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Original Research Article

Patient-generated subjective global assessment (PG-SGA) as a nutrition assessment tool in patients with cancer

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ABSTRACT

Background: The consequences of malnutrition in Cancer patient, include an increased risk of complications, a lower quality of life, reduced survival and higher health-care costs. The Scored Patient-Generated Subjective Global Assessment (PG-SGA) is used internationally as the reference method for screening, monitoring and triaging for interventions in patients with cancer**.** The aim of this study was to evaluate the use of the scored PG-SGA as a nutrition assessment tool in hospital patients with cancer

Materials and Methods: A prospective 15 week study assessing the nutritional status and QoL(Quality of life) of ambulatory patients receiving chemotherapy, radiation therapy, medications/supplements therapy were analyzed and used to predict the magnitude of QoL in a private hospital in Bengaluru. The total sample number was around 50.Statistical Analyses were performed, using SPSS software.

Result: The result based on total PG-SGA Score, shows, 14% required no intervention, 32% required patient and family education, 24% required intervention by dietitian and doctor and 20% required critical care management. Overall, there was no significant difference in intervention required when classified according to BMI groups ($p > 0.05$).Surprisingly similar percentage of participants in both Group 1 and Group 2 required critical care management since most of them in both the groups were facing different eating problems.

Conclusion: This concludes that the PG-SGA showed high sensitivity and good specificity in predicting malnutrition among cancer patients but it can be improved further by taking up a larger sample of patients or increasing the number of sample size so that the data are made accurate.

1. Introduction

One of the prime concerns in Cancer patients is the PEM (Protein Energy Malnourishment), which may result in a remarkable reduction in the quality of life and poor prognosis. European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines strongly recommend to screen for risk of malnutrition in all cancer patients and further perform a nutritional assessment in patients at risk to identify those who are malnourished.[1] The high prevalence of malnourished cancer patients thus highlights the importance of a sensitive and specific tool for nutritional risk and status assessment screening, which is the PG SGA(Patient Generated Subjective Global Assessment.[2] The consequences of malnutrition may include an increased risk of complications, decreased response and tolerance to treatment, a lower quality of life, reduced survival and higher health-care costs.[3]

The PG-SGA is a nutritional assessment tool which could be used for, descriptive nutrition screening, to identify

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malnutrition risk with high sensitivity and specificity, identifying treatable impediments and guiding patients and professionals in triaging for interdisciplinary interventions, improve the quality of interaction between the clinician and the patient.[4,5] The scored PG-SGA identifies malnutrition in ambulatory oncology patients can be used to predict the magnitude of change in QoL (Quality of life) which may lead to improvements in nutritional status, quality of life, patient satisfaction and treatment outcome.[6,7]

PG-SGA Form, incorporates a numerical score as well as providing a global rating of well-nourished, moderately or suspected of being malnourished or severely malnourished.[8,9] The scored PG-SGA consists of two sections: a patient- completed medical component and a clinician portion. The four medical components (weight loss, nutrition impact symptoms, intake and functional capacity) are completed by the patient using a check box format.[10,11] The higher the score the greater the risk for malnutrition.[12,13] In an Oncology , PG-SGA will help to identify the most relevant information to identify malnutrition risk with high sensitivity and specificity.[14]

2. Materials and Methods

This observational study was conducted to evaluate the association between diet and lifestyle habits and improvement in health by PG SGA scoring.

2.1. Sample size

The total sample size was n = 50, Patients aged 6 years onwards participated in the study. Patients with Acquired immunodeficiency syndrome (AIDS) or transplanted organ(s) and patients who were admitted to the intensive care unit (ICU) and were in a critical condition at the beginning of recruitment were excluded from this study because these problems could affect the study purpose. Those who refused to participate or would not cooperate with the questionnaire survey were also excluded from the study because the questionnaire needs to be completed by them.

2.2. Selection of area

This study was conducted in the Bengaluru urban District of Karnataka state. Bangalore is Karnataka's capital city. Bengaluru urban district was chosen purposely because of rapid urbanization. It was performed in the oncology department of the Aster CMI Hospital, Hebbal, Bangalore urban district, for a period of 2 months, from 12th February to 30th April 2022.

2.3. Sample collection

After obtaining permission from Chief Dietician and Chief consultant, the PG SGA form template was used for the evaluation with an informed consent from the patient and their caretakers.

The Scored Patient-Generated Subjective Global Assessment sets the standard of and is the pre-eminent interdisciplinary patient assessment (weight, intake, symptoms, functional status, disease state, metabolic stress and nutritional physical examination) in oncology and other chronic catabolic conditions.[14,15] The first four boxes of the PG-SGA have been designed to be used by the patient independently.

The remaining portions of the PG-SGA are to be completed by the professional Subsequently, the Scored PG-SGA allows for triaging of specific nutrition interventions, as well as facilitating quantitative outcomes data collection.[16,17] The design validity was assessed using the advice of the chief dietician and statistician.

2.4. Data analysis

All data was entered into Microsoft Excel worksheet before being uploaded to SPSS. Data were analyzed using SPSS for Windows (Version 25, IBM Corporation, Armonk, New York, United State). Data presented as Mean± SD or Median (Minimum-maximum) frequency (%). Cross tabulations were computed according to gender and data was compared using chi-square test for categorical variables. The Independent Sample T test was used to analyze differences in age and anthropometric parameters when classified according to gender.[18,19] Mann Whitney U test was used to analyze difference in dietary habits and frequency of food intake when classified according to gender.[20,21]

Cross tabulations were computed according to BMI groups and compared using Chi-square test/ Fisher's exact test. $p<0.05$ was considered to be statistically significant. For purposes of analysis, patients were classified in 2 group categories:

Group 1: Underweight +Normal

Group 2: Overweight +Obese

3. Results

Having analyzed the data and obtained the results, it is appropriate to explain the results in the light of the objectives of the current research to understand the actions or attitudes of the patients and their caretakers about their knowledge and doubts associated with foods and activity to be included and understanding the nature of cancer. The study concepts are tested and interpreted, after which appropriate discussions are presented.

3.1. Gender distribution

Data presented as frequency (percentage)

Figure 1 gives the gender distribution of study participants. From the 50 participants, 24 were males and

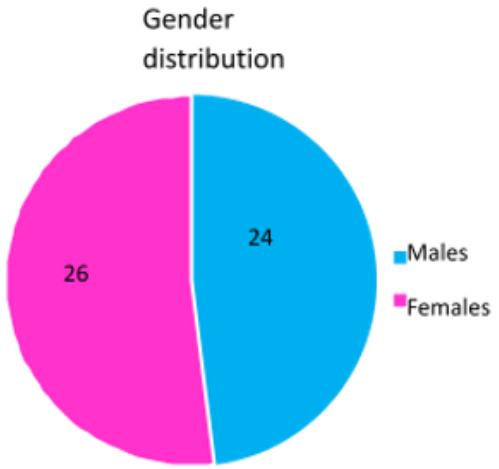

Figure 1: Gender distribution of study participant

26 were females, considering all age groups from 15 years to 90 years.

3.2. *Change in Weight over 6 months*

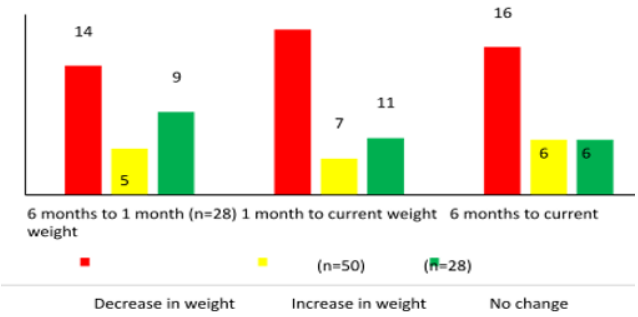

Figure 2: Change in weight over 6 month

Figure 2 From the 28 patients for whom data was available for weight status before 6 months, 57.2% had reduction in weight at current time point and 21.4% had increase in weight, few of them with oedema. Compared to weight 1 month ago, 60% showed reduction in weight over the last 1-month period and 18% showed an increase in weight over the last 1 month. While 22% did not have any change in weight over the last month.

3.3. *Nutritional status based on BMI*

Data presented as frequency (percentage).

Figure 3 represents nutritional status of study participants based on body mass index classification for Asians. From 50 participants, 12% were underweight, 30% were normal BMI, 28% were overweight and 30% were obese.

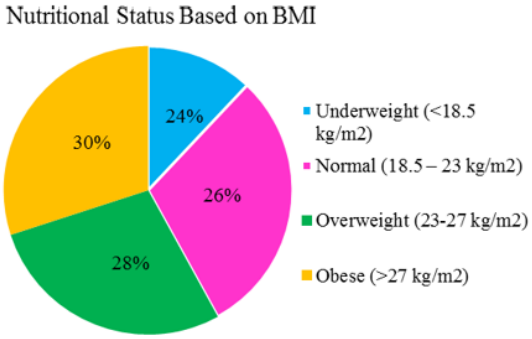

Figure 3: Nutritional status of participants based on BMI

3.4. *Stage of chemotherapy undergoing*

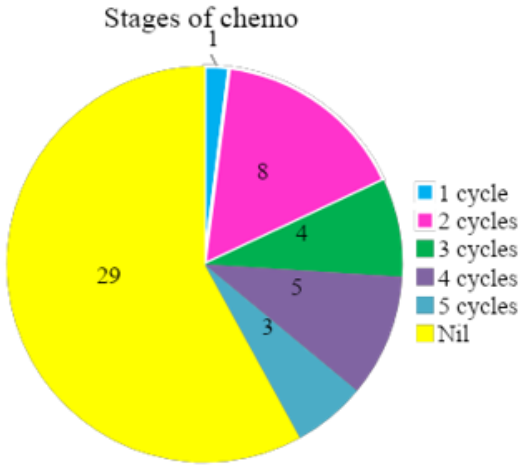

Figure 4: Stages of chemotherapy taken by the number of patients.

The patients were under different cycles of treatment. Treatment cycles might be in a week or might take 2, 3 or 4 weeks, depending on the drugs and particular treatment plan.[22] A treatment course often takes between 3 and 6 months but it can be more or less than that. During that time, would probably have between 4 and 8 cycles of treatment

3.5. *Comorbidities present apart from Cancer*

Figure 4 represents the presence of other co- morbidities that was seen in patients with different types of cancer. About 13% had hypertension while 16% were having diabetes of either type 1 or type 2. The drugs had to be taken life-long for hypothyroidism in 4% of the patients .The low energy level due to anemia was another incidence concern which contributed to 6% and so does asthmatics. But the good part was that as many as 7% of cancer patients did not have any other co- morbidity which increases their chances of recovery better.

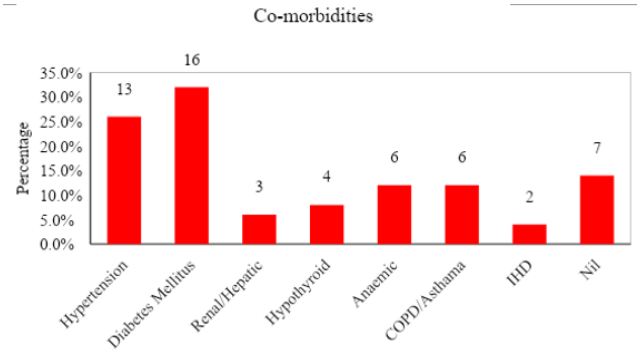

Figure 5: Comorbidities along with cancer

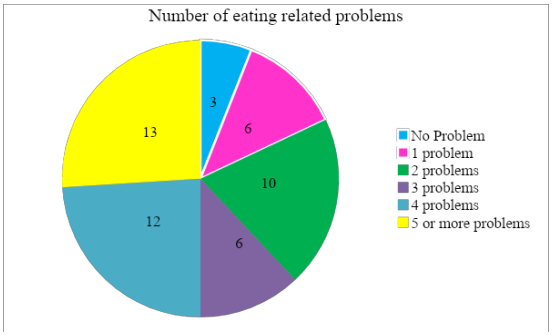

Figure 7: Total number of eating problems faced by study participants

3.6. Radiation therapy taken by the patients

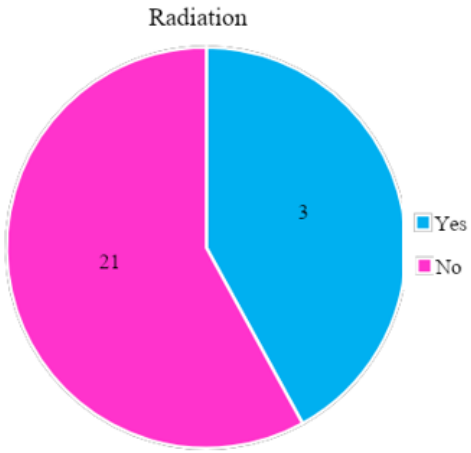

Figure 6: Radiation therapy

In Figure 6, the number of patients taking radiotherapy were only 3% and the rest 21% were not taking the radiotherapy as they were under either medication or chemotherapy or in maintenance phase.

4. Food intake as compared to normal

From 50 participants, 15 had no change in food intake, 5 had more than usual intake, 19 had less than usual intake, 6 consumed little solid food, 3 consumed only liquid and 2 consumed little of anything. There was no significant association of BMI groups and food intake, indicating that BMI status had no effect on food intake of participants ($p>0.0$)

4.1. Eating related problems

Data presented as Frequency (percentage)

Eating related problems faced by participants were assessed. From the 50 participants, only 3 (6%) reported no eating related problems, 6 (12%) participants had 1 problem, 10 (20%) had 2 problems, 6 (12%) had 3 problems, 12 (24%) had 4 problems and 13 (26%) had 5 or more problems).

1. Refers to fatigue /nausea.
2. Refers to, problem swallowing due to pain apart from fatigue and nausea.
3. Refers to, diarrhea and vomiting, including the problem of trouble swallowing
4. Refers to dry mouth and mouth sores apart from suffering with other 3 problems in above lines.
5. Refers to, feeling full too quickly or no appetite and all the four other problems which showed severe suffering.

4.2. Prevalence of various eating related problems

The most common problem related to eating was fatigue as reported by 38 participants followed by no appetite as reported by 20 participants. The least common problem related to eating was diarrhoea as reported by 1 participant. Significantly higher percentage of participants in Group 2 reported no appetite as compared to Group 1 ($p<0.05$), i.e. higher percentage of participants with higher BMI had no appetite as compared to participants with normal or low BMI. No other significant differences were observed in the prevalence of other eating related problems between the 2 BMI groups ($p>0.05$).

5. Limitations in activities and functions

Though there was no significant difference in the 2 BMI groups ($p>0.05$), higher percentage of Group 2 (i.e. overweight and obese) participants reported that they were not their normal self but able to be up and about with fairly normal activities as compared to Group 1 participants. On the other hand, higher percentage of participants in Group 1 reported not feeling up to most things, but in bed or chair less than day. This indicates that even though not significant, weight may have some small influence on activities and functions of participants.

Table 1: Food intake in study participants at present as compared to normal times

Food intake	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
Unchanged	7	333	8	27.6	15	30	0.640
More than usual	2	9.5	3	10.3	5	10	
Less than usual	7	33.3	12	41.4	19	38	
Little solid food	4	19	2	6.9	6	12	
Only liquid	1	4.8	2	6.9	3	6	
Little of anything	0	0	2	6.9	2	4	

Table 2: Prevalence of various eating related problems in participants

Prevalence of various eating related problems	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
Fatigue	16	76.2	22	75.9	38	76	0.979
No appetite	5	23.8	15	51.7	20	40	0.047
Feel full quickly	6	28.6	13	44.8	19	38	0.242
Dry mouth	10	47.6	9	31	19	38	0.233
Pain	7	33.3	11	37.9	18	36	0.774
Nausea	4	19	8	27.6	12	24	0.526
Things taste funny/have no taste	5	23.8	7	24.1	12	24	0.979
Problems swallowing	6	28.6	6	20.7	12	24	0.520
Mouth sores	6	28.6	4	13.8	10	20	0.286
Constipation	6	28.6	3	10.3	9	18	0.098
Bothered by smell	3	14.3	3	10.3	6	12	0.686
Vomiting	1	5	3	10.7	4	8	0.631
Diarrhea	0	0	1	3.4	1	2	0.999

Table 3: Activities and functions

Activities and functions	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
Normal with no limitation	8	38.1	9	31	17	34	0.549
Not my normal self, but able to be up and about with fairly normal activities	3	14.3	10	34.5	13	26	
Not feeling up to most things, but in bed or chair less than half the day	6	28.6	5	17.2	11	22	
Able to do little activity and spend most of the day in bed or chair	1	4.8	2	6.9	3	6	
Pretty much bedridden, rarely out of bed	3	14.3	3	10.3	6	12	

Table 4: Metabolic demand score

Metabolic Demand Score	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
None	10	47.6	17	58.6	27	54	0.297
Mild	8	38.1	9	31	17	34	
Moderate	1	4.8	3	10.3	4	8	
High	2	9.5	0	0	2	4	

Table 5: Stress levels in study participants

Stress levels	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
None	6	28.6	7	24.1	13	26	0.389
Low	13	61.9	18	62.1	31	62	
Moderate	0	0	3	10.3	3	6	
High	2	9.5	1	3.4	3	6	

Table 6: Muscle loss in participants

Muscle loss	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
Temple							
None	20	95.2	28	96.6	48	96	0.815
Mild	1	4.8	1	3.4	2	4	
Clavicle							
None	18	71.4	23	79.3	38	76	0.464
Mild	6	28.6	5	17.2	11	22	
Moderate	0	0	1	3.4	1	2	
Shoulder							
None	16	76.2	25	86.2	41	82	0.324
Mild	5	23.8	3	10.3	8	16	
Moderate	0	0	1	3.4	1	2	
Inter-osseous							
None	14	66.7	24	82.8	38	76	0.278
Mild	6	28.6	4	13.8	10	20	
Moderate	1	4.8	0	0	1	2	
Severe	0	0	1	3.4	1	2	
Scapula							
None	15	71.4	26	89.7	41	82	0.091
Mild	6	28.6	2	6.9	8	16	
Moderate	0	0	1	3.4	1	2	
Thigh							
None	17	81	25	86.2	42	84	0.481
Mild	4	19	3	10.3	7	14	
Moderate	0	0	1	3.4	1	2	

Table 7: Final triage based on PG SGA score

Triage based on PG SGA score	Group 1 (n=21)		Group 2 (n=29)		Total (n=50)		P value
	Freq.	%	Freq.	%	Freq.	%	
No intervention required	1	4.8	6	20.7	7	14	0.087
Patient and family education	5	23.8	11	37.9	16	32	
Intervention required by dietitian and doctor	11	52.4	6	20.7	17	24	
Critical need for management required	4	19	6	20.7	10	20	

5.1. When classified according to BMI groups, none of the participants.

Group 2 had high metabolic demand score. Higher percentage.

Group 2 participants had no metabolic demand score as compared.

Group 1 participants. However, these differences were not significant. (p>0.05).

5.2. Stress

Comparing both the groups of participants, there were very minimal to no s stress in 6 (28.6%) of them in group 1, whereas in group 2, participants with no stress were 7 (24.1%). The support of the family members and regular practice of staying active and doing some meditation relieves a lot of stress which most of them were following. The participants who had high stress in group 1 were 2 (9.5%) and in group 2 it was only 1 (3.4%). This shows the quality of life and treatment of cancer is associated with stress levels. Lower the stress levels, better is the prognosis and the body responds in a positive way.

5.3. Muscle loss in participants

Though higher percentage of participants in Group 1 showed muscle loss at clavicle, shoulder, inter-osseous, scapula and thigh as compared to participants in Group 2, this difference was not significant (p>0.05).

5.4. Final triage based on PG SGA score

Higher percentage of Group 2 participants either required no intervention or patient and family education as compared to participants in Group 1. On the other hand, a higher percentage of participants in Group 1 required intervention by dietitian or doctor as compared to Group 2. Overall, there

was no significant difference in intervention required when classified according to BMI groups p>0.05).

6. Conclusion

The future scope of studies in PG-SGA as a nutrition assessment tool can be improved further by taking up a larger sample of patients or increasing the number of sample size so that the data are made accurate .The intervention by the dietitians during the treatment can improve the quality of life and longevity, as food plays a very important role in recovery of body.

The number of participants for which the PG-SGA was done, were counseled along with the basic instructions for improving their quality of nutrient intake and to how to manage the symptoms. The queries to patients' questions were also answered alongside. They looked satisfied and less doubtful about food and lifestyle changes to be made, after the counseling and queries being resolved.

Due to advances in medical nutritional therapy, combination of treatments such parenteral nutrition support in addition to using oral nutritional supplements and eating some food, is more common. Such a treatment combination is difficult to express when answering about food intake in PG-SGA since the form is missing with such options.

Therefore, PG-SGA should be amended and elaborated accordingly so that the doubts and clarification is all covered under one go and the PG-SGA format is an effective tool which can be used in all malnourished patients. This will help in further improving the nutritional status, BMI and healthy weight gain and activity of the participants.

Statistically, no significant difference was observed in the total PG-SGA Score of Group 1 and Group 2 (p>0.05).Higher percentage of Group 2 participants either required no intervention or patient and family education as compared to participants in Group-1. Therefore further studies/research on more such kinds of patients is needed along with Doctors and family members guidance and support as well as dietitians intervention so that their quality of life, lifestyle management, health condition, and ambulation can be wonderfully managed. Patience, health condition, family members cooperation is what all is needed to improve with the studies further.

7. Source of Funding

None.

8. Conflict of Interest

None.

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