

RESEARCH COMMUNICATION

Nutritional Assessment of Cancer Patients in Tehran, Iran

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Abstract

Background and objectives: Weight loss and malnutrition are common among cancer patients, these two factors greatly affecting survival and quality of life during treatment. Since cancer is becoming increasingly common in the world and in order to provide better treatment measures, it is important to identify and prevent side effects. The present study has been conducted in 2010 on a sample of cancer patients in the oncology center of Shahid Beheshti University of Medical Sciences to determine the prevalence rates of malnutrition and the factors affecting it. **Methods:** The PG-SGA standard questionnaire was administered to 416 cancer patients to evaluate their nutrition status and determine the frequency of each malnutrition stage. Correlations and ANOVA tests were used to analyze the relationship between factors and weight loss and how they might affect the development of malnutrition. **Results:** The prevalence of malnutrition among the patients was 53.1% out of which 29.1% had moderate and 24% had severe malnutrition. The most common factors inducing nutritional symptoms were depression and anorexia. Some 35% of the patients had over 5% weight loss in the last month. The average PG-SGA score was 10.1 with 49 being the highest. 46.1 percent of the patients scored over 9 (requiring critical nutrient intervention). Malnutrition has a high correlation with weight loss, activity limitations, nutritional symptoms, and cancer stage, but low correlation with treatment and pathologic type. **Conclusion:** Malnutrition has a high prevalence in Iranian cancer patients and has a close relationship with mortality, morbidity and treatment-related problems and also quality of life. Therefore, periodical assessment by PG-SGA to detect malnutrition in patients should be made so that appropriate nutritional interventions can be provided.

Keywords: Malnutrition - cancer - weight loss - scored patient generated subjective global assessment - Iran

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Introduction

Malnutrition is a common phenomenon among the patients with cancer. But it is often ignored in treatments and follow-up care (Leuenberger et al., 2010). With the growth of cancer cases, the management and care problems of these diseases are expected to be minimized; also, through diagnosis and early treatment, better quality of life is expected for the patients (Akbari, 2008).

Studies indicate that malnutrition and weight loss are prevalent among 20 to 80% of oncologic patients (Bauer et al., 2002; Kubrak & Jansen, 2007; Michele et al., 2010). Nutrition as an important factor in treatment affects patient's mortality and morbidity so that about 20% of these patients die of the symptoms caused by malnutrition (Leuenberger et al., 2010).

So clinical care can improve the prognosis, reduce the treatment of side effects, frequency and hospital stay, the treatment and care expenses and finally improve the patient's survival and quality of life (Bauer et al., 2002; Huhmann & Scuningham, 2005).

The treatment prognosis of the patients with cancer is directly related to the severity of weight loss. It is observed that 5% weight loss during 6 months increases

the incidence of treatment problems (Klein et al., 1997; Huhmann & Scuningham, 2005). Without proper screening, over half of the patients are not recognized as being at the risk of malnutrition or are not sent for treatment (Klein et al., 1997).

Therefore, it is necessary to use appropriate, standard and localized tools to gather detailed information about the patient nutritional status, identify the cases, estimate the prevalence rate, classify them and ultimately provide suitable treatment plans (Dewys et al 1980; Dervenis, 2003). Today, there is no common and suitable standard to evaluate the nutritional status of cancer patients in Iran. The real incidence for malnutrition and its effects on oncologic patients is still unidentified and no exact information is available about the prevalence and the risk factors of these problems. This is because most studies have always been retrospective and nonspecific and there has been no standard method for evaluating the nutritional status according to the patient's demographic and clinical conditions. To determine the mutual effect between nutrition and cancer and to recognize the appropriate assessment tools for screening and identify the patients at risk of malnutrition, a study was conducted in the nutrition section of the academic hospital internal

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department in Switzerland (2009) which examined several tools including PG-SGA, MNA and MST questionnaires in oncology settings.

In this study, the efficiency and accuracy of these tools for screening purpose, the ease of application on the part of the doctor and patient, the required time for filling the questionnaire as well as their reliability and validity were investigated. As a result, PG-SGA was recognized as the most efficient and specific tool for screening and evaluating cancer patients (Roulston & Dermott, 2009; Michele et al., 2010). In a study by Bauer (2002), PG-SGA is suggested for cancer patients and shows that the resulting score of this questionnaire is related to weight loss in the previous 6 months and hospitalization (Akbari, 2008). In a similar study on 71 patients using PG-SGA, the results demonstrated a sensitivity of 98% and a specificity of 82% (Bauer et al., 2002; Isenring et al., 2006; Witowich, 2008).

Isenring et al. (2003) also examined the PG-SGA scores on the basis of weight loss over the previous 6 months, BMI and quality of life percent and also the changes in QOL after 4 weeks of radiation therapy. The patient's prognosis was clearly different in well nourished patients (Isenring et al., 2003). Lochs H Dervenis (2003) conducted another study on the importance of nutrition and weight loss among different patients and the effect of nutritional interventions on their prognosis, remedy and life style. His study shows that elderly and cancer patients are at a higher risk of malnutrition and also take more advantage of these interventions (Dervenis, 2003).

In another study (Ottery FD, 1996) advanced cancer patients who have lost 8.1 kg have had a poor prognosis. In addition, oncologic patients who suffered from malnutrition during their illness were at risk for treatment problems, delayed treatment, frequent hospitalizations and poor quality of life (Ottery, 2000). In a similar study by Kubark, Catherine (2008) conducted in Alberta University on head and neck cancer patients, the best screening method among available questionnaires was PG-SGA.

Kubark assigned this questionnaire to 350 patients and found out that over 55% of them were at the risk for malnutrition, 30% needed severe nutritional intervention, 44% had more than two nutritional symptoms and 47% showed poorer physical performance and quality of life (Kubark, 2008). Also according to Persson's study (2002), Lees et al. (1999) and Khalid et al (2007), considering the fact that oral and dental problems and swallowing and digestive disorders (such as oral ulcers, Dysphasia and etc) in head and neck and gastrointestinal cancers are highly effective factors in generating malnutrition, it is necessary to examine the prevalence of malnutrition among outpatients and inpatients of other cancer to find out all the morbidity-affecting factors (Lees, 1999; Persson, 2002; Khalid et al, 2007).

In a study done in Queensland University of Australia in 2007 on 145 gynecological cancer patients who completed PG-SGA questionnaire, 80% were assigned well nourished and 20% to moderate malnutrition (Laky et al., 2007). No article or specific relevant study was found to be done in Iran or other under developed countries. Except for a few general studies on the importance of nutrition

and nutrient deficiency in some patients and the elderly, there is no approved information about the prevalence rate of malnutrition among Iranian cancer patients, the aim of this study is to determine the prevalence rate and different levels of malnutrition in cancer patients using PG-SGA questionnaire. Moreover, the importance of the factors affecting malnutrition and also the efficiency of this questionnaire is examined.

Materials and Methods

This study is a descriptive, cross-sectional study in which the standard questionnaire of PG-SGA (Ottery, FD 2001) (Ottery, 2000) has been used to evaluate nutritional status of the patient. This questionnaire evaluates variables such as weight losses, variations in food- in take, nutrition symptoms, physical activity status, and clinical examination and the resulting scores are used to classify the patients for treatments plans. The participants of this study were cancer patients of over 18 years old who had referred to oncology departments and were diagnosed as having malignancy.

They were receiving surgery, radiotherapy, chemotherapy or a combination of these or passing their last treatment stages and follow-up care. The participants necessarily watched their weight over the last month or the previous 6 months. Stratified sample design was applied after interviews and simultaneous clinical examinations by the doctor. The different oncologic patients were assigned to 6 categories according to Table 3. Depending on the total number of the samples, a number of patients were selected from each cancer group and noticing the average prevalence of 50% in malnutrition (Bauer et al., 2002; Kubrak & Jansen, 2007), sample size was calculated (N=384) and finally total number of 416 patients were brought under study.

The patient's weight over 1 or 6 previous months was recorded on the basis of their self-report or their profiles and their weight loss percentage was calculated. The results of interview and examination are scored based on the questionnaire. The patients were categorized into three groups: Group A, Well-nourished; Group B, Patients at risk of malnutrition or suspicious malnutrition patients; Group C, Severe malnutrition.

The scores from each part of the questionnaire were calculated using SPSS 16. The prevalence rate was calculated using descriptive statistics; the correlation among variables was calculated using ANOVA and Spearman correlations; and to assess the effect of independent variables on dependant variables and the probability of the effect of these variables on malnutrition Logistic Regression Multivariate tests were used.

One limitation of this study was that the patients were required to be aware of their weight over 1 or 6 months previous to their interview. Although they were more likely to suffer from malnutrition, in some cases the researcher had to discard some participants due to their poor social, economical and cultural status and their unawareness of their disease. Another limitation relates to the patient nutrition symptoms.

In some cases, symptoms like depression, dysphasia,

etc. could have meant differently from one patient to another. In the evaluation and clinical examination phase, in which the doctor determines the severity of fat or muscle loss or the existence of edema, the doctor's decision and skill can partly affect the scores. However, using a standard assessment tool, these factors which could affect the questionnaire design and the range of scores were controlled. So the final score or decision about the existence or severity of malnutrition and the intervention type was not influenced by the doctor's skill and decision. The criteria for excluding from the study was cancer recurrence, people who were not aware of their weight over 1 or 6 months before, people with consciousness or cognitive disorders, instability of clinical status, neurodegenerative disorders in movement like stroke, hemiplegia, Parkinsonism, myopathy, severe arthritis, cardio pulmonary limitations.

Results

In this study, 416 cancer patients (214 males & 208 females) in mean of age 53.4 ± 15.3 were assessed by PG-SGA score questionnaire. The most patients based on the site of cancer and demographic factors were in ratio between 10 to 20% and approximately 32% of them doing chemotherapy and radiotherapy, 18% had a surgery and 75.5% in 8 weeks after surely diagnosis of cancer.

In the analysis of the information about the patient's food-intake, 50.4% of patients had less food-intake relative to the previous 1 or 6 months. The most frequent nutrition symptoms causing food-intake reduction over a month were depression(38.8%), anorexia(37.8%), dry mouth(32.5%), nausea(25%) and pain(23.1%). Symptoms such as depression, pain or dysphasia which patients had stated as a result of their reduced food-intake

were confirmed by the physician when completing the questionnaire or based on the records in the patient profiles. After calculation of the additive scores of nutritional symptoms in each patient, the average score and the highest score were respectively 4.01 ± 4 and 20.

In this study, nutrition symptoms, weight loss percentage, reduced physical activity and the decrease of fat and muscle tissue are the factors which seemingly have a role in generating malnutrition in cancer patients and which would directly or indirectly increase the probability of malnutrition. The score from each of these factors were graded by software and categorized as normal, weak, moderate and severe. The frequency of different stages of these symptoms separated by cancer type has been showed in Table 1.

The average of the patient scores taken on the questionnaire was 10.11) SD=9.5(with the median score of 8. In the gradation of the patients according to the questionnaire 46.4% needed serious clinical treatment, 22.8% needed to consult with the nutritionist and only 21.2% were needless of any nutritional treatment. Examining patient's weight loss revealed that about 41 percent did not lose weight during the last 6 months and 44.4 percent had either lost over 5% during the previous month or over 10% during the previous 6 months.

In classification of this information based on cancer site, the most prevalent and sever cases of weight loss was observed in the gastroenterology group (Table 1). The least number of weight loss cases was observed in breast cancer patients, as expected. Moreover, weight gain has the highest rate in breast cancer patients.

To confirm the existence of a correlation among different parameters affecting the patient nutrition, Spearman correlation was used. The severity of nutrition symptoms had a significant relationship with reduction in

Table 1. Frequency of Variables Affecting Patient Nutrition in Cancer Groups (PG-SGA Score)

	GI*	Gu*	Breast	Lung	Hematopoetic	Others	Total
Number	89	86	63	38	49	89	414
Symptom grade**							
Severe symptoms	12 (13.5)	3 (3.5)	1 (1.6)	4 (10.5)	5 (10.2)	9 (10.1)	34 (8.2)
Moderate symptoms	32 (36)	16 (18.6)	4 (6.3)	13 (34.2)	15 (30.6)	19 (21.3)	99 (23.9)
Mild symptoms	32 (36)	39 (45.3)	36 (57.1)	14 (36.8)	18 (36.7)	29 (32.6)	168 (40.6)
No symptoms	13 (14.6)	28 (32.6)	29 (34.9)	7 (18.4)	11 (22.4)	32 (36.0)	113 (27.3)
Weight loss							
>10%	24 (27.0)	4 (4.7)	1 (1.6)	3 (7.9)	3 (6.1)	4 (4.5)	39 (9.4)
5-10%	19 (21.3)	13 (15.1)	6 (9.4)	7 (18.4)	11 (22.4)	14 (15.7)	70 (16.9)
3-5%	13 (14.6)	17 (19.8)	9 (14.1)	11 (28.9)	9 (18.4)	16 (18.0)	75 (18.1)
< 3%	33 (27.1)	52 (60.5)	48 (75)	17 (44.8)	26 (53)	55 (61.8)	231 (55.6)
Weight increased	11 (12.4)	11 (12.8)	17 (26.6)	2 (5.3)	7 (14.3)	19 (21.3)	67 (16.1)
Physical activity:							
Rarely out of bed	20 (22.5)	11 (12.8)	0 (0)	4 (10.5)	5 (10.2)	13 (14.6)	53 (12.8)
Less than half the day , in bed	7 (7.9)	7 (8.1)	2 (3.1)	8 (21.1)	10 (20.4)	16 (18.0)	50 (12.0)
Fairly normal activities	36 (40.4)	23 (26.7)	15 (23.4)	15 (39.5)	15 (30.6)	25 (28.1)	129 (31.1)
Normal no limitation	26 (29.2)	45 (52.3)	47 (73.4)	11 (28.9)	19 (38.8)	35 (39.3)	183 (44.1)
Physical Examination***							
Severe	19 (21.3)	8 (9.3)	2 (3.1)	6 (15.8)	6 (12.2)	4 (4.5)	45 (10.8)
Moderate	20 (22.5)	1 (1.2)	0 (0)	11 (28.9)	10 (20.4)	5 (5.6)	47 (11.3)
Mild	20 (29.3)	29 (33.7)	10 (15.6)	15 (39.5)	14 (28.6)	22 (24.7)	116 (28.0)
Normal	24 (27.0)	48 (55.8)	55 (81.2)	6 (15.8)	19 (38.8)	58 (65.2)	207 (49.9)

*GI, gastrointestinal; GU, genitourinary; **According to the questionnaire in nutrition symptom box: severe grade: >grade 6, Moderate symptoms: 3-6, Mild symptoms: up to 3; *** Based on the questionnaire in the clinical examination box: severe: >6, Moderate: 4-6, Mild: up to 3 points

Table 2. Frequency of the Severity of Malnutrition in Different Cancer Sites

Malnutrition	% Cancer					
	GI	Geni- tourinary	Breast	Lung	Hema- tology	Others
SGA -C	44.0	14.0	5.0	12.0	12.0	13.0
SGA- B	17.4	23.1	6.6	11.6	16.5	24.8
SGA -A	12.4	22.7	26.3	6.2	8.8	23.7

Table 3. Malnutrition Frequency during in Different Treatment Types

Type of treatment	Malnutrition, N ,%		Total
	Well nourished	Malnourished	
	SGA-A	SGA_B, C	
Surgery	27 (14.0%)	47 (21.5%)	74 (18.0%)
Chemotherapy	68 (35.2%)	67 (30.6%)	135 (32.8%)
Radiotherapy	61 (31.6%)	70 (32.0%)	131 (31.8%)
Chemo radiotherapy	13 (6.7%)	22 (10.0%)	35 (8.5%)
Follow up	24 (12.4%)	13 (5.9%)	37 (9.0%)
Total	193	219	412

food-intake ($r = 0.652$, $p < 0.00$).

Also the weight loss was significantly related to the grade of nutrition symptoms ($r = 0.577$, $p < 0.00$). Moreover a significant correlation between the nutrition symptoms and the reduction of physical activity ($r = 0.503$, $p < 0.00$). Considering the final score of the questionnaire as a dependent variable, the final PG-SGA score has a significant correlation with weight loss percentage ($r = 0.684$) clinical symptoms ($r = 0.754$), nutrition symptom ($r = 0.801$) and reduction in physical activity ($P = 0.00$). In this study, general evaluation of weight loss factors, nutritional symptoms, clinical examinations are used to determine the malnutrition stage. According to these results, 24% of the patients had severe malnutrition (SGA-C), 29.1% suffered from moderate malnutrition (SGA-B) and 46.9% did not have clinical malnutrition at the time of examination. Therefore, the prevalence of moderate to severe malnutrition in the patients under study was 53.1%. The frequency of this amount in different cancer sites is shown in Table 2.

The prevalence of SGA-C between two genders showed 54% for males and 46% for females with no significant difference. Malnutrition abundance in chemotherapy and radiotherapy is more frequent compared to other treatment methods (Table 3).

To examine the importance and priority of the effect of main variables such as weight loss, reduction of physical activities, nutritional symptoms and the final score of the questionnaire on malnutrition a regression analysis was used. The result of this analysis shows that the highest correlation coefficient for the dependent variable (malnutrition) is related to weight loss degree and the scores from clinical examination. $R^2 = 0.755$, $p = 0.00$, treatment and cancer site have less correlation with other factors.

Discussion

This is the first study in Iran to examine the prevalence rate of malnutrition among cancer patients and to classify

them in order to decide on different treatments and preventive intervention measures using the standard assessment tool. The present study makes use of PG-SGA (Bauer et al., 2002; Isenring et al, 2006) which is considered as the best standard questionnaire used in oncologic patient's nutritional status (Ferguson et al, 1999).

The results of the patient's assessment demonstrated that almost half (53%) of Iranian cancer patients experience malnutrition in some stages of their treatment and care period. This is similar to the studies of other countries which show the malnutrition prevalence between 30-80 percent (Bauer et al., 2002; Kubrak and Jansen, 2007). This similarity sheds light on the importance and necessity of paying attention to the patient's nutritional status since nutrition is proved to have a role in reducing the disease side effects and improving the treatment prognosis and the patient's quality of life (Ferguson et al, 1999; Mccallum and Polisena, 2000; Nitenberg and Raynard, 2000).

In this study, in addition to determining the general prevalence of malnutrition in cancer patients, its frequency was investigated among a number of serious cancers. Expectedly, the data analysis shows that malnutrition, especially in most serious forms, happens among gastrointestinal cancers and secondly among gynecologic cancers including kidney, prostate, uterine and ovarian cancers. However, in most cases weight loss in these patients is associated with cancer and the patients, families and even the medical team ignore their nutrition and nutritional symptoms. The most frequent symptoms preventing patients from having good nutrition, even among those under chemotherapy, are related to depression and anorexia. These problems are totally non-organic and can be prevented by psychological interventions. This is also true about other issues like nutritional symptoms, weight loss percentage, reduction of social activities and reduction of fat and muscle tissue which mostly happen in the aforementioned cancer sites.

Therefore, investigating the relevant factors and the severity of these symptoms would help in deciding about treatment type. The most weight loss and the lowest rate of malnutrition, regarding prevalence and severity, are seen in patients with breast cancer. In spite of being moderate complains in a higher frequency of occurrence in these patients (PG-SGA score less than 3), these factors have not led to higher prevalence of malnutrition and weight loss among them (Table 3) and it seems that investigation of nutritional interventions is crucial even in the case of weight gain.

Although malnutrition is assumed to be more prevalent in chemotherapy (because of its complications and side effects), the results show that different treatment methods do not have a significant effect on the prevalence of malnutrition. Also, weight loss and other nutritional symptoms should not be associated with their type of treatment (Table 5). An important point to be considered is the priority of effective variables which determine the priority of nutritional plans. The value of the scoring system and final evaluation of this questionnaire was used to find patients with malnutrition or suspicious cases. Over

96% of the patients who, based on PG-SGA triage, scored above 9 needed serious treatment and were clinically considered to have severe malnutrition and vice versa; over 44% of the patients who did not need any treatment (scores 0 or 1) and 18% who only needed instruction were placed in the well nourished group. With regard to these facts, this study can form a basis for other researches and can confirm the reliability and validity of this assessment tool for our patients. This is especially true when the evaluation is done in multiple sessions, for example before and after the treatment or with intervals of 3 to 6 months. Compared to similar studies, the prevalence of malnutrition and the mean of the patient final scores do not differ significantly (Bauer et al., 2002; Kubrak and Jansen, 2007). But the high median of the final scores, high frequency of cases with severe nutrition symptoms and reduced physical activities, and consequently the high number of patients who needed serious intervention and consult show that, in final evaluation, our patients have had poorer nutritional status.

Therefore, further studies can investigate the factors affecting more nutritional symptoms and the prevalence of depression and anorexia. Regarding the fact that in similar studies symptoms like swallowing problem or nausea has higher incidence. Considering the high occurrence of malnutrition in cancer patients, nutritional screening plans and prescribing supplements and educational intervention are very important and can improve the patient's survival, cause the shorter hospital stays, better social activities, help to prevent depression, and have a better quality of life. Hence, there are other factors about cancer patients like cancer location treatment type, swallowing ability, oral ulcers, dry mouth, dental problems, eating ability and etc that need to be attended by consultation and supportive clinics (Kubrak and Jansen, 2007; Nitenberg and Raynard, 2000).

Performing screening methods, together with prevention or early treatments of malnutrition which can be applied during oncologic treatment, can reduce the cancer patient's symptoms and treatment costs. The results of this study can be applied to localize and determine the suitable criteria for epidemiology of our country in an appropriate screening tool or to design specific studies on any cancer type or any other variables. It is recommended to use the results of this study and the basic information about the patient nutritional status to design suitable treatment and care packages for malnutrition in cancers which can be applied to all stages of prevention, treatment and follow-up care. These guidelines can be used in consultation and support centers to improve the patient's quality of life and to present an appropriate model to prevent and treat cancers in planning and policy making of the health system.

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