

## Changes in Nutrition, Metabolism, and Psychology in Total Gastrectomy Patients After Discharge

Masataka Horikoshi,<sup>1</sup> Atsuko Sugimoto<sup>2</sup> and Tamae Futawatari<sup>1</sup>

**Aims :** The aims of this study were to clarify the activity level, nutritional state, and psychological changes after discharge in cancer patients who underwent total gastrectomy. **Methods :** Data concerning the energy expenditure, body weight, body fat percentage, and psychological state were obtained from 3 patients who were discharged after total gastrectomy by interviews and a review of the patients' personal, activity, and clinical records. **Results :** [Activity level and nutritional state] The body weight and body fat percentage decreased in all subjects over 1 month after discharge. The total energy expenditure and activity level showed no marked change. [Psychological changes] Despite the decrease in body weight, the patients perceived a recovery of fitness, learned how to cope with symptoms, and became confident in life. **Conclusion :** Total gastrectomy patients experience body weight losses and various symptoms during 1 month after discharge, and support to resume a normal life is necessary in this period. It was also suggested that closely listening to patients describe their symptoms and providing corresponding educational intervention are necessary. (Kitakanto Med J 2010 ; 60 : 321~328)

**Key Words :** total gastrectomy, postoperative gastric cancer patients, energy expenditure, psychological state, intervention

### Introduction

The mortality rate due to gastric cancer has decreased annually over the past few years. According to statistics from the Ministry of Health, Labour and Welfare on mortality rates due to malignant neoplasms,<sup>1</sup> gastric cancer, which used to rank first, has been the second in males since 1993, with lung cancer ranking top, and the second in females since 2003, with first place going to colon cancer. Causes of the decrease in the mortality rate due to gastric cancer are considered to include changes in diet, spread of cancer screening, and improvements in technology for early detection and treatment. Particularly, the mortality rate has decreased more markedly in younger people, and survivors of gastric cancer are increasing. However, gastric cancer patients have various concerns and problems regarding returning to life at home and work after discharge.

For gastric cancer patients to resume a normal life after discharge, preparations for life at home by learning to cope with the reduced activity level due to

hospitalization, muscle weakness due to surgical invasion and inactivity, and changes in diet are indispensable. Factors that interfere with postoperative rehabilitation and the establishment of self-control in eating include pain of the surgical wound, associated restriction of body movements, and anxiety over the physical condition early after surgery, along with anxiety over life at home and physical and psychological fatigue due to anxiety and increased energy expenditure late after surgery.

There have been studies on the psychological state of gastric cancer patients in an early recovery period<sup>2</sup> and the diet and activity level of gastric cancer patients.<sup>3</sup> In these studies, stress and coping behavior were categorized, and the nutritional state and activity level were evaluated, but the relationships between the energy expenditure and psychological factors were overlooked.

Therefore, to evaluate nursing intervention effective for supporting postoperative gastric cancer patients, the relationships among the activity level, nutritional state, and psychological state in the pos-

<sup>1</sup> School of Health Sciences, Gunma University Faculty of Medicine, 3-39-22 Showa-machi, Maebashi, Gunma 371-8511, Japan

<sup>2</sup> Department of Nursing, Gunma University Hospital, 3-39-15 Showa-machi, Maebashi, Gunma 371-8511, Japan

Received : July 22, 2010

Address : MASATAKA HORIKOSHI School of Health Sciences, Gunma University Faculty of Medicine, 3-39-22 Showa-machi, Maebashi, Gunma 371-8511, Japan

operative recovery process must be clarified.

Thus, in this study, changes in the energy expenditure, body weight, and body fat percentage (BFP) were examined to evaluate changes in the nutrition and metabolism of postoperative gastric cancer patients after discharge. Alterations in their psychological state during this period were also investigated.

## Methods

### 1. Subjects

The subjects were gastric cancer patients who underwent total gastrectomy at the Department of Gastrointestinal Surgery of D Hospital for the first episode of the disease, showed no metastasis to other organs or severe complications, and were discharged after hospitalization of a typical duration. Those who were aged 40-75 years and provided consent to cooperate in the study based on an understanding of its objectives and methods were enrolled.

### 2. Methods for data collection

The data were collected by interviews and reviews of the patients' personal, activity, and clinical records.

Semi-structured interviews were performed first at discharge and on the first and second outpatient visits after discharge according to an interview guide. The interviews concerned basic information (age, job, family composition, presence or absence of a key person, state of employment), diet (appetite, number of daily meals, contents of meals, presence or absence of a person who cooks for the patient, degree of satisfaction with meals), symptoms associated with the surgical procedure (nausea/vomiting, difficulty in swallowing, symptoms of reflux, unpleasantness, diarrhea), and anxiety over the present life (meals, work, outcome, others). The interviews were recorded using an IC recorder with the patients' permission, and the contents were transcribed verbatim.

The items recorded in the self-record form were the body weight and body fat percentage before dinner in order to follow daily body weight changes, number of daily meals, unpleasant symptoms before and after meals, number of bowel movements, and stool properties. The body weight was measured from the day after discharge, using an Omron body weight/body composition meter HBF-200, which was given to each patient at discharge.

Concerning activity records, the total energy expenditure (Kcal) and activity level were recorded using SUZUKEN Lifecorder PLUS, which was worn by each patient daily from getting up to going to bed, starting on the day after discharge. The recording period was from discharge to the second outpatient visit after discharge.

Also, as clinical and nursing records, basic attributes, information concerning the disease and course of treatment, and problems regarding nursing were recorded.

The investigation period was from January to May 2009.

## 3. Methods for data analysis

### 1) Changes in nutrition and metabolism

Individual and daily data of the body weight and body fat percent based on the patients' self-records were converted to graphs, and their changes from discharge to the second visit after discharge were compared. The distribution of individual and daily data on total energy expenditure and the activity level recorded with Lifecorder was also analyzed.

### 2) Psychological changes

Using the verbatim transcriptions, the contents of the interviews were analyzed qualitatively and inductively on the basis of the method of content analysis.

First, the verbatim transcriptions were read carefully, and descriptions of psychological responses in daily life after surgery were converted to sentences with each representing a single meaning without changing the meaning or content. Modifications were made on incomplete sentences as needed. These sentences were classified and grouped as subcategories according to the similarity of the meaning and content. Then, subcategories with similar meanings or contents were grouped as categories and given names representing a common feature of the category.

## 4. Ethical considerations

This study was carried out after obtaining approval from the Committee of Medical Ethics (Clinical Research) of E University.

The study was explained to the subjects orally and in writing, and they were assumed to have consented to enrollment based on their signing of the consent form. The interviews were carried out in a room appropriate to protect the patients' privacy. Their contents were recorded with an IC recorder with each subject's consent. It was explained to the subjects that the data of the clinical and nursing records, patients' self-records, and activity records would be handled anonymously from the stage of data collection, and that the data obtained would not be used for purposes other than scientific research.

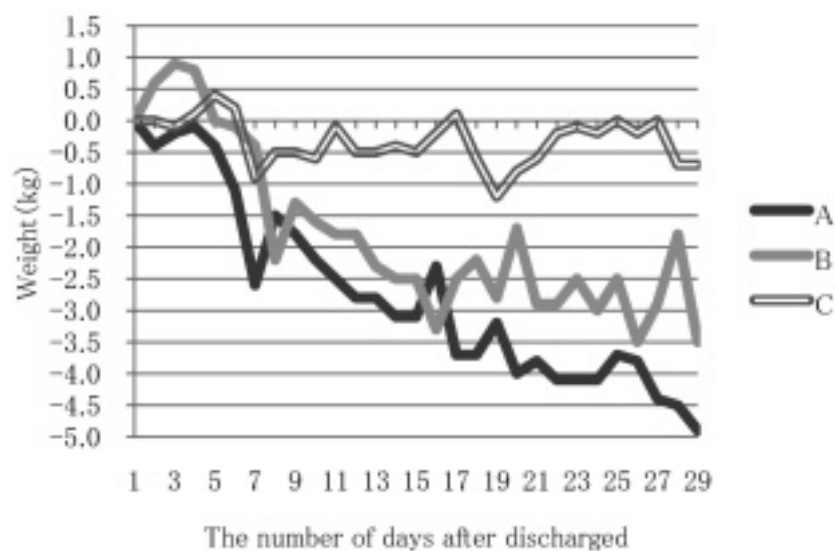
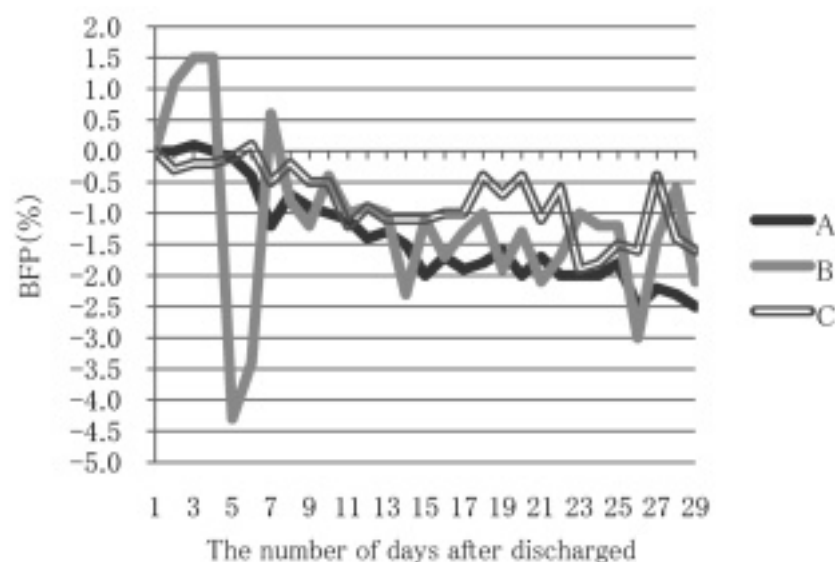
## Results

### 1. Characteristics of subjects

The subjects were 3 males (A, B, and C) who underwent total gastrectomy (with Roux-en Y reconstruction), and the postoperative diagnoses ranged

**Table 1** Description of participants

Participants	sex	age	Weight at hospitalization (kg)	weight at discharged (kg)	weight loss	Stage
Patient A	male	fifties	62.1	55.0	7.1	I b
B	male	sixties	55.4	48.4	7.0	II
C	male	seventies	62.0	55.1	6.9	IIIa

**Fig. 1** Changes of weight**Fig. 2** Changes of BEF

from Stage Ib to IIIa. They were in their 50s to 70s (Table 1). They were all retired. The persons who cooked for them were primarily their wives, and they took 3 meals a day before surgery.

The mean period from discharge to the second outpatient visit after discharge was 33.0 days. Since the shortest period from discharge to the second outpatient visit was 29 days, the evaluation period was set at 29 days in all subjects. The mean duration of interviews was 35 minutes.

## 2. Results of analysis

### 1) Changes in nutrition and metabolism

#### (1) Changes in body weight and body fat percentage

Figures 1 and 2 show changes in the body weight and body fat percentage during the 29 days in the 3 subjects.

After discharge, both the body weight and body fat percentage decreased gradually in all subjects.

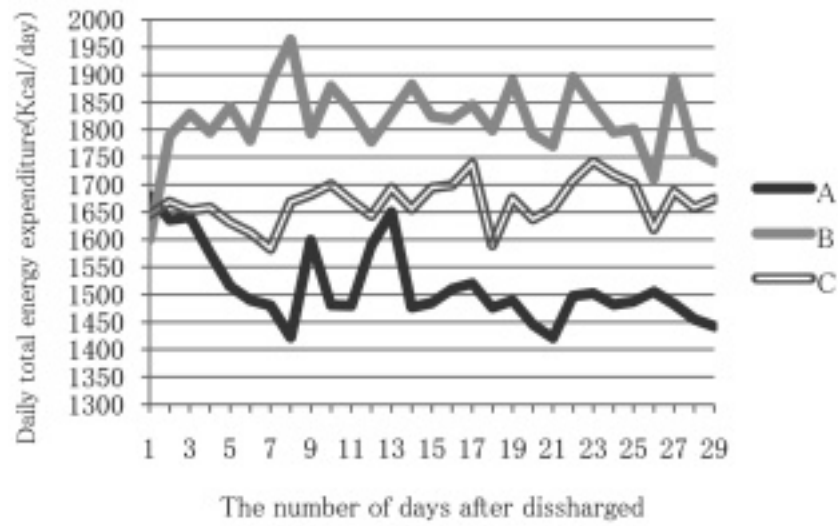


Fig. 3 Changes of total

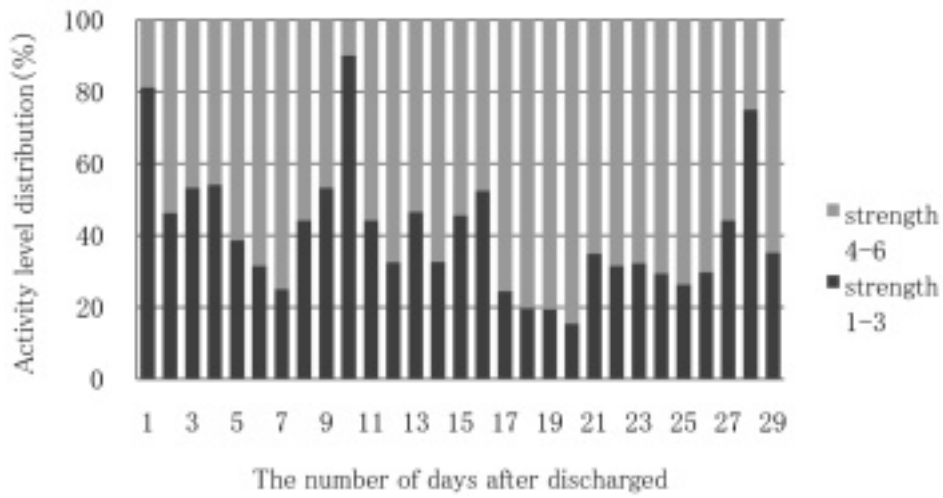


Fig. 4 Activeness of A

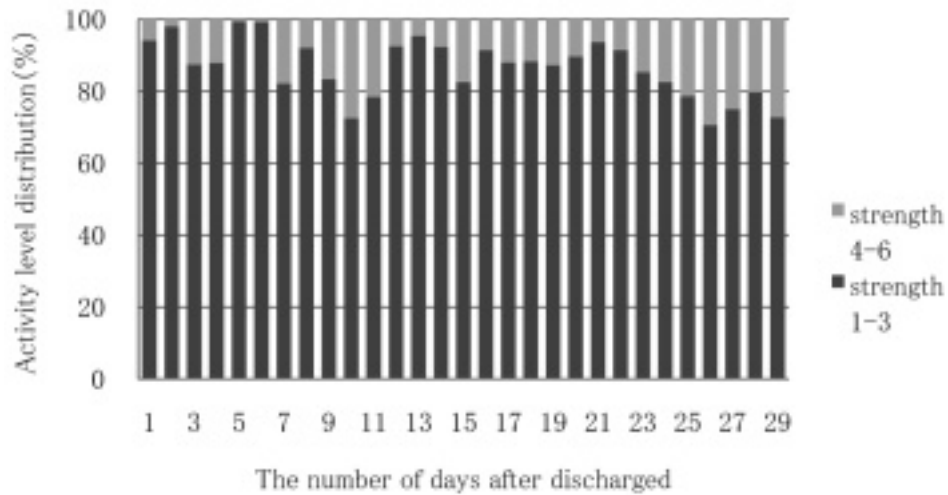


Fig. 5 Activeness of B

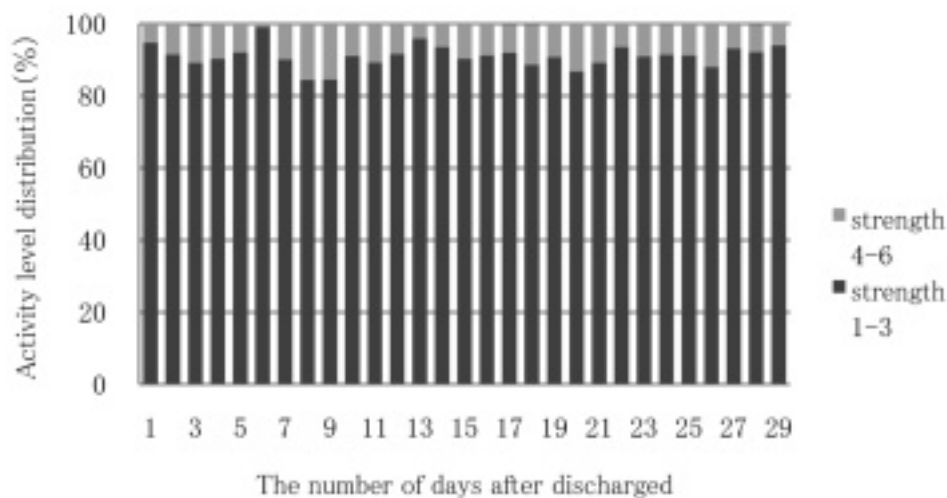


Fig. 6 Activeness of C

(2) Daily total energy expenditure and activity level distribution

Figure 3 shows changes in the daily total energy expenditure of subjects.

In Patient A, the energy expenditure decreased until 1 week after discharge but remained near the baseline level thereafter. In Patients B and C, it remained near the baseline level throughout the evaluation period.

Using Lifecorder, a level of physical activity corresponding to normal walking is indicated as 1-3, that corresponding to rapid walking as 4-6, and vigorous exercise as 7-9 (Figures 4-6).

In Patient A, level 1-3 and level 4-6 activities occupied about 50% each of his daily activities. In Patients B and C, level 1-3 and level 4-6 activities accounted for more than 75% and about 20%, respectively, of their daily activities.

## 2) Changes in the psychological state

By analysis of the verbatim records of the interviews, the psychological responses of the gastric cancer patients during 1 month after discharge were classified into 5 categories at discharge and into 7 categories at the first and second outpatient visits after discharge (Table 2).

The categories observed at discharge, the first visit, and second visit are described below. Categories are indicated by [ ], and subcategories by { }.

(1) At discharge

The psychological responses were classified into 5 categories: [Trial and error regarding meals] [anxiety over meals] [anxiety over recurrence] [thoughts about recurrence] [concerns over declining fitness].

In this period, anxiety over life after discharge, particularly meals, was strong. The patients were careful regarding their eating behavior and had vague anxiety over meals. They also had concerns over

recurrence and declining fitness.

(2) At the first outpatient visit

The patients made their 1st visit to the outpatient clinic about 2 weeks after discharge. Their psychological responses in this period were classified into 7 categories: [Trial and error regarding meals] [anxiety over meals] [anxiety over recurrence] [concerns over declining fitness] [concerns over body weight loss] [consideration for wife] [anxiety over symptoms (hiccups, epigastric discomfort, etc.)].

Causes of anxiety increased as symptoms due to physiologic narrowing of the anastomotic site appeared in addition to the anxiety and concerns reported at discharge. However, the vagueness of anxiety as observed in the subcategory {worried because there is no standard for the amount of food I can eat} disappeared, suggesting that the patients were becoming accustomed to the new dietary habits.

They were also worried about their wives, who were cooking for them, suggesting their consideration for their caregivers.

(3) At the second outpatient visit

The psychological responses of the patients in this period were classified into 7 categories: [understanding their own ability to eat] [anxiety over meals] [anxiety over recurrence] [concerns over declining fitness] [efforts to recover fitness] [consideration for people around them] [anxiety over additional treatments].

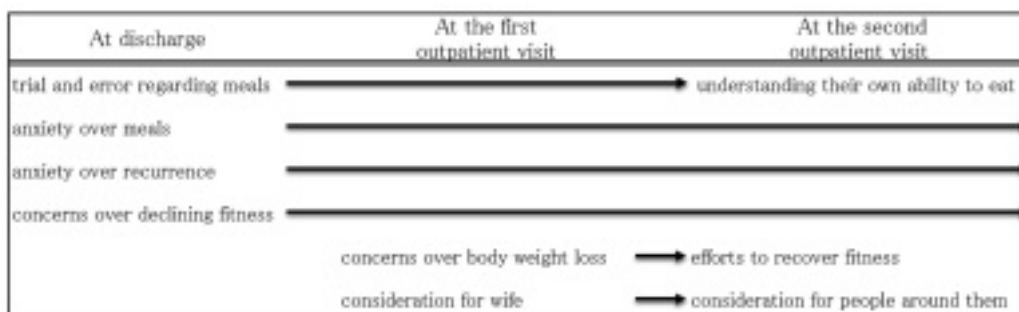
The patients had developed their own eating habits about 1 month after discharge, and their concerns had shifted to not being able to eat enough from how they should adjust their eating behavior. They also continued exercising to recover lost fitness.

## Discussion

In this study, changes in nutrition and metabolism

**Table 2** Psychological state of total gastrectomy patients after discharge

<b>At discharge</b>		
Category	Subordinate category	Participants
trial and error regarding meals	It's important to eat slowly.	A, C
	I eat after consulting with my body.	B
anxiety over meals	I give it up to eat the favorite dish.	B, C
	I'm worried somehow about meal.	A, B, C
	I worry about lack of experience to new eating style	B
	I'm not confident to eat.	C
anxiety over recurrence	It is difficult for me to swallow.	C
	I'm anxious about relapse.	A, B, C
thoughts about recurrence	It is not possible to prevent the relapse.	B
	If cancer relapses, I give it up.	B
	If cancer relapses, I want the doctor to find the relapse early.	B
	How can I live?	A, B, C
concerns over declining fitness	I worry about physical strength to start work again.	A, B
<b>At the first outpatient visit</b>		
Category	Subordinate category	Participants
trial and error regarding meals	I give it up to eat the favorite dish.	A, C
	I came to get eating various food.	C
	I must eat if it become the time of meals.	B
anxiety over meals	I'm anxious about the amount of meals because it isn't predictable	A, B, C
anxiety over recurrence	I'm anxious about relapse.	A, B, C
concerns over declining fitness	I was conscious of decreased physical strength.	A, B, C
concerns over body weight loss	I'm anxious about weight loss.	A, B, C
consideration for wife	My wife becomes tired to prepare meal every day.	B
anxiety over symptoms (hiccups, epigastric discomfort, etc.)	I'm anxious about a lot of hiccups.	A, B, C
	I'm anxious about a heartburn.	A, C
	The wound often hurts.	A, B, C
<b>At the second outpatient visit</b>		
Category	Subordinate category	Participants
understanding their own ability to eat	I know that the amount of meals is different by the day.	A, B, C
	I was relieved to be able to eat .	B
	I have understood the knack of swallowing foods.	C
	I should devise method of eating.	B, C
anxiety over meals	I worry to eat a lot of amount.	A, B
	I worry about ileus.	C
anxiety over recurrence	I worry about relapse.	A, B, C
	I'm depressed by hearing the story that the person died of stomach cancer	A, B
	I'm prepared myself for relapse.	B
concerns over declining fitness	I was conscious of decreased physical strength.	A, B, C
	I'm anxious to lose weight too much.	B
efforts to recover fitness	I am exercising as hard as I do.	A, B, C
consideration for people around them	I think that I only have to be able to live for several years.	B, C
	I don't be able to trouble everyone.	B
anxiety over additional treatments	I'm anxious about chemotherapy.	A



**Fig. 7** Structure of psychological state about total gastrectomy patients after discharge

and the psychological state of patients after total gastrectomy during about 1 month after discharge were evaluated. Body weight loss was noted in any patient. The characteristic psychological changes described below were observed (Fig. 7). Strategy of intervention for patients is also discussed.

### 1. Psychology about meals and intervention

The subjects showed trial and error behavior regarding their eating methods, developed a method suitable for them, and came to understand their eating ability between discharge and the 1st outpatient visit. Also, anxiety over eating persisted even 1 month after discharge, and they apparently made efforts to acquire eating habits appropriate for them to reduce this anxiety. However, if some trouble should occur, they might experience a psychological burden regarding eating and develop a negative attitude toward it. Yoshimura et al. reported that the mental health level declines if needs for eating are not fulfilled by, for example, loss of appetite or if there are postoperative symptoms.<sup>4</sup> Patients require intervention to control symptoms in order to promote the reestablishment of eating habits.

In addition, the eating habit is markedly affected by the original lifestyle and preferences. If there are problems with the lifestyle, the possibility of the occurrence of postoperative complications increases. Even if there is no problem with the lifestyle, patients are expected to participate in various ceremonial events such as weddings and funerals during their convalescence at home. Koizumi et al. investigated the relationships between factors of ileus after open abdominal surgery and activities of daily living, and reported that preventive measures against ileus are impossible to take in special situations without basic knowledge of it.<sup>5</sup> Educational intervention in consideration of special as well as everyday situations is necessary for the prevention of postoperative complications. If the patient has adopted inadequate eating habits, it is important to provide guidance on the appropriate method while being careful not to damage the patient's self-respect and to encourage them to act positively by proposing effective alternatives. Also, none of the subjects in this study intended to return to work, but results suggesting increases in the frequency of generalized and abdominal symptoms such as those of dumping syndrome and symptoms of hypoglycemia after the resumption of work have also been reported.<sup>6</sup> For those who return to work, support to acquire methods to cope with common symptoms is necessary in consideration of an increase in the activity level compared with the period of hospitalization or recuperation at home. Recently, various approaches of educational

intervention for gastric cancer patients undergoing surgery, including those based on cognitive-behavioral therapy and computer-assisted instruction (CAI), have been attempted.<sup>7,8</sup> Nurses are expected to develop the ability to identify and adopt an intervention method considered effective for individual patients according to their abilities.

### 2. Psychology about declining fitness and body weight loss and intervention

During the 1 month after discharge, all 3 patients continued to worry about a decline in fitness. Patients with cancer at any site are considered to have similar concerns, but as the digestive function is markedly impaired in gastric cancer patients after surgery, a decline in fitness and body weight loss are particularly notable in them. This also applied to the subjects of this study. There is a report that postoperative complications were more frequent, and the mortality rate was higher, in patients who showed a 10% or greater body weight loss compared with the body weight before the disease than those in whom the loss was less than 10%.<sup>9</sup> Physiologic loss of body weight is unavoidable, but secondary body weight loss (that due to inadequate eating habits or discouragement) can be prevented by dietary guidance and psychological support. The subjects of this study continued to worry about declining fitness but made efforts to recover fitness without succumbing to this anxiety. Nurses are expected to support such efforts of patients by helping them recover from a loss of confidence caused by the perception of a decline in fitness and body weight loss and promote the desire to recover. Specifically, nurses should listen to patients attentively and provide appropriate information concerning the disease, nutrition, and exercise programs.

### Acknowledgement

The authors wish to express our gratitude to all participants in this study for sharing their experiences with us. This study was supported by a Grant-in-Aid for Young Scientists (B) (No.20791690) in the fiscal years of 2008 to 2009.

### References

1. Ministry of Health, Labour and Welfare. Vital Statistics (September 2009)  
<http://www.e-stat.go.jp/SG1/estat/List.do?lid=000001057775>
2. Masumi Ebisu. The Psychological State of Postoperative Gastric Cancer Patients during the Early Extended Stage of Survival. *Journal of Japanese Society of Cancer Nursing* 2001; 15(2): 41-51
3. Masumi Yamaguchi, Yayoi Kamakura, Junko Fukada, et al. Self-control Food Intake Volume in Postoperative Distal Gastrectomy Patients after Discharge. *Journal of*

- Japanese Society of Nursing Research 2006 ; 29(2) : 19-26
4. Yasuko Yoshida, Yuko Maeda, Kumiko Shirata. Quality of Life in Cancer Patients after Gastrectomy by Evaluating Correlation between Eating Habits and Postoperative Symptoms, Psychological Health J. Jpn. Acad. Nurs. Sci. 2005 ; 25(4) : 52-60
  5. Koizumi Megumi, Kazuma Keiko, Kawamura Swako. Relationship between Postoperative Lifestyle and Onset of Ileus following Laparotomy J. Jpn. Acad. Nurs. Sci. 1998 ; 18(2) : 63-70
  6. Kimiko Okusaka, Keiko Kazuma. Investigation of changes in Symptom and Eating Behavior Associated with the Return to the Workplace of Postgastrectomy Patients. J. Jpn. Acad. Nurs. Sci. 2000 ; 20(3) : 60-68
  7. Hisami Nagai, Tomoko Takeuchi, Masako Yano. Comparison of Pamphlet Presentation Versus Computer-assisted Instruction (CAI) of Dietary Guidance for Gastrectomy Patients. Journal of Japanese Society of Nursing Research 2007 ; 30(5) : 23-30
  8. Hatsumi Kanzaki, Yoshihiro Kido. Cognitive-Behavioral Intervention for Gastrectomy Patients with the Early Stage of Gastric Cancer-Weekly Counseling and Journal Writing targeted to Self-efficacy and Psychological Stress. J. Jpn. Acad. Nurs. Sci. 2002 ; 22(4) : 1-10
  9. Aoife M. Ryan, Laura A. Healy, Derek G. Power, et al. Short-term nutritional implication of total gastrectomy for malignancy, and the impact of parenteral nutritional support. Clinical Nutrition. 2007 ; 26 : 718-727