% (mean  $\pm$  standard deviation [SD]) on SCI, which meant that they frequently (i.e., more commonly than usual) engaged in the use of coping styles during stressful events. The content validity of SCI was assessed using surveys on Japanese samples of university students, the general population, and nurses.<sup>[18]</sup>

The respondents’ demographic and clinical information were gathered using self-reports. The demographic information included age, sex, number of family members, and work status while the clinical information inquired about the site of cancer, physical functional disorder, comorbidity, and adjuvant therapy. As regards physical functional disorder, respondents were asked to answer yes or no to the question: “Do you have any physical functional disorders (mobile disability of the limbs, difficulty urinating, frequent diarrhea, and so on) that you became conscious of after your surgery?”

### Statistical analysis

Correlations between continuous study variables were assessed using the Spearman rank correlation coefficient. Owing to the probability that significant homogeneity of variance between the variables was not secure because of the small sample size, nonparametric methods (Mann-Whitney or Kruskal-Wallis test) were used to assess differences in stress experience and coping strategies in terms of stressful encounter (cancer- or noncancer-related event), demographic information, or clinical information. The statistical analyses were performed using SPSS version 18 (IBM, Armonk, NY, USA).  $P < 0.05$  was considered significant.

## Results

### Patient characteristics

A total of 81 questionnaires were distributed during the survey period, and 47 were returned by mail (response rate, 58.0%). However, five questionnaires had significant defects

in the data or were returned after the due date and were thus judged invalid and excluded from the present analyses. Therefore, 42 patients (effective response rate, 51.9%) and their questionnaires were used in this study.

The average age of the respondents was 58.1 years (SD = 14.8); 61.9% were female. On average, the period to discharge after surgery was 6.9 days (SD = 3.8; range, 1-15 days). In total, the proportion of both gastrointestinal and breast cancers was 28.6% while the proportions for urinary cancer and thyroid cancer were 23.8% and 19.0%, respectively. The demographic and clinical characteristics of the present sample are summarized in Table 1. A significant difference between patients with gastrointestinal cancer and those with other cancers was found in terms of the elapsed time after surgery ( $U = 296.5$ ,  $P < 0.001$ ).

### Characteristics of stress and coping

Regarding the respondents’ stress experience, the total average SRS-18 score was 9.59 (SD = 9.03). Table 2 presents the descriptive statistics for the SRS-18 including subscales along with those among the general population.<sup>[15]</sup> Means and SD in a general population are quoted from “SRS-18” by Suzuki.<sup>[15]</sup> On the basis of the standardized scores among the general population,<sup>[15]</sup> the SRS-18 scores for the male patients were normal, except for displeasure/anger, which was modest while the SRS-18 scores for the female patients were all modest. The average Q-Demands total score was 2.47 (SD = 0.48). The most-weighted demand was “skillfully managing my social life to recuperate or to have medical treatment,” and that average score was 3.43 (SD = 1.15). Three items of demands related to medical information (lacking, overwhelmed, and nondistinguishable) followed, and concerns about a recurrence were the fifth most-weighted

Table 1: Sample demographics and clinical characteristics

Variable	Property	n (%)
Age, years	Mean = 58.1 (SD = 14.8)	
Gender	Male	16 (38.1)
	Female	26 (61.9)
Cancer site	Breast	12 (28.6)
	Gastrointestinal	12 (28.6)
	Urinary	10 (23.8)
	Thyroid	8 (19.0)
Adjuvant therapy	Some treatments	21 (50.0)
	None	18 (42.9)
Missing data: 3 (7.1%)		
Comorbidity	Present	16 (38.1)
	Absent	25 (59.5)
Missing data: 1 (2.4%)		
Physical functional disorders	Present	12 (28.6)
	Absent	28 (66.7)
Missing data: 2 (4.8%)		
Living status	Living with family	39 (92.9)
	Single	2 (4.8)
Missing data: 1 (2.4%)		
Duration of discharge after surgery (days)	Mean = 6.9 (SD = 3.8)	

SD: Standard deviation

demand. “Concerns about my physical condition and symptoms” was the demand with the lowest weight, its average score being 1.60 (SD = 0.54).

As the most stressful event recently experienced, 21.4% of the respondents (9 respondents) indicated an event unrelated to their cancer diagnosis and treatment (e.g., family trouble, working relationship, or an accident). One patient replied that she had not had such a stressful encounter, but she still answered the questions on the SCI. The total average score for problem-focused coping was 24.95 (SD = 10.76) while for emotion-focused coping, it was 25.52 (SD = 8.72). When the total scores for problem- and emotion-focused coping were compared, the proportion of respondents who showed a higher total score for emotion-focused coping was 54.8% for all respondents while 4.8% were tied in their use of coping strategies. The rate of respondents who were allocated a grade of 4 or 5 for each coping style was as follows: Seeking social support, 28.6%; positive reappraisal, 26.2%; self-controlling, 23.8%; planful problem solving, 19%; escape-avoidance, 11.9%; distancing, 11.9%; confrontive coping, 9.5%; and accepting responsibility, 7.1%.

The total average SRS-18 score was moderately correlated with the Q-Demands score ( $r = 0.55, P < 0.001$ ) and weakly correlated with the total average score for emotion-focused coping ( $r = 0.38, P < 0.01$ ) [Table 3]. No significant differences between the two types of stressful encounters (cancer-specific and noncancer-related) were found when comparing the average scores for the SRS-18, Q-Demands, and coping functions.

**Associations with clinical and demographic data**

No significant associations were found between the demographic variables and stress and coping in the patients. In addition, cancer sites were not associated with stress and coping. However, the total average SRS-18 scores for the respondents who had undergone adjuvant therapy and had physical, functional disorders were significantly higher than for those who had not ( $U = 291.5, P = 0.004$  and  $U = 80.5, P = 0.008$ , respectively). For the SRS-18 subscales, adjuvant therapy was significantly associated with apathy and anxiety/depression ( $U = 304.0, P = 0.001$  and  $U = 274.0, P = 0.016$ , respectively), and physical functional disorders were significantly associated with anxiety/depression and displeasure/anger ( $U = 74.0, P = 0.005$  and  $U = 96.5, P = 0.03$ , respectively). The total average scores for problem-focused coping in respondents who had a comorbidity were significantly higher than in those with no comorbidity ( $U = 93.5, P = 0.004$ ).

**Discussion**

In this study, the average duration of the period before discharge after cancer surgery was 6.9 days, which was

**Table 2: Descriptive statistics for the stress response scale-18 in cancer patients and general population**

Sex	Scale	Cancer patients <sup>a</sup>		General population <sup>b</sup>	
		Mean	SD	Mean	SD
Men	SRS-18	10.69	9.67	13.73	11.79
	Anxiety and depression	4.31	3.82	4.30	4.35
	Displeasure/anger	2.56	3.88	5.56	4.64
	Apathy	3.81	3.02	3.83	4.01
Women	SRS-18	8.91	8.75	15.81	11.12
	Anxiety and depression	3.69	3.74	5.79	4.54
	Displeasure/anger	2.35	3.08	5.31	5.31
	Apathy	2.88	3.02	4.48	4.48

Me Note. <sup>a</sup>n = 16 (men), 26 (women), <sup>b</sup>n = 482 (men), 847 (women), SD: Standard deviation, SRS-18: Stress Response Scale-18

**Table 3: Spearman rank correlations between Stress Response Scale-18, Questionnaire on the Demands of Illness, problem-focus coping, and emotion-focused coping**

Measure	n	1	2	3	4
SRS-18	42	—			
Q-Demands	42	0.55**	—		
PF-coping	42	0.27	-0.07	—	
EF-coping	42	0.38*	0.04	0.65**	—

\*P < 0.01, \*\*P = 0.01, SRS-18: Stress Response Scale-18, PF: Problem-focus, EF: Emotion-focused, Q-Demands: Questionnaire on the Demands of Illness

considered short when compared with the average length of stay in Japanese General Hospitals. However, the stress response of patients was moderate, even when compared with that of healthy people.<sup>[15]</sup> The stress response was moderately correlated with perceived illness-related demands. The illness-related demands in the present study were lower than those of gastrointestinal cancer patients within 2 weeks of discharge from the hospital:<sup>[12]</sup> The average score for the Q-Demand for the former was 2.47 (SD = 0.48), and for the latter, 3.00 (SD = 0.58). The patients of the present study were surveyed within 1 week of discharge from the hospital. Therefore, they might not yet have been aware of issues causing stress or imposing demands.

The stress response in patients with physical, functional disorders or who were receiving adjuvant therapy was higher than in other patients. Stressful encounters that stimulate patients’ concerns in the postsurgical phase may be restrictively experienced in such specific patients. In a study that estimated the prevalence and severity of patients’ self-perceived supportive care needs within the immediate posttreatment phase, most patients had zero or few moderate or severe unmet supportive care needs, although 30% of them reported more than 5 unmet needs.<sup>[19]</sup> It may be that specific patients had great needs in the posttreatment phase, but other patients did not perceive stressful problems that would make them aware of their needs. In addition, most of the patients of the present study may have tended not to perceive stressful problems related to their situation.

The stress-coping process progresses in a spiral manner, and both aspects of stress and coping are interrelated. Since the scores indicating patients' stress experiences were low, engagements in their coping strategies and styles might be appropriate. The proportions of patients who were concentrating coping on seeking social support or positive reappraisal were over 15.9%, at 28.6% and 26.2%, respectively. This means that the proportion of patients who were concentrating on those coping styles was high when compared with the percentile of norm distribution because the SIC were scored by assigning a weight derived from norm-based scoring estimated from standardized scores for the Japanese general public.<sup>[18]</sup> Those findings suggested that the patients in the present study sample were apt to choose coping strategies that would lead to positive outcomes. According to Doi (who provided a key analysis of Japanese behavior), the Japanese encourage the other person's sensitivity toward dependence and welcome dependence.<sup>[20]</sup> Having cancer is apt to stimulate Japanese behavior related to such dependence. Hence, patients' families in Japan tend to want their loved one to accept their kindness and generosity, and thus, patients may find it easier to seek social support than do Japanese people in general. Moreover, patients in the present study positively coped with stress through positive reappraisal, and this coping style is one of the approach-coping methods. Several previous studies have shown that increased use of approach-coping methods was related to positive outcomes, whereas avoidant coping was related to a greater number of negative outcomes.<sup>[10,21,22]</sup> In the present study, there was no remarkable use regarding escape-avoidance and distancing, namely avoidant coping methods.

The difference in the average scores between problem-focused coping and emotion-focused coping was slight in the present study. However, the scores for problem-focused coping in patients with comorbidity were higher than in other patients. The problem-focused strategies of patients with comorbidity may have derived from their experience of repeatedly facing actual demands as a consequence of their comorbidity. Meanwhile, a review of coping in patients with advanced cancer suggested that they were apt to use emotion-focused coping more often than problem-focused coping.<sup>[23]</sup> The differences in backgrounds and disease stages may influence the coping strategies that patients prefer to use. Cameron and Jago<sup>[24]</sup> noted that anxiety arousal was to be expected in patients experiencing significant health threats; thus, emotion regulation must be addressed in parallel with problem-focused regulation. Problem- and emotion-focused coping can each fulfill an important function. The finding that emotion-focused coping and problem-focused coping were used with almost the same frequency suggested that both functions were well balanced.

Despite the shortened hospital stays of cancer patients, the stress experience in this study sample was moderate,

and the illness-related demands were not perceived to be excessive. The experience of going through surgical treatment might have given the patients hope and lightened their stress. A study of older cancer patients in Taiwan showed that uncertainty and anxiety in postsurgical patients during the period before hospital discharge significantly decreased when compared with at the time of surgery.<sup>[25]</sup> Since the patients in the present study were surveyed only 1 week after their discharge, their emotional condition had rather recovered, and they might not yet have been aware of issues causing stress or imposing demands. The best time to begin nursing interventions is when patients perceive their own illness-related demands, and the best contents of those interventions are what the patients recognize as their care needs. Apart from those with physical, functional disorders or undergoing an adjuvant therapy, most of the patients of this study probably did not perceive their care needs. However, demands related to managing social life and medical information were highly perceived. Postsurgical cancer patients in Japan typically see the surgeon 2 weeks after discharge from the hospital. An intervention program using that occasion of the visit to the hospital may be useful, especially when focusing on demands related to managing social life and medical information. In addition, web-based interventions that can provide patients with education about self-managing and medical information may be suitable for patients to use in their daily life whenever they recognize their needs.

### Limitations

The small sample size and heterogeneity in cancer sites as well as the fact that the patients had all undergone surgery for cancer in a university hospital make it difficult to generalize the results of the present study. In addition, the time of diagnosis and surgery varied among the patients. Explanations for coping strategies were based on proportions found in this sample, but not on statistical testing in comparison with other variables. A study using a larger sample size, which qualifies certain critical conditions for the sampling, should be carried out in the future. Further, future studies should plan to use measures/variables that are able to calculate the function of each coping strategy to verify the relationship between stress response and coping strategy.

### Conclusion

Most of the patients here were shown to have a low-stress response and proper coping strategies. The proportion of patients who were concentrating on coping through seeking social support or positive reappraisal was high. Emotion-focused coping weakly correlated with stress response, and the problem-focused and emotion-focused

coping functions were roughly balanced with each other. Ultimately, the results suggested that particular attention must be paid to stress-coping in patients who have a specific clinical condition such as a physical functional disorder as well as in patients who are receiving adjuvant therapy and that an intervention program focusing on demands related to managing social life and medical information may be useful for postsurgical cancer patients.

### Financial support and sponsorship

A grant-in-aid for Scientific Research (B) from the Japan Society for the Promotion of Science 21390577.

### Conflicts of interest

There are no conflicts of interest.

## References

1. Stanton AL, Ganz PA, Rowland JH, Meyerowitz BE, Krupnick JL, Sears SR. Promoting adjustment after treatment for cancer. *Cancer* 2005;104 11 Suppl:2608-13.
2. Ministry of Health, Labour and Welfare, Kanja Chousa; 2014. [Patient Survey 2014] Available from: <http://www.mhlw.go.jp/toukei/saikin/hw/iryosd/14/dl/2-3.pdf>. [Last accessed on 2015 Nov 27].
3. Low CA, Stanton AL, Thompson N, Kwan L, Ganz PA. Contextual life stress and coping strategies as predictors of adjustment to breast cancer survivorship. *Ann Behav Med* 2006;32:235-44.
4. Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. New York: Springer Publishing Company; 1984.
5. Schroevers M, Ranchor AV, Sanderman R. Adjustment to cancer in the 8 years following diagnosis: A longitudinal study comparing cancer survivors with healthy individuals. *Soc Sci Med* 2006;63:598-610.
6. Groarke A, Curtis R, Kerin M. Global stress predicts both positive and negative emotional adjustment at diagnosis and post-surgery in women with breast cancer. *Psychooncology* 2013;22:177-85.
7. Smyth JM, Filipkowski KB. Coping with stress. In: French D, Vedhara K, Kaptein AA, Weinman J, editors. *Health Psychology*. 2<sup>nd</sup> ed. Chichester, UK: Wiley-Blackwell; 2010. p. 271-82.
8. Folkman S. Stress, coping, and hope. *Psychooncology* 2010; 19:901-8.
9. Shapiro JP, McCue K, Heyman EN, Dey T, Haller HS. Coping-related variables associated with individual differences in adjustment to cancer. *J Psychosoc Oncol* 2010; 28:1-22.
10. Park CL, Edmondson D, Fenster JR, Blank TO. Positive and negative health behavior changes in cancer survivors: A stress and coping perspective. *J Health Psychol* 2008;13:1198-206.
11. Lazarus RS. *Stress and Emotion: A New Synthesis*. New York: Springer Publishing Company; 1999.
12. Prasertsri N, Holden J, Keefe FJ, Wilkie DJ. Repressive coping style: Relationships with depression, pain, and pain coping strategies in lung cancer outpatients. *Lung Cancer* 2011;71:235-40.
13. Hulbert-Williams N, Neal R, Morrison V, Hood K, Wilkinson C. Anxiety, depression and quality of life after cancer diagnosis: What psychosocial variables best predict how patients adjust? *Psychooncology* 2012;21:857-67.
14. Burton CL, Galatzer-Levy IR, Bonanno GA. Treatment type and demographic characteristics as predictors for cancer adjustment: Prospective trajectories of depressive symptoms in a population sample. *Health Psychol* 2015;34:602-9.
15. Suzuki S. Stress response scale-18 (SRS-18). In: *Stress Scale Guidebook*. Public Health Research Center Edition. Tokyo: Jitsumu Kyouiku Shupan; 2006. p. 423-7.
16. Mizuno M, Kakuta M, Ono Y, Kato A, Inoue Y. Experiences of Japanese patients with colorectal cancer during the first six months after surgery. *Oncol Nurs Forum* 2007;34: 869-76.
17. Mizuno M, Kakuta M, Inoue Y. The effects of sense of coherence, demands of illness, and social support on quality of life after surgery in patients with gastrointestinal tract cancer. *Oncol Nurs Forum* 2009;36:E144-52.
18. Japan Health Psychology Institute. *Stress Coping Inventory Ego Aptitude Scale Manyuaru [Manual of Stress Coping Inventory and Ego Aptitude Scale]*. Tokyo: Jitsumu Kyouiku Shupan; 2009.
19. Armes J, Crowe M, Colbourne L, Morgan H, Murrells T, Oakley C, *et al*. Patients' supportive care needs beyond the end of cancer treatment: A prospective, longitudinal survey. *J Clin Oncol* 2009;27:6172-9.
20. Doi T. *The anatomy of dependence*. Revised Paperback Edition. Tokyo: Kodansha International Ltd.; 1981.
21. McCorry NK, Dempster M, Quinn J, Hogg A, Newell J, Moore M, *et al*. Illness perception clusters at diagnosis predict psychological distress among women with breast cancer at 6 months post diagnosis. *Psychooncology* 2013; 22:692-8.
22. Schroevers MJ, Kraaij V, Garnefski N. Cancer patients' experience of positive and negative changes due to the illness: Relationships with psychological well-being, coping, and goal reengagement. *Psychooncology* 2011;20:165-72.
23. Thomsen TG, Rydahl-Hansen S, Wagner L. A review of potential factors relevant to coping in patients with advanced cancer. *J Clin Nurs* 2010;19:3410-26.
24. Cameron LD, Jago L. Emotion regulation interventions: A common-sense model approach. *Br J Health Psychol* 2008;13(Pt 2):215-21.
25. Lien CY, Lin HR, Kuo IT, Chen ML. Perceived uncertainty, social support and psychological adjustment in older patients with cancer being treated with surgery. *J Clin Nurs* 2009;18:2311-9.