

## Nutritional Status Assessment and Its Correlation with Performance Status in Head & Neck Cancer Patients

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### Abstract

*Context:* Malnutrition among cancer patients is a frequent problem and has been observed in 40 and 80% patients. It is a more common problem in patients with head and neck cancer owing to the nutrition impact symptoms. Its incidence has been found between 30-50% in various studies. *Aims:* The purpose of this study was to assess the nutritional status using PG-SGA and its correlation with performance status in patients with Head & Neck cancer. *Material & Methods:* Fifty one patients of proven Head and Neck Cancer were assessed using scored Patient Generated Subjective Global Assessment (PG-SGA), SGA classes and functional status was scored using Karnofsky Performance Scale (KPS). *Results:* Mean age was 50.78 years. Site wise distribution was as: Oropharynx- 25% (13/51), Hypopharynx- 8.0% (4/51), Nasopharynx-2% (1/51), Larynx- 12% (6/51) and Oral cavity- 53% (27/51). Mean PG-SGA Score was 7.72. The prevalence of malnutrition was eighty one percent (41/51) patients as assessed by scored PG-SGA and SGA classes. Median KPS was 70. Eight one percent patients had compromised performance status as assessed by KPS. Scored PG-SGA, SGA and KPS were significantly correlated ( $r=-.934$ ,  $p<0.00001$  and  $r=-0.868$ ,  $p<0.00001$ ) respectively. *Conclusion:* Patients with Head & Neck Cancer have a high prevalence of malnutrition. Scored PG-SGA and SGA classes can be used to assess malnutrition and are significantly correlated with performance status assessed using KPS.

**Keywords:** Head and Neck Cancer; Malnutrition; PG-SGA; KPS.

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### Introduction

Cancer is a public health problem worldwide with an annual incidence of 14.1 million cases, annual mortality of 8.2 million and a prevalence of 32.6 million in 2012. In India the International Agency for Research on Cancer had estimated an incidence of 1 million cases, 6.83 lakh cancer deaths and overall prevalence of 1.8 million in India [1]. In Uttar Pradesh age standardized cancer mortality rate is 108.2/100,000 population [2]. By 2030, the global burden of new cancer cases is expected to grow to 21.4 million with cancer deaths increasing to 13.2 million. Among these, about 70% of deaths are estimated to occur in low and middle income countries [1,2].

Nutrition plays an important role in the treatment and progression of cancer. Majority of cancer patients experience weight loss as their disease progresses with or without treatment. Malnutrition among cancer patients is a frequent problem and has been observed in 40 and 80% patients [3]. It is a more common problem in patients with head and neck cancer owing to the nutrition impact symptoms and subsequently during treatment (radiotherapy alone or combined with chemotherapy or surgery) malnutrition may aggravate due to treatment toxicity and persistent mechanical difficulties. Its incidence has been found between 30-50% in various studies [4]. Malnourishment results in decreased physical activity, decline in quality of life, poor response to cancer treatment and prolonged duration of hospitalstay [5].

Several clinical trials have demonstrated that appropriate nutritional care can help to overcome

nutrition impact symptoms and help patients to maintain their weight and quality of life. Key aspects of the nutrition care process include identification of malnutrition, establishing the goals of treatment, determining the nutrition prescription and implementing the nutrition care. The aim of nutritional screening is to quickly identify patients who are malnourished or at risk of developing malnutrition [6].

Increased need to recognize malnutrition at earliest has led to development of subjective global assessment (SGA) and further adaptation to patient generated- subjective global assessment (PG-SGA) [7]. It is a noninvasive, easily reproducible & fairly accurate tool to identify malnutrition in cancer patients [8]. The scored PG-SGA has been accepted by the Oncology Nutrition Dietetic Practice Group of the American Dietetic Association as the standard for nutrition assessment for patients with cancer [4,6,8].

The Karnofsky Performance Status (KPS) score is an assessment tool for functional impairment. It can be used to compare effectiveness of different therapies and to assess the prognosis in individual patients. In most serious illnesses, the lower the KPS score, the worse the likelihood of survival [9].

Nutritional status is closely associated with performance status of the patient, which in turn can affect the quality of life, co-morbidity and treatment outcome in head and neck cancer patients [4,10].

#### *Aim*

The purpose of this study was to assess the nutritional status using PG-SGA and its correlation with performance status in patients with Head & Neck Cancer.

#### **Material & Methods**

Confirmed Head and Neck Cancer patients presenting to the OPD of Radiotherapy Department for consultation and treatment from April 2014 to November 2015, were included in this study. The institute mostly caters to the rural population with most patients presenting in the advanced stage of the disease. The study was approved by the Institutional Ethical Committee and informed written consent was obtained from each patient.

#### *Inclusion Criteria*

The inclusion criteria consisted of cytologically or biopsy proven head and neck cancer more than 18

years of age, irrespective of sexes, the treatment status or stage of the disease.

#### *Exclusion Criteria*

Those who did not agree to give the informed consent, altered state of consciousness, preceding non-oncological disease (e.g. diabetes mellitus, hypertension, chronic obstructive pulmonary disease, tuberculosis etc.) which could significantly affect nutritional status.

Anthropometric parameters like height (meter) and weight (kg) were recorded using standard techniques and equipment. Nutritional status was assessed using PG-SGA (including SGA class) worksheet [8]. Questionnaire was explained in local language to illiterate patients and responses were recorded accordingly. A score  $\geq 4$  indicates a need for active nutritional intervention and a score  $\geq 9$  indicates a critical need for nutrition intervention [8]. PG-SGA score obtained was further compared with SGA categories. Patients were classified as per SGA categories as well nourished (SGA A), moderately malnourished (SGA B) or severely malnourished (SGA C) [7].

The KPS score was obtained by professionals of the multidisciplinary team using a scoring system that classifies patients on a scale from zero to 100. Specifically, a score of 100 represents a good state of health, and zero represents death [9].

#### *Statistical Analysis*

The data obtained was compiled and analysed using Microsoft excel 2013. The observations were expressed in appropriate tabular and graphical forms. The tests of significance were applied using SPSS version 21. Quantitative data were analysed using means and standard deviations. Different variables were analysed using ANOVA. The correlations were made using Pearson's "r" test. P value  $\leq 0.05$  at 95% confidence interval was taken as significant.

#### **Results**

Table 1 shows the demographic profile of the patients. A total of 51 (male-45 and female 6) patients of Head and Neck Cancer were included in the study. Mean age was 50.78 years. Site wise distribution was as: Oropharynx- 25% (13/51), Hypopharynx- 8.0% (4/51), Nasopharynx- 2% (1/51), Larynx- 12% (6/51) and Oral cavity- 53% (27/51). Stage wise (I:II:III:IV)

distribution was 3:10:16:22 respectively with 3/4<sup>th</sup> patients presenting in advanced stage. Mean hemoglobin was 9.76 gm% and body weight was 55.46 kgs. Seventy five percent patients were reported having the significant nutritional impact symptoms like nausea, dysphagia, odynophagia, ulcers in oral cavity, etc. As shown in table-2, according to SGA classification 19% (10/51) patients were well-nourished (SGA-A) and prevalence of suspected moderate (SGA-B) & severe malnutrition (SGA-C) combined was 81% (41/51). Mean PG-SGA Score was 7.72, indicating that majority of patients have the need for active nutritional intervention at presentation. Scored PG-SGA identified 81% (41/51) of patients as having PG-SGA score  $\geq 4$  i.e. 65% (33/51) requiring

active or 16% (8/51) having need for critical nutritional intervention.

Table 3 shows mean KPS was 70.2 and median was 70. The performance status was good with no limitation of daily activities (KPS score  $\geq 80$ ) in 19% (10/51) and performance was compromised with significant limitations of daily activities (KPS score  $\leq 70$ ) in 81% (41/51). Fifty nine percent (30/51) patients had already received oncological treatment in the form of Chemotherapy (20/51), Radiotherapy (6/51) and Surgery (4/51) and represented patients with residual disease or progressive disease.

Table 3 shows PG-SGA and KPS score across SGA classes A, B & C were strongly correlated in the study

**Table 1:** Patient Characteristics

Variable	Mean $\pm$ SD
Age (yrs)	50.78 $\pm$ 12.05
M: F	8: 1
Rural/Urban Status (%)	63/37
Patient Habits (%)	
Smokers	40
Alcoholic	29
Gutkha chewer	21
SE status (%)	
Lower & lower middle	69
Nature of complaint (%)	
Nutritional impact symptoms	75
Cancer Site (%)	
Oral Cavity	24.5 (27)
Oropharynx	51 (13)
Hypopharynx	8.5 (4)
Nasopharynx	02 (1)
Larynx	13 (6)
Cancer Stage (%)	
Stage I	03
Stage II	10
Stage III	16
Stage IV	22
Hemoglobin (g/dl)	9.76 $\pm$ 1.96
Body weight (Kgs)	55.46 $\pm$ 4.42
Karnofsky Performance Status (%)	
Less than 70	19 (10)
70-80	77 (39)
90	4 (2)
Treatment received	
No treatment	41 (21)
Chemotherapy	39 (20)
Radiotherapy	12 (6)
Surgery	8 (4)

**Table 2:** Prevalence of malnutrition Using Scored PG-SGA and KPS

Tool used	Prevalence of malnutrition			Correlation and P value
	Nutritional status	Number of Patients	%	
SGA Class	No Malnutrition (A)	10	19	SGA & KPS r=-0.86 p value <0.00001
	Malnourished (B&C)	41	81	
PG-SGA Score	No Malnutrition (0-3)	10	19	PG-SGA & KPS r=-0.934,

				p value <0.00001
KPS score	Malnourished (≥4)	41	81	
	Good Performance ≥80	10	19	
	Compromised Activity ≤70	41	81	

**Table 3:** Nutritional Assessment Using Scored PG-SGA and KPS N=51

%	Mild Malnutrition SGA-A	Moderate Malnutrition SGA-B	Severe Malnutrition SGA-C	
SGA	19 (10)	65 (33)	16 (8)	Mode SGA-B
PG-SGA score	2.6±0.32	8.18±0.58	12.25±0.71	Mean score 7.72±0.58
	F value 434.62, P value <0.00001			
KPS score	82±4.21	69.4±2.42	58.75±3.53	Mean 70.2 Median 70
	F value 135.75, P <0.00001			

(F=434, p <0.00001 and F=155, p <0.00001, respectively). As shown in Table 2, PG-SGA score was strongly but negatively correlated with KPS (r=-0.934, p value <0.00001). SGA was also negatively correlated with KPS (r=-0.868, p value <0.00001).

### Discussion

Malnutrition has been recognized as a poor prognostic indicator for cancer treatment-related morbidity and mortality in general, and it is reported to affect 30-80% of all patients with cancer [3,4,12]. Hébuterne et al reported the prevalence of malnutrition in 49% of Head and Neck Cancer patients at presentation [13]. In our study, 81% patients were malnourished using SGA categorisation. The probable reason might be the nutrition impacts symptoms these patients experience and the already existing malnourishment due to socio-economic factors.

This shows that Indian Head and Neck Cancer patients tend to have high malnourishment. Similar results were reported by Carvalho et al, in which moderate and severe malnutrition (SGA-B&C) was observed in 76% of cancer patients [11]. In Oesophageal cancer patients SGA-B&C category malnutrition was shown in 50% of patients in a study from Vitenam [10]. Bhattacharjee et al reported a prevalence of 76% in Head and Neck Cancer patients of North-eastern India but he used other Prognostic Nutrition Index as the assessment tool [14]. Our results were similar with no major discrepancy.

Scored PG-SGA is a validated tool for nutritional assessment in cancer patients [8]. The mean PG-SGA-score was 7.72 indicating that most patients were in need for active nutritional intervention. Eighty one percent (41/51) patients had PG-SGA

score more than 4, implying active or critical nutritional intervention in these head and neck cancer patients. Eighty seven percent terminal cancer patients were reported with similar PG-SGA scored nutritional status in a study from Brazil [11]. Quyen et al reported a PG-SGA score of more than 4 in 95% of Oesophageal cancer patients [10].

Karnofsky performance status score of mean 70.2 was observed in our study, median was 70. Quyen et al has reported mean KPS score of 75 and median 80 in his study of oesophageal cancer patients [10].

PG-SGA and KPS score across SGA classes A, B & C was strongly correlated in our study (F=434, p <0.00001 and F=155, p <0.00001, respectively). PG-SGA score was strongly but negatively correlated with KPS (r=-0.934, p value <0.00001). SGA was also negatively correlated with KPS (r=-0.868, p value <0.00001). Quyen et al also showed that both the SGA and PG-SGA were negatively correlated with the KPS (r=-0.632 and r=-0.717, both p <0.001) [10]. There was a statistically significant inverse correlation between the PG-SGA and KPS scores (r=-0.432, P<0.001) in other study by Carvalho et al [11].

The observations in the present study are relevant in the sense that many studies have pointed out to poor survival in patients with SGA-C class, PG-SGA score more than 13 and KPS <50 [15,16]. Since these tools correlate and can complementarily suggests the prognosis and survival in Head and Neck Cancer Patients.

There are potential limitations to this study. The study was only an assessment study and no intervention was carried based on the nutritional triage from different parameter in this study. The effect of these parameters was not correlated with current energy intake and survival in these patients. Most patients had already received some oncological

treatment and had residual or progressive disease and would have more nutritional compromise [5,12,15,16]. These limitations open new horizon to formulate such studies with proper intervention for validating the role of PG-SGA and KPS in rural Indian Head and Neck Cancer patients in future.

### Conclusion

Patients with Head & Neck Cancer have a high incidence of malnourishment at presentation in Rural Indian setting. There is no universal or commonly shared method for identifying those who are malnourished among cancer patients, yet malnutrition is associated with decreased survival in these patients. PG-SGA, SGA classes and KPS are easily employable tools which can be used to assess malnutrition in Head and Neck Cancer patients. Treatment in such patients should be combined with adequate nutritional intervention in identified patients.

### Funding

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### Conflict of Interest

None

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