

## RESEARCH COMMUNICATION

# Impact of Nutritional Status on the Quality of Life of Advanced Cancer Patients in Hospice Home Care

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### Abstract

**Background:** Cancer patients frequently experience malnutrition and this is an important factor in impaired quality of life. **Objective:** This cross-sectional study examined the association between global quality of life and its various subscales with nutritional status among 61 (33 females and 28 males) advanced cancer patients cared for by selected hospices in peninsular Malaysia. **Methods:** The Patient Generated-Subjective Global Assessment (PG-SGA) and the Hospice Quality of Life Index (HQLI) were used to assess nutritional status and quality of life, respectively. **Results:** Nine (14.7%) patients were well-nourished, 32 (52.5%) were moderately or suspected of being malnourished while 20 (32.8%) of them were severely malnourished. The total HQLI mean score for these patients was  $189.9 \pm 51.7$ , with possible scores ranging from 0 to 280. The most problem areas in these patients were in the domain of functional well-being and the least problems were found in the social/spiritual domain. PG-SGA scores significantly correlated with total quality of life scores ( $r^2 = 0.38, p < 0.05$ ), psychophysiological well-being ( $r^2 = 0.37, p < 0.05$ ), functional well-being ( $r^2 = 0.42, p < 0.05$ ) and social/spiritual well-being ( $r^2 = 0.07, p < 0.05$ ). Thus, patients with a higher PG-SGA score or poorer nutritional status exhibited a lower quality of life. **Conclusion:** Advanced cancer patients with poor nutritional status have a diminished quality of life. These findings suggest that there is a need for a comprehensive nutritional intervention for improving nutritional status and quality of life in terminally ill cancer patients under hospice care.

**Key Words:** Hospice - advanced cancer patients – nutritional status - quality of life

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### Introduction

Cancer is a leading cause of mortality globally. In 2007, there were 7.9 million deaths from cancer accounting for 13% of all deaths worldwide (World Health Organization, 2009). Among these, about 70% of deaths occurred in low and middle income countries. Cancer deaths are projected to increase to 12 million in 2030. One of the main health dilemmas afflicting Malaysia today is cancer. Cancer is ranked third among the most frequent causes of medically certified deaths in Malaysia (Health Facts, Ministry of Health, 2004). The incidence of cancer has been estimated to be 30,000 yearly and the 10 most common cancers in Peninsular Malaysia are cancers of the breast, large bowel, lung, cervix uteri, leukaemia, nasopharynx, lymphoma, stomach, prostate gland, and other skin (National Cancer Registry, 2008).

Cancer and cancer therapy effects nutritional status through alterations on the metabolic system and reduction in food intake (Delano and Moldawer, 2006). Treatment options for cancer include systemic chemotherapy, surgery, and radiation. All of these treatments result in damage to normal tissues, and at the same time produce intense side effects such as diarrhea, oral mucositis, nausea, and vomiting that limit eating. Malnutrition and

severe weight loss become evident as the disease progresses (Bovio, 2008). Malnutrition in cancer patients is a multi-factorial syndrome that ranges from weight loss to acute muscle and fat wasting, disruption of the immune system and morbidity and mortality (Fearon, 2008).

Beyond and beside the great effect of cancer on physical condition, patients more than often experience mental and psychological problems (Argiles, 2005). Patients experience depression, increased fatigue, sleep disturbances and poor quality of life after diagnosis and treatment of cancer (Olsson et al., 2007). Nutritional status can affect quality of life among patients with cancer (Bozzetti et al., 2002; Crogan and Pasvogel, 2003; Sperling, 2004). Several studies in Western populations have reported a relationship between nutritional status and quality of life in cancer patients (Andreyev et al., 1998; Isenring et al. 2003; Ovesen et al., 1993; Hutton et al., 2007).

The concept of hospice and palliative care implicate a team approach to improve the quality of life of patients and families who confronted many difficulties related to fatal disease. Symptom control, pain management, spiritual and emotional help from diagnosis to the end of life and counseling care are also provided by the hospice program. Hospice care is supplied in the hospital, at home

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or in a nursing home, depending on patient's choice and situation, and on the local hospice services (National Hospice and Palliative Care Organization, 2009). In Malaysia, patients in the last stages of life threatening diseases are often referred to hospices and most of them are those with advanced cancer. (Hospice Malaysia, 2008). The objective of this study was to determine the relationship between nutritional status and quality of life in cancer patients in Hospice Home Care.

## Materials and Methods

### Selection of subjects

A cross-sectional study was conducted to examine the relationship between nutritional status and quality of life among cancer patients receiving Hospice Home Care facilities in Pulau Pinang and Negeri Sembilan in Malaysia. After receiving approval from the Ethics Committee of the Faculty of Medicine & Health Sciences, University Putra Malaysia, face-to-face interview was carried out at patients' house in November 2008 to April 2009. Eligible subjects were screened for their functional status using the Eastern Cooperative Oncology Group (ECOG) performance scale (Oken, 1982). This scale assesses the patients' functional condition and is used by physicians and nurses to determine how a patient's illness is progressing, assess how the illness influences the daily activities and apply suitable therapies. ECOG is a 6-point measure ranging between 0 (fully active) and 5 (dead) that assesses the patient's ability for self-care and ambulation. ECOG 0-3 were used for selecting patients who had reasonable functional status. The patients were screened by the palliative care physician and nurses of the selected Hospices. Patients who met the inclusion criteria were invited to participate in the study. Only those who gave informed consent were recruited. Patients with ECOG 4&5 and patients/caregivers who did not give informed consent were not included in the study. The sample size needed for this study was 61 patients calculated based on the formula by Daniel (2005). Twenty-eight men and thirty-three women age 18 to 74 years were enrolled in this study.

### Data collection

All data were collected during a face-to-face interview with the subjects at their house by researcher. Socio-demographic (age, ethnicity, educational status, occupation, income, living condition and duration of receiving the Hospice care), disease characteristics (type of cancer, stage of disease, type of treatment, duration of disease and ECOG performance status rate), nutritional status and quality of life information were obtained. The nutritional status of patients was assessed by the Patient-Generated Subjective Global Assessment (PG-SGA) which was developed specially for cancer patients (Ottery, 2000). The PG-SGA covers seven items, viz: weight, food intake, symptoms, activities and function, disease and its relation to nutritional requirements, metabolic demand and physical examination. Subjects' quality of life was assessed with the Hospice Quality of Life Index (HQLI) (McMillan and Weitzner, 1998). The HQLI is a 28-item,

which includes three aspects of overall quality of life of home-based Hospice patients: psychophysiologic well-being (13 items), functional well-being (7 items) and social and spiritual well-being (8 items). Each item score ranged from 0 (serious problem) to 10 (no problem) with total scores ranging from 0 (poor quality of life) to 280 (high quality of life). Reliability of the HQLI was acceptably high with an overall Cronbach's alpha of 0.876.

### Data analysis

All data were analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0. Descriptive statistic including means, range, standard deviation and frequency were used to present subject's demography information, disease characteristic, quality of life score and PG-SGA score. General Linear Model (GLM) univariate analysis was used to evaluate the association between PG-SGA score and total quality of life score. The association between PG-SGA score and three domains of quality of life was assessed by GLM multivariate analysis.  $P < 0.05$  was deemed as the significant level.

## Results

Socio-demographic and disease characteristics of the study groups are described in Table 1. A total of 61 cancer patients were included: 33 women (54%) and 28 men (46%). The mean age was  $59.2 \pm 12.5$  years old (range: 18 to 74 years). Classification by ethnicity showed that a majority of the patients were Chinese (67.2%) followed by Malay (18%) and Indian (14.8%). The most (86.9%) of the respondents had some form of education: 41%, 41% and 4.9% with primary, secondary and tertiary level of education, respectively. Most of the patients (47.5%) had retired and were disable. About 31.2% of the subjects were unemployed, either as housewives or student. Among the subjects 21.3% were employed as part time employees or managing their own business. Approximately 80% of the subjects were in hospice home care for less than 12 months. This was followed by 14.8% and 4.9% of subjects who had been in hospice care for 1 to 2 years (13 to 24 months) and more than 2 years, respectively.

As shown in Table 1, patients with a variety of cancer types participated in this study. The type of cancer seen among these patients demonstrated that breast cancer was the most widespread form of cancer among females while rectum cancer was the most widespread these patients. The majority (72.1%) of the subjects were in stage 4. About 45.9% of the population had been living with cancer for more than 2 years. The mean duration of cancer was  $37.8 \pm 53.1$  months. The ECOG, showed that 40% in ECOG 3, followed by ECOG 2 (34.4%) and ECOG 1 (24.6%). Almost 88 % of the subjects had received some types of cancer therapy although 11.5% of them had not received any. The majority (54.1%) of the respondents were cared by their spouses.

Nutritional status was categorized into three groups; well-nourished, moderate or suspected malnutrition and severely malnourished (as shown in Figure 1). The mean PG-SGA score was  $13.6 \pm 7.0$ . A score  $\geq 9$  indicates a critical need for nutrition intervention. Figure 2 shows

**Table 1. Socio-demographic Characteristics**

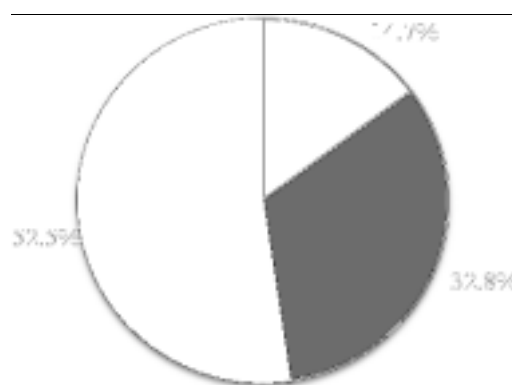
Characteristics	Men (28)	Women (33)	Total (61)		
Age (years)	18-39	3 (10.7)	5 (8.2)		
	40-59	12 (42.9)	23 (37.7)		
	60-74	13 (46.4)	33 (54.1)		
	Mean ± S.D	56.6±14.6	61.5±10.1	59.2±12.5	
Range	18-74	38-74	18-74		
	Ethnicity				
	Chinese	16 (57.1)	25 (75.8)	41 (67.2)	
Malay	7 (25.0)	4 (12.1)	11 (18.0)		
Indian	5 (17.9)	4 (12.1)	9 (14.8)		
Education	No	0 (0.0)	8 (13.1)		
	Primary	11 (39.3)	14 (42.4)	25 (41.0)	
	Secondary	15 (53.6)	10 (30.3)	25 (41.0)	
	Tertiary	2 (7.2)	1 (3.0)	3 (4.9)	
Occupation	Retired/disabled	18 (64.3)	11 (33.3)	29 (47.5)	
	Unemployed	2 (7.1)	17 (51.5)	19 (31.2)	
	Employed	8 (28.6)	5 (15.2)	13 (21.3)	
	Household income (RM)				
<1000	11 (39.3)	7 (21.2)	18 (29.5)		
1000-2000	11 (39.3)	17 (51.5)	28 (45.9)		
2000	6 (21.4)	9 (27.3)	15 (24.6)		
Cancer type	Colon	3 (10.7)	5 (15.2)	8 (13.1)	
	Rectum	5 (17.9)	3 (9.1)	8 (13.1)	
	Female Breast	0 (0.0)	11 (33.3)	11 (18.0)	
	Lung	3 (10.7)	4 (12.2)	7 (11.5)	
	Stomach	2 (7.1)	2 (6.1)	4 (6.6)	
	Prostate	3 (10.7)	0 (0.0)	3 (4.9)	
	Kidney	2 (7.1)	1 (3.0)	3 (4.9)	
	Nasopharynx	2 (7.1)	1 (3.0)	3 (4.0)	
	Leukemia	1 (3.6)	2 (6.1)	3 (4.9)	
	Liver	2 (7.1)	0 (0.0)	2 (3.3)	
	Brain	2 (7.1)	0 (0.0)	2 (3.3)	
	Cervix uteri	0 (0.0)	1 (3.0)	1 (1.6)	
	Ovary	0 (0.0)	1 (3.0)	1 (1.6)	
	Pancreas	0 (0.0)	1 (3.0)	1 (1.6)	
	Other	3 (10.7)	1 (3.0)	4 (6.6)	
	Primary disease stage	Stage 2	3 (10.7)	3 (9.1)	6 (9.8)
		Stage 3	5 (17.9)	6 (18.2)	11 (18.1)
		Stage 4	20 (71.4)	24 (72.7)	44 (72.1)
		Duration of cancer (months)			
	1-12	9 (32.1)	9 (27.3)	18 (29.5)	
13-24	8 (28.6)	7 (21.2)	15 (24.6)		
>24	11 (39.3)	17 (51.5)	28 (45.9)		
Mean ± SD	26.2±25.3	47.6±67.3	37.8±53.1		
Range	5-108	1-228	1-228		
Hospice care (months)	1-12	23 (82.1)	26 (78.8)	49 (80.3)	
	13-24	3 (10.7)	6 (18.2)	9 (14.8)	
	>24	2 (7.2)	1 (3.0)	3 (4.9)	
	Mean ± SD	8.4±9.9	7.8±11.7	8.1±10.8	
Range	1-42	1-64	1-64		
Treatment	Surgery	5 (17.9)	4 (12.1)	9 (14.8)	
	Chemotherapy	3 (10.7)	4 (12.1)	7 (11.5)	
	Radiotherapy	1 (3.5)	1 (3.0)	2 (3.3)	
	Combinations	14 (50.0)	22 (66.7)	36 (59.0)	
	None	5 (17.9)	2 (6.1)	7 (11.5)	
Care giver description	Spouse	21 (75.0)	12 (36.4)	33 (54.1)	
	Son/Daughter	4 (14.3)	13 (39.4)	17 (27.9)	
	Self-care	0 (0.0)	4 (12.1)	4 (6.5)	
	Parents	2 (7.1)	1 (3.0)	3 (4.9)	
	Sister/Brother	0 (0.0)	2 (6.1)	2 (3.3)	
	Maid	1 (3.6)	1 (3.0)	2 (3.3)	
ECOG	1	10 (35.7)	5 (15.2)	15 (24.6)	
	2	4 (14.3)	17 (51.5)	21 (34.4)	
	3	14 (50.0)	11 (33.3)	25 (41.0)	

**Table 2. Mean ± SD HQLI Scores for the Subjects**

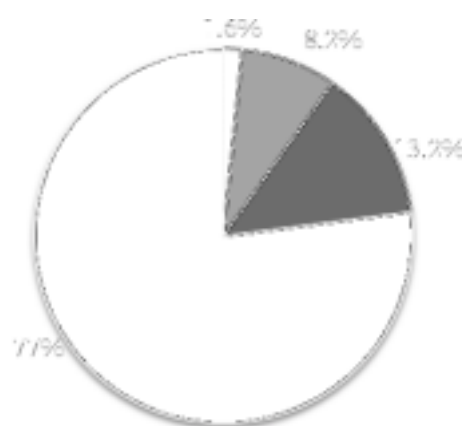
HQLI Well-being	Male (28)	Female (33)	Total (61)
Total score	183.5±52.9	195.4±50.9	189.9±51.7
Range	55-268	76-264	55-268
Psychophysiological	85.9±29.2	87.2±25.9	86.6±27.2
Range	16-130	42-125	16-130
Functional	36.0±20.6	42.4±18.2	39.4±19.4
Range	0-68	0-70	0-70
Social/ Spiritual	63.2±14.9	65.5±13.9	64.4±14.2
Range	11-80	23-80	11-80

98.4% of the patients required nutrition triage recommendations including patient and family education, symptom management and nutrition intervention.

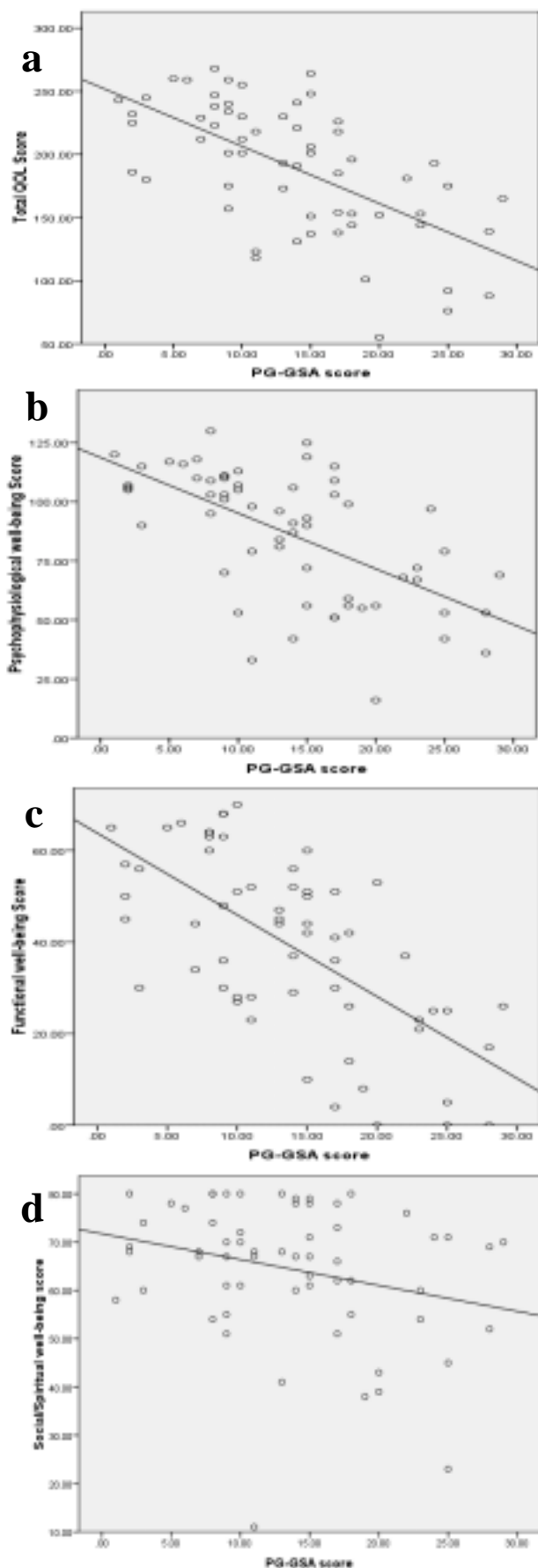
The total HQLI mean score for these patients was 189.9±51.7 (Table 2). The highest possible score is 280. Functional well-being subscale scores were the lowest among the three subscales. The possible range of scores for this subscale was 0-70; the mean score was 39.4±19.4. For the functional well-being subscale, the lowest score was enjoyable activity with the mean of 4.5±3.8 as shown



**Figure 1. Distribution of Subjects by Nutritional Status According to PG-SGA Global Assessment Categories (Ottery, 2000)** (White, well-nourished; grey, severely malnourished; black, moderately malnourished)



**Figure 2. Nutritional Recommendations.** White, 0-1, no intervention, re-assessment on routine and regular basis during treatment; light grey, 2-3, patients and relatives require nutritional education provided a specialist in nutrition (or other clinician) with pharmacological intervention based on the symptoms and the patient's data; dark grey, 4-8, require intervention of a specialist in nutrition in conjunction with the attending physician based on the patients' data and symptoms; black, ≥9, critical need to improve the management of the patient's symptoms together with a nutritional intervention



**Figure 3. Correlations with PG-SGA Scores.** a) Total Quality of Life (R Squared = 0.380); b) Psychophysiological Subscale Well-being (R Squared = 0.369); c) Functional Subscale Well-being (R Squared=0.418); d) Social/spiritual Subscale Well-being (R Squared = 0.07)

**Table 3. Item Mean Scores for HQLI Domains**

Items	Mean±S.D
<b>Functional Items</b>	
Enjoyable activity	4.5±3.8
Usual activity can do	4.7±3.9
Tiredness	5.5±3.7
Social life	5.5±4.3
Independence	5.6±4.1
Concentration	6.3±3.9
Eating	7.3±3.5
<b>Psychophysiological Items</b>	
Anxious about what is happening	5.4±4.0
Sex life	5.4±4.0
Anxious about family and friends	6.2±4.1
Sadness	6.2±3.8
Sleep	6.4±3.7
Pain relief	6.6±3.6
Breathlessness	6.6±3.7
Worry about living expenses	6.7±3.8
Loneliness	7.1±4.0
Hope	7.4±3.3
Anger	7.5±3.8
Nausea	7.8±3.1
Constipation	8.0±3.4
<b>Social/ Spiritual Items</b>	
Physical contact	6.4±3.7
Surroundings	7.0±3.6
Meaning in life	7.1±3.3
Relationship with God	7.7±3.6
Spiritual support - healthcare team	8.7±2.1
Support from family and friends	8.9±3.0
Physical care	8.9±2.4
Emotional support - healthcare team	9.0±1.8

in Table 3. The subjects mentioned that they felt tired and were able to take part in fewer of their normal activities, and felt that they were losing their freedom. The mean score for psychophysiological well-being subscale was  $86.6 \pm 27.2$ , ranging 16 to 130. Anxiety about what was happening to them and satisfaction with sex life had the lowest mean score in the psychophysiological well-being subscale. Social/ Spiritual well-being subscale scores were the highest among the three subscale scores with a mean of  $64.4 \pm 14.2$ , ranging from 11 to 80. The lowest score in this subscale was physical contact. Most of the subjects mentioned that they did not have enough physical contact (touching, holding hands, hugging and others) with their families.

Correlation between nutritional status (presented by PG-SGA score) and total quality of life score assessed by using General Linear Model (GLM) univariate analysis. The partial eta squared was used as the measure of effect size (ES), where a value more 0.15 is considered as a large effect, a value close to 0.10 is considered as a moderate effect and a value less than 0.06 is considered as a small effect (Cohen, 1988). As shown in Figure 3, the PG-SGA score was significantly correlated to total quality of life score ( $F=36.142, p=0.000, EF=0.38$ ). PG-SGA score alone was able to explain 38% of the total variation in total quality of life score. Using a multivariate general linear model, PG-SGA score showed significant correlation with psychophysiological well-being ( $F=34.571, p=0.000,$

EF=0.37), functional well-being ( $F=42.365$ ,  $p=0.000$ ,  $EF=0.42$ ) and social/ spiritual well-being ( $F=4.429$ ,  $p=0.040$ ,  $EF=0.07$ ). PG-SGA score is able to explain 36.9%, 41.8% and 7% of the total variation in psychophysiological, functional and social/ spiritual well-being, respectively (Figure 3).

## Discussion

This cross-sectional study assessed the nutritional status and quality of life among patients with advanced cancer receiving care by hospice and found a significant association between impaired quality of life and malnutrition. We used the scored PG-SGA as an effective and accurate tool in identifying cancer patients with malnutrition and triage of medical nutrition therapy (Ottrey, 2000). Less 15% of the study patients were well nourished and nearly all required nutrition recommendations such as education for patient and family, managing symptoms and nutrition intervention. The results of the present study are consistent with a study by Segura et al. (2005) on 781 mixed advanced cancer cases receiving care by the national health system at outpatient clinics, hospitals and at home. Using the PG-SGA, they found that nearly all of the patients (97.6%) needed some kind of nutrition recommendations and intervention for improving nutritional status. A Portugal study assessed the nutritional status of 205 colorectal, gastro-esophageal and head and neck cancer patients (Ravasco et al., 2003). The study found that patients with advanced cancer were more malnourished compared to cancer patients in earlier stages. According to the PG-SGA, 79% of cancer patients in stage III and IV were malnourished compared with only 3% prevalence of malnutrition in patients with stage I and II cancer. Bauer et al. (2002) conducted a study to evaluate nutritional status by using PG-SGA on 71 advanced cancer patients of breast, lung, lymphoma, oesophagus, prostate, sarcoma and myeloma. They also reported that 76% of cancer patients in acute care medical setting were moderate to severe malnourished.

Quality of life was assessed by HQLI questionnaire, which is a reliable and validated tool for home-based hospice cancer patients (McMillan and Weitzner, 1998). In the present study, the global quality of life means score was  $189.9 \pm 51.7$ . Among the three domains of HQLI, the lowest scores were for functional well-being followed by psychophysiological well-being subscale. The highest scores were obtained for social/spiritual well-being subscale. The results of this study were consistent with a previous study conducted by McMillan and Weitzner (2000) using the HQLI. They assessed the quality of life among 231 mixed cancer patients receiving hospice home care. Their results showed that the mean global quality of life was 191.3 and highest mean scores were obtained for social/spiritual domain followed by psychophysiological and functional well-being subscale. Besides, they reported that sex life, capability to carry out usual activities and meaning in life were the most problematic items among other items in cancer patients in hospice care.

In the present study, the lowest mean score for functional subscale were related to the enjoyable and usual

activities that the subjects were able to carry out. Cancer patients at this level of their illness lost their independence, felt tired and were not be able to participate in pleasant activities. These conditions also affect their social life. Some patients mentioned that they could not concentrate maybe due to the fatigue and medications, which they received during their treatment (Cimprich, 1992; McDaniel et al., 1995). Meanwhile, in the psychophysiological domain, anxious about what was happening to themselves, sex life, anxious about family and friends, sadness and pain relief items had lowest mean scores. Symptoms such as constipation, nausea and breathless were reported by patients. Evidence supports that pain, constipation and breathless are frequent problems among terminally ill patients (Donnelly and Walsh, 1995; Weitzner et al., 1997). Furthermore, among different social/spiritual items, receiving physical contact had the lowest mean score in this domain. Patients mentioned that they did not receive enough physical contact such as hugging and touching from their surrounding. Most of the patients mentioned that they were satisfied with emotional and spiritual support from the hospice team. In addition, most of them indicated that they were happy with the support and physical care, they received from their friends and family. Two previous studies (McMillan, 1996; McMillan and Mahon, 1994) reported that among all items on three subscales of HQLI, the mean score for relationship with God was highest. In the present study, the mean score for relationship with God was fairly high. A few of patients mentioned that they do not have any connection with God and did not believe in religion.

This study found that nutritional status was significantly correlated to total quality of life score, psychophysiological, functional and social/ spiritual domains. The relationship between malnutrition and impaired quality of life have also been reported by several studies (Marin Caro et al., 2007; Isenring et al., 2004; Sperling, 2004). However, studies specifically in the hospice care setting are limited. As mentioned in the result earlier, the current study is also in agreement with Hutton et al's. (2007) study. They assessed quality of life of 66 patients with advanced cancer receiving palliative care services. Their results showed that 86% patients with nutritional symptoms such as change in sense of taste, unpleasant taste in the mouth, lack of appetite and nausea had significantly lower quality of life scores especially the physical well-being scale ( $p=0.001$ ). In addition, the significant correlation ( $p<0.05$ ) between PG-SGA score and quality of life score also was reported by Ravasco et al. (2005). They conducted a study among 111 colorectal cancer patients who were referred for palliative or cancer therapy. The results showed that deterioration in QOL and functional score were significantly related to higher PG-SGA score (poorer nutritional status). This result is in line with a recent study by Tong et al. (2009) on 219 mixed cases of cancer patients. It was reported that patients with higher PG-SGA score and higher nutritional symptoms such as constipation, diarrhea, vomiting and bad taste in the mouth and had lower quality of life and life satisfaction score.

In a series of 58 patients with advanced colorectal cancer, Gupta et al (2006) assessed nutritional status by using subjective global assessment (SGA). Prevalence of malnutrition was 41% which was significantly associated with poor quality of life. Well-nourished patients compared to malnourished patients had significantly better quality of life scores on the functional, physical and global. In addition, well-nourished status was related with a decrease in pain, insomnia, fatigue and lack of appetite. A similar study also have been conducted by Isenring et al. (2003) on 60 head, neck, rectal abdominal cancer patients to evaluate relationship between nutritional status through the Patient-Generated Subjective Global Assessment (PG-SGA) score and quality of life. The results showed a significant negative relationship between PG-SGA score and global QOL which means patients with poorer nutritional status had poorer quality of life. In addition, they suggested that score PG-SGA is an appropriate tool for predicting the alteration in quality of life. According to Marin Caro et al. (2007), malnutrition can decrease quality of life through an increase in postoperative complications, increase in infection rate and reduced tolerance to treatment. These conditions can increase cost and social burden and reduce performance status. In summary, the higher PG-SGA score indicates more complications in food intake, activities and functions, metabolic stress, physical condition and nutritional symptoms such as poor appetite, nausea, vomiting, dry mouth, chemosensory symptoms (taste and smell distortion), painful swallowing and early satiety. These situations can jeopardize quality of life in cancer patients as found in the present study.

In summary, we have been able to establish the association between quality of life and its three domains with PG-SGA score as nutritional assessment tool among cancer patients in hospice home care. A potential limitation in the current study was the small sample size and excluded of subjects with emotional, cognitive or physical problems that prevented them from completing the HQLI and PG-SGA questionnaire. Therefore, affirmation of these results by further studies in cancer patients in hospice setting is necessary.

In conclusion, a significant association between poorer nutritional status and impaired quality of life, in all domains, was confirmed by our study. Malnutrition and poor quality of life are prevalent among advanced cancer patients in hospice care. It is imperative that quality of life and nutritional assessment using appropriate tools such as the HQLI and PG-SGA be carried out on cancer patients in hospice care to plan targeted interventions.

## References

- Andreyev HJN, Norman AR, Oates J, et al (1998). Why do patients with weight loss have a worse outcome when undergoing chemotherapy for gastrointestinal malignancies? *Eur J Cancer*, **34**, 503-9.
- Argiles JM (2005). Cancer-associated malnutrition. *Eur J Oncol Nursing*, **9**, 39-50.
- Bauer J, Capra S, Ferguson M (2002). Use of the scored Patient-Generated Subjective Global Assessment (PG-SGA) as a nutrition assessment tool in patients with cancer. *Eur J Clin Nutr*, **56**, 779-85.
- Bovio G, Bettaglio R, Bonetti G, et al (2008). Evaluation of nutritional status and dietary intake in patients with advanced cancer on palliative care. *Minerva Gastroenterol Dietol*, **54**, 243-50.
- Bozzetti F, Cozzaglio L, Biganzoli E, et al (2002). Quality of life and length of survival in advanced cancer patients on home parenteral nutrition. *Clin Nutr*, **21**, 281-8.
- Cimprinch B (1992). Attention fatigue following breast cancer surgery. *Res Nurs Hlth*, **15**, 199-207.
- Cohen, JW (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd Edition. New Jersey: Lawrence Erlbaum Associates.
- Crogan NL, Pasvogel A (2003). The influence of protein-calorie malnutrition on quality of life in nursing homes. *J Gerontol Ser A: Biol Sci Med Sci*, **58**, 159-64.
- Daniel WW (2005). *Biostatistics: A Foundation for Analysis in the Health Sciences*. 8th. New York: John Wiley and Sons.
- Delano MJ, Moldawer LL (2006). The origins of cachexia in acute and chronic inflammatory diseases. *Nutr Clin Pract*, **21**, 68-81.
- Donnelly S, Walsh DA (1995). The symptoms of advanced cancer. *Sem Oncol*, **22**, 67-72.
- Fearon KCH (2008). Cancer cachexia: Developing multimodal therapy for a multidimensional problem. *Eur J Cancer*, **44**, 1124-32.
- Ferlay J, Autier P, Boniol M, et al (2007). Estimates of the cancer incidence and mortality in Europe in 2006. *Ann Oncol*, **18**, 581-92.
- Gupta D, Lis CG, Granick J, et al (2006). Malnutrition was associated with poor quality of life in colorectal cancer: a retrospective analysis. *J Clin Epidemiol*, **59**, 704-9.
- Ministry of Health Malaysia (2005). *Health Facts 2004*. Planning and Development Division (Information and Documentation System Unit).
- Hospice Malaysia (2009). What is palliative care?. <http://www.hospitemalaysia.org>. Accessed 20/07/09.
- Hutton JL, Baracos VE, Wismer WV (2007). Chemosensory dysfunction is a primary factor in the evolution of declining nutritional status and quality of life in patients with advanced cancer. *J Pain Symp Manage*, **33**, 156-65.
- Isenring E, Bauer J, Capra S (2003). The scored Patient-generated Subjective Global Assessment (PG-SGA) and its association with quality of life in ambulatory patients receiving radiotherapy. *Eur J Clin Nutr*, **57**, 305-9.
- Isenring E, Capra S, Bauer JD (2004). Nutrition intervention is beneficial in oncology outpatients receiving radiotherapy to the gastrointestinal or head and neck area. *Br J Cancer*, **91**, 447-52.
- Jemal A, Siegel R, Ward E, et al (2009). Cancer statistics, 2009. *Ca J Clin*, **59**, 225-49.
- Lim GCC (2002). Overview of cancer in Malaysia. *Jpn J Clin Oncol*, **32**, 37-42.
- Marín Caro MM, Laviano A, Pichard C (2007). Nutritional intervention and quality of life in adult oncology patients. *Clin Nutr*, **26**, 289-301.
- McDaniel JS, Musselman DL, Porter MR, et al (1995). Depression in patients with cancer: Diagnosis, biology and treatment. *Arch Gen Psych*, **52**, 89-99.
- McMillan SC (1996). The quality of life of patients with cancer receiving hospice care. *Oncol Nursing Forum*, **22**, 1221-8.
- McMillan SC, Mahon M (1994). Measuring quality of life in hospice patients using a newly developed Hospice Quality of Life Index. *Qual Life Res*, **3**, 437-47.
- McMillan SC, Weitzner M (1998). Quality of life in cancer patients: use of revised Hospice Index. *Cancer Pract*, **6**, 282-

8.

- McMillan SC, Weitzner M (2000). How problematic are various aspects of quality of life in patients with cancer at the end of life? *Oncol Nursing Forum*, **27**, 817-23.
- National Cancer Registry (2008). Cancer Incidence in Malaysia 2003. Lim GCC., Rampal S & Halimah YH (eds). National Cancer Registry: Kuala Lumpur.
- National Hospice and Palliative Care Organization (2009). An Explanation of Palliative Care. <http://www.nhpc.org>. Accessed 25/08/09.
- Oken MM, Creech RH, Tormey DC, et al (1982). Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol*, **5**, 649-55.
- Olsson U, Bosaeus I, Svedlund J, et al (2007). Patients' subjective symptoms, quality of life and intake of food during the recovery period 3 and 12 months after upper gastrointestinal surgery. *Eur J Cancer Care*, **16**, 74-85.
- Ottery FD (2000): Patient-Generated Subjective Global Assessment. In: The Clinical Guide to Oncology Nutrition, ed. PD McCallum and CG Polisena, pp 11 - 23.
- Ovesen L, Hannibal J, Mortensen EL (1993). The interrelationship of weight loss, dietary intake, and quality of life in ambulatory patients with cancer of the lung, breast, and ovary. *Nutr Cancer*, **19**, 159-67.
- Ravasco P, Monteiro-Grillo I, Vidal P, et al (2005). Dietary counseling improves patient outcomes: a prospective, randomized, controlled trial in colorectal cancer patients undergoing radiotherapy. *J Clin Oncol*, **23**, 1431-8.
- Ravasco P, Monteiro-Grillo I, Vidal P, et al (2003). Nutritional deterioration in cancer: the role of disease and diet. *Clin Oncol*, **15**, 443-50.
- Segura A, Pardo J, Jara C, et al (2005). An epidemiological evaluation of the prevalence of malnutrition in Spanish patients with locally advanced or metastatic cancer. *Clin Nutr*, **24**, 801-14.
- Sperling R (2004). New nutrition and exercise guidelines for cancer survivors. *Home Health Nurse*, **22**, 263.
- Tong H, Isenring E, Yates P (2009). The prevalence of nutrition impact symptoms and their relationship to quality of life and clinical outcomes in medical oncology patients. *Support Care Cancer*, **17**, 83-90.
- Weitzner MA, Moody LN, McMillan SC (1997). Symptom management issue in hospice care. *Am J Hospice Palliative Care*, **14**, 190-5.
- World Health Organization (2009). World Health Organization Global Factsheets on cancer. <http://www.who.int/mediacentre/factsheets/en/>; accessed 01/09/09.

