Oman Medical Journal (2013) Vol. 28, No. 4:270-274
DOI 10. 5001/omj.2013.75

Quality of Life and Nutritional Status Among Cancer Patients on Chemotherapy

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Received: 27 Mar 2013 / Accepted: 29 May 2013
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Abstract

Objectives: Malnutrition is prevalent among cancer patients, and maybe correlated with altered quality of life. The objective of this study is to determine wether quality of life among cancer patients on chemotherapy at the National Kidney and Transplant Institute-Cancer Unit differs from patients with normal nutrition based on the Subjective Global Assessment scale.

Methods: A cross sectional study was conducted among cancer patients admitted for chemotherapy at the National Kidney and Transplant Institute-Cancer Unit from January to May 2011. Demographic profile, performance status by Eastern Cooperative Oncology Group performance scale, nutritional status assessment by Subjective Global Assessment, and quality of life assessment by the European Organization for Research and Treatment of Cancer QoL-30 core module were obtained. Descriptive statistics and ANOVA were performed for analysis of quality of life parameters and nutritional status.

Results: A total of 97 subjects were included in this study, 66 subjects (68.04%) were females and 31 (31.96%) were males. Mean age was 54.55 ± 11.14 years, while mean performance status by the Eastern Cooperative Oncology Group classification was 0.88 ± 0.83 with a range of 0-3. According to the Subjective Global Assessment, there were 58 patients with SGA A, classified to have adequate nutrition, and 39 patients (40.21%) were considered malnourished. Among these 39 patients, 32 were classified SGA-B (moderately malnourished) and 7 were classified SGA C (severely malnourished) mean global quality of life was 68.73 ± 19.05. Results from ANOVA test revealed that patients were statistically different across the Subjective Global Assessment groups according to global quality of life ($p<0.001$), physical ($p<0.001$), role ($p<0.001$), emotional ($p<0.001$), and cognitive functioning ($p<0.001$); fatigue ($p<0.001$), nausea and vomiting ($p<0.001$), pain ($p<0.001$), insomnia ($p<0.001$), and appetite loss ($p<0.001$).

Conclusion: Global quality of life and its parameters: physical state, role, emotional state, cognitive functioning, cancer fatigue, nausea and vomiting, pain, insomnia, and loss of appetite were statistically different across all Subjective Global Assessment groups. Moreover, there was no difference between financial difficulties, social functioning, constipation and diarrhea among the Subjective Global Assessment groups.

Keywords: Cancer nutrition; Quality of life; Subjective global assessment.

Introduction

Malnutrition among cancer patients is very common, with an estimated incidence of approximately 40 to 80%.[1,2] Local incidence of malnutrition is estimated to be around 47.7%.[3] Cancer patients undergo metabolic alterations, which render them to have protein energy malnutrition throughout all stages of the disease. Malnutrition globally impacts all cancer patient by increasing the risk of infection, delaying wound healing, increasing treatment toxicity, prolonging hospital stay and increasing health related costs. While it is already a proven fact that malnutrition is prevalent among cancer patients, its impact on the quality of life of patients has not been adequately studied, particularly in the local setting. This is a pilot study conducted to determine the relationship between nutritional status and quality of life among cancer patients at our institution. The results from this study will not only provide cancer patients' adequate information about the importance of adherence to aggressive nutritional intervention, but also enhance oncologists profeciency on achieving better comfort and improve the quality of life of their patients on chemotheraphy.

While malnutrition is already very prevalent among cancer patients, nutrition supportive intervention should always be part of the global oncology strategy.[4] Nutrition related symptoms, such as nausea, vomiting, anorexia, or gastro-intestinal symptoms such as diarrhea and constipation, negatively impact the patient's well being, thus reducing their quality of life. Wasting, muscle loss, combined with cachexia, induced by tumor metabolism through treatment related complications or both can cause malnutrition in cancer patients.[5] Nutrition plays an important role in maintaining better quality of life among cancer patients, and it is an instinct for every human being to value food intake in order to maintain social structure, self esteem and enjoyment.[6] In a study of 907 cancer patients Nourissat et al. showed that the mean global quality of life for patients with weight loss of 10% was 48.8, which is lower compared to 62.8 among patients without weight loss.[7]

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In contrast to the traditional biomedical indicators of treatment outcome like overall survival time and progression free survival, there is an increased interest in patient's physical, psychological and social health, all grouped under quality of life (QoL).[8,9] Quality of Life is patient's perspectives on their ability to live useful, meaningful, fulfilling lives even while burdened with disease.[10,11] Quality of life encompasses the patient's own view and perspective of their global health, physical, social, financial, psychosocial performances, as well as symptoms such as pain, fatigue, anorexia, nausea, sleep, sexual dysfunction and depression. In patients suffering from chronic illnesses, QoL can be affected more than physical impairment as Wafa Hamdi et al. demonstrated in Tunisian patients.[12] A study by Gotay et al. showed that Filipino cancer patients had lower QoL than other races,[13] although a later study showed that global score was comparable with the Caucasians and Japanese.[14] A local study by Ong et al. in a population of 39 untreated hepatocellular carcinoma patients showed European Organization for Research and Treatment of Cancer (EORTC) QoL score range of 51-61.[15]

The Subjective Global Assessment (SGA) created by Detsky et al. is a tool comprising of history observation focusing on weight loss, gastrointestinal symptoms like nausea and vomiting, and physical examination focusing on loss of subcutaneous fat tissues and muscle wasting. Its purpose then was to identify nutritionally-at risk patients prior to surgery.[16] Currently, the SGA is used as a general nutritional screening tool. In a study of two hundred sixty two patients with digestive diseases Wakahara et al. showed that the SGA is a simple tool and a reliable predictor of hospital stay.[17]

The EORTC Quality of Life Questionnaire QoL 30 version 3 is a valid and an extensively used tool for measuring quality of life in international clinical trials.[18] It is composed of one global quality of life scale, five functional scales, 3 symptom scales and 6 single item scales. It is available in 44 languages including both Filipino and English. A local validation of the EORTC QoL-30 core questionnaire was done by Zafranco et al.[19] Currently, it is being used as an assessment tool for patients undergoing clinical trials.

The objective of this study is to determine whether quality of life and its various dimensions among cancer patients receiving chemotherapy at the National Kidney and Transplant Institute-Cancer Unit (NKTI-CU) varies among patients with normal nutrition (SGA A), moderately malnourished patients(SGA B) and severely malnourished patients (SGA C).

Methods

This cross sectional study was conducted at the chemotherapy unit and wards of NKTI-CU from January to May 2011. This study was based on a 95% confidence level, with ±10 confidence interval. Using the 2009 census of 938 patients seen at the Medical Oncology section, and at 50% prevalence rate of malnutrition, we obtained a sample size of at least 88 subjects. (http://sampsize.sourceforge.net/iface/index.html).

Ninety seven (97) cancer patients seen consecutively at the chemotherapy unit and wards for chemotherapy were included in the study. Inclusion criteria were as follows: subjects should be more than 18 years old, no hospitalization in the month prior to the study (except for routine chemotherapy), no signs of infection, and be able to read and understand the questionnaire. All exclusion criteria included the presence of active illness and infection. Participants agreed to participate in the study and an informed consent was obtained from all patients. The research protocol was approved by the Section of Medical Oncology.

Nutritional status was assessed by means of the SGA, which was based on history and physical examination. History taking focused on weight loss in the preceding 6 months, gastrointestinal symptoms such as anorexia, vomiting, diarrhea and food intake, as well as functional capacity and co-morbidity. While physical examination focused on the loss of fat stores and signs of muscle wasting. Scoring was calssified as follows SGA A: normal or mild malnutrition, SGA B: moderate malnutrition and SGA C: severe malnutrition. Subjective Global Assessment was carried out by two medical oncology fellows who were adequately trained to conduct the SGA.

The EORT QoL version 3 was used to assess quality of life of the participants and was composed of 30 items, which entailed five functional scales (physical, role, emotional, cognitive, and social), three symptom scales (pain, fatigue, nausea and vomiting), six single item scales (dyspnea, insomnia, appetite loss, financial difficulties, diarrhea, and constipation) and one global quality of life scale. Each item was scored on a 4-point scale, with a score of 1 for "not at all" to a score of 4 "very much", except for the last 2 questions for the global QoL scale, which were scored on a 7-point scale ranging from 1 "very poor" to 7 "excellent". The EORTC QoL core module was completed by the patients. A Filipino or English version was given depending on the patients' preferences. EORTC questionnaire was conducted in accordance with the EORTC manual. EORTC QLQ-30 was administered anytime during the patient's admission. Scoring was applied according to the EORTC Manual, with a range from 0-100. For the global and the functional scales, a higher score indicated better global and physical functioning; and for the symptom scale, a higher score would indicated worse symptoms.

Anthropometric measures in weight, height, BMI were also obtained. Weight was obtained using a calibrated Ohaus weighing scale and height was taken using a stadiometer. Functional Status was scored by the Eastern Cooperative Oncology Group (ECOG) Performance Scale.

Statistical analysis was carried out using SAS software (version 9.0, SAS Institute, Cary, NC, USA). Categorical variables were expressed using descriptive statistics (frequency, percentages) and continuous variables were expressed as mean ± standard deviation. For analysis of variance F test was used to compare the variances among the different malnutrition (SGA) groups in terms of the quality of life parameters. A p value of <0.05 was considered significant.

Results

A total 97 subjects were included in this study, 66 (68.04%) were females and 31 (31.96%) were males. Mean age of the subjects

was 54.55 ± 11.14 years old. Mean BMI was 23.88 ± 4.09 kg/m^2. Mean performance status by the ECOG classification was 0.88 ± 0.83 with a range of 0-3. Among the cancer types, there were 37 patients (38.14%) with breast cancer, followed by colorectal cancer with 13 (13.40%) patients and then hematologic malignancies with 9 subjects (9.28%). Also 58 (59.79%) patients were allocated with SGA score of A. While 39 (40.21%) patients were allocated an SGA scores of B and C combined. Patients with SGA B and C were considered to be malnourished. (Table 1)

Table 1: Demographic, and Clinical Characteristics of Cancer Patients (N=97).

Variable	Mean ± SD
Age (years)	54.55 ± 11.14
Weight (kg)	60.64 ± 11.18
Height (m)	1.59 ± 0.08
BMI (kg/m^2)	23.88 ± 4.09
ECOG Score	0.88 ± 0.83
Cancer type: n (%)	
Hematologic	9(9.28%)
Gynecologic	7(7.22%)
Colorectal	13(13.40%)
Breast	37(38.14%)
Lung	15(15.46%)
Germ cell	1(1.03%)
Pancreatic	5(5.15%)
Prostate	1(1.03%)
Renal	1(1.03%)
Head & Neck	7(7.22%)
Urinary Bladder	1(1.03%)
Nutritional Status	
SGA A n(%)	58(59.79%)
SGA B n(%)	32(32.99%)
SGA C n(%)	7(7.22%)

Looking at the distribution of the SGA scores across the different diagnoses, the results indicated that patients with head and neck, pancreatic and gynecologic malignancies were more malnourished (SGA B and C). Out the 5 pancreatic cancer patients, 3 were malnourished and of the 7 patients with head and neck cancer, 6 were malnourished. (Table 2)

Table 3 shows the mean quality of life scores. Global quality of life was 68.73 ± 19.05. Among the functional scales, physical functioning exhibited the highest score at 76.01 ± 21.23, while social functioning had the lowest score at 57.90 ± 30.24. The symptom scores which comprised of, fatigue, pain, dyspnea, nausea and vomiting, constipation, appetite loss, insomnia and diarrhea had generally scored low, except for financial difficulties, which was scored very high at 73.20 ± 32.50.

The different parameters of quality of life across the different nutritional status classification (SGA A, B and C) are depicted in Table 4. Global score is different across the different SGA groups, from a score of 76.14 ± 15.49 among those who are well nourished (SGA A), to a score of 61.46 ± 16.77 to those who are moderately malnourished (SGA B) and a score of 40.47 ± 18.28 to those who are poorly nourished (SGA C), and this was significant (p<0.001). Using ANOVA, it was shown that patients were statistically different across SGA groups with regard to physical functioning (p<0.001), role functioning (p<0.001), emotional functioning (p<0.001), cognitive functioning (p<0.001), fatigue (p<0.001), nausea and vomiting (p<0.001), pain (p<0.001), insomnia (p<0.001), and appetite loss (p<0.001). No significant difference was noted with regards to social functioning, dyspnea, diarrhea, constipation and financial difficulties.

Table 2: Nutritional Status by Subjective Global Assessment and Cancer Type.

Diagnosis	SGA A normal nutrition	SGA B moderate malnutrition	SGA C severe malnutrition	Total
Breast	25	11	1	37
Colon	10	2	1	13
Germ cell	1	0	0	1
Gynecologic	2	4	1	7
Head and Neck	1	5	1	7
Hematologic	6	3	0	9
Lung	10	4	1	15
Pancreatic	2	1	2	5
Prostate	0	1	0	1
Renal	0	1	0	1
Urinary Bladder	1	0	0	1
Grand Total	58	32	7	97

Table 3: Quality of Life and Its Dimensions by European Organization for Research and Treatment of Cancer Quality of Life Core questionnaire version 3 (EORT QoL ver 3).

Variable	Mean ± SD
Global Health Status	68.73 ± 19.05
Physical Functioning	76.01 ± 21.23
Role Functioning	58.25 ± 30.63
Emotional Functioning	73.28 ± 23.88
Cognitive Functioning	76.00 ± 19.10
Social Functioning	57.90 ± 30.24
Fatigue	35.39 ± 23.97
Nausea and Vomiting	16.64 ± 23.55
Pain	32.30 ± 30.12
Dyspnea	16.83± 24.59
Insomnia	29.90 ± 34.19
Appetite Loss	32.64 ± 34.69
Constipation	20.96 ± 31.67
Diarrhea	8.93 ± 20.70
Financial difficulties	73.20 ± 32.50

Table 4: Patient's Quality of Life Score and dimensions by EORTC QoL ver 3 by Subjective Global Assessment: Analysis of Variance.

Variable	SGA A (n=58) mean ± SD	SGA B (n=32) mean ± SD	SGA C (n=7) mean ± SD	*p*-value
Global Score	76.14 ± 15.49	61.46 ± 16.77	40.47 ± 18.28	<0.001
Physical Functioning	83.33 ± 14.30	66.25 + 24.42	60.00 ± 29.31	<0.001
Role Functioning	66.67 ± 27.75	50.0 + 30.23	26.19 ± 26.97	<0.001
Emotional Functioning	80.74 ± 16.54	64.32 ± 28.02	52.38 ± 15.75	<0.001
Cognitive Functioning	83.33 ± 12.44	66.84 ± 22.78	57.14 ± 17.48	<0.001
Social Functioning	63.79 ± 29.31	48.44 ± 31.50	52.38 ± 22.32	0.060
Fatigue	26.24 ± 18.22	43.06 ± 22.71	76.19 ± 17.48	<0.001
Nausea and Vomiting	9.77 ± 17.67	19.79 ± 23.74	45.24 ± 39.24	<0.001
Pain	20.67 ± 23.84	45.31 ± 28.78	69.05 ± 32.53	<0.001
Dyspnea	12.64 ± 18.55	19.78 ± 30.36	38.10 ± 29.99	0.023
Insomnia	16.67 ± 22.73	48.96 ± 39.70	52.38 ± 37.80	<0.001
Appetite loss	20.11 ± 27.17	44.79 ± 35.53	80.95 ± 26.22	<0.001
Constipation	16.67 ± 27.40	28.12 ± 37.01	23.81 ± 37.10	0.254
Diarrhea	8.04 ± 19.05	8.33 ± 18.93	19.05 ± 37.80	0.410
Financial Difficulties	69.54 ± 33.79	78.12 ± 28.85	80.95 ± 37.80	0.397

Discussion

Through SGA, this study showed that 40.21% (39 patients) were malnourished; on the basis of obtaining SGA B and C classification. This observation is in conformity with previously published studies of prevalence of malnutrition which reported a 40-80% rate. The SGA not only reliably classifies nutritional status but also predicts survival. Gupta et al. showed that patients classified as SGA A had significantly better survival compared with patients classified as SGA B/C, independent of age and stage of cancer.[20] In another study, Gupta et al. showed there was statistical significance among median survival of patients classified as SGA A (12.8 months) compared with patients classified as SGA B (8 months) and SGA C (6 months) among colorectal cancer patients.[21]

In the current era of oncology, where ensuring patients' comfort, and determining whether they lead suitable and functional lives, cancer management has laid the same importance on the subject of quality of life as that of the conventional parameters of treatment response.

The interplay between cancer and cancer associated cachexia and pro-inflammatory cytokines and host metabolism often leads to both physical and biochemical nutritional deterioration which subsequently leads to poor quality of life.[22] Cytokines have been reported to influence the balance of orexigenic and anorexigenic circuits that predispose to cancer anorexia-cachexia syndrome.[23] Research shows that cancer anorexia-cachexia syndrome involves the interplay of mediators which includes hormones like leptin, neuropeptides (e.g., melanin-concentrating hormone, neuropeptide Y, and orexin) and cytokines (e.g., tumor necrosis factor alpha [TNF-α], interleukin [IL] 1, interleukin 6, and interferon γ),[24] and differentiation factor. IL-1, IL-6 and TNF-α all together decrease intake of food, increase gluconeogenesis, increase glucose oxidation, increase hepatic synthesis of fatty acids, increase synthesis of acute phase reactive proteins, decrease fatty acid uptake and increase resting energy expenditure. These same cytokines also affect metabolism by altering insulin, glucagon and corticosterone levels.[25] IL-6 and TNF-α were also believed to be associated with muscle wasting.

Our population's global quality of life score is fairly above average at 68.73 ± 19.05, which is slightly better than the EORTC reference value global score of 61.3 ± 24.2 for all cancer types, and of all stages.[26] Our study population encompassed all patients undergoing chemotherapy, regardless of whether it was taken an adjuvant, neoadjuvant or palliative treatment. Dehkordi et al. demonstrated in a study among cancer patients undergoing chemotherapy that QoL is better in patients with more chemotherapy cycles.[27] Looking at the global quality of life score across all the SGA groups, pateints with the SGA A classification had 35 more points compared to pateints under the SGA C category, this finding was statistically significant. In a retrospective study by Gupta, malnutrition was associated with a poorer quality of life and its other dimensions, as pateints with better nutritional status exhibited better level of functioning in a subset of colorectal patients.[28]

Other functional scales in our study were within the range of established reference values. This reflects that the study group had above average capacity in terms of physical, social, emotional and cognitive parameters. However, looking at the functional scales across the SGA groups, only the social functioning aspect was not statistically different.

The scores for the symptom and single item scales were almost all generally lower. The symptom with the highest score is fatigue. Cancer related fatigue is defined according to the National Cancer Comprehensive Network (NCCN) as a distressing, persistent, subjective sense of tiredness related to cancer and cancer treatment that interferes with usual functioning.[29] Cancer related fatigue is the most prevalent cancer symptom, which was reported by about 50-90% of cancer patients.[30] Pateints under the SGA C classification reported the worse cancer related fatigue with a score of 76.19, as

compared to a score of 26.24 among with SGA A patients. In the single item scale, financial difficulties registered a very high score of 73.20±32.50. This is not surprising as most of the medical expenses incurred during cancer chemotherapy are shouldered by the patients. The Philippines embarked on a goal since 1995 attempting to secure for universal health coverage among all her constituents, however, due to barriers like low and dispersed incomes, weak government healthcare services,[31] and rising inflation, this goal has not yet been realized. No statistically significant difference was observed between financial difficulties and SGA groups, the scores were high accross all the strata of nutritional status.

Conclusion

Global quality of life, physical, role, emotional, cognitive functioning, cancer fatigue, nausea and vomiting, pain, insomnia, and loss of appetite were statistically different across all SGA groups. There was no difference observed in terms of financial difficulties, social functioning, constipation and diarrhea between the SGA groups.

Acknowledgements

The authors reported no conflict of interest and no funding was received for this work.

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