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Comparison of Efficacy and Feasibility of Global Leadership Initiative on Malnutrition (GLIM) Criteria and Subjective Global Assessment (SGA) To Evaluate the Nutritional Status of Patients at A Tertiary Hospital

Research Article

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Abstract

Background: Over one billion people suffer from malnutrition as a result of illness, financial hardship, starvation, conflict, and natural disasters. The gold standard for identifying malnutrition in hospitalized patients is Subjective Global Assessment (SGA) as it is a common occurrence. Nevertheless, the American Society of Parenteral and Enteral Nutrition (ASPEN) and the European Society for Clinical Nutrition and Metabolism (ESPEN) have proposed new assessment tools in the last few decades, such as the Global Leadership Initiative on Malnutrition (GLIM), but there hasn't been much research done on the accuracy of these tests.

Methodology: This observational study conducted at tertiary hospital which includes 100 subjects of age group (18-60 years) with or with-out comorbidities. The nutrition risk was diagnosed with a systemic nutritional risk screening (NRS) and nutritional assessment was done with SGA and GLIM criteria. While the GLIM recommends using DEXA (Dual X-ray absorptiometry, (BIA Bioelectrical Impedance Analysis), and CT (Computerized Tomography) scans to evaluate the decreased muscle mass, in the present study, TSF, MAMC, MUAC and hand grip were used as functional measures.

Results: Data obtained revealed that about 97% were moderately malnourished when screened with NRS tool. Further the assessment tools SGA and GLIM reported that 65% and 73% of the subjects were moderately malnourished whereas 5% and 27% subjects were severely malnourished.

Conclusion: This study concludes that the majority of the hospitalized patients were moderately malnourished. GLIM shows the fair sensitivity and accuracy in depicting the nutritional status of the patients than SGA and demonstrates that the practicality of GLIM was difficult.

Keywords: Glim; Sga; Nrs; Malnutrition

Introduction

Malnutrition is one of the most common clinical conditions in this population, with estimates of 20–60% of adult hospital patients having it [1]. The increased needs, excessive nutrient loss or a combination of both of these make the hospitalized patients vulnerable to malnutrition. Increased morbidity, mortality, re hospitalization rates, and health care costs are just a few of the serious negative effects of malnutrition that have an impact on patients and the health care system [3].

The fundamental components of nutritional management for hospitalized patients include nutritional status assessment, risk factor identification, and early nutritional interventions. Despite the importance of identifying malnutrition and developing effective prevention and treatment strategies, a worldwide agreement on the

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diagnosis of malnutrition remains elusive. The Global Leadership Initiative on Malnutrition (GLIM) has recently put forth new diagnostic criteria to establish global consensus on the fundamental factors of adult malnutrition diagnosis. These include two etiologic criteria, lower disease burden/inflammation and reduced food intake or assimilation and three phenotypic criteria, non-volitional weight loss, low body mass index, and reduced muscle mass. To diagnose malnutrition, at least one of the two etiologic and phenotypic criteria have to be met [4]. Several earlier research have assessed how well the GLIM criteria identify malnutrition in cohorts with particular disease [5].

Current study aims to compare the efficacy and feasibility of GLIM criteria and SGA to evaluate the nutritional status of patients.

Materials and Methods

Research design: Prospective observational study

Study Sample

This prospective observational study included 100 individuals from the Inpatient ward.

Study site

The current study is a single-centre, hospital-based investigation conducted from January 2023 to March 2023 in various departments of Yashoda Hospital, Secunderabad.

Inclusion criteria

The study includes male and female, aged >18 to 60 years who were hospitalized in various departments as inpatients. Every patient underwent a medical examination in accordance with the predetermined proforma. Patients were included in the study only after providing written, informed consent.

Exclusion criteria

The study excludes patients who do not meet the inclusion criteria. Age groups those under 18 and above 60 years as well as those from the outpatient clinic and who failed to provide the informed consent were excluded from the study.

The information was collected using a self-administered, semi-structured, and validated questionnaire which includes two parts such as socio demographic profile, assessment tools (NRS TOOL, GLIM, SGA). NRS Tool 2002 was used as a common tool for nutritional screening. GLIM includes, phenotypic criteria (weight loss, BMI, reduced muscle mass), Etiological criteria (Impaired food intake, inflammation (albumin and (C-reactive protein (CRP)). SGA includes (weight loss, functional capacity, BMI, edema/ascites, gastro symptoms and albumin). The various other anthropometric tools and instruments were used in data collection are height, weight, BMI, MUMC, MUAC (Mid-Upper Arm Circumference), Hand grip, TSF, calf circumference.

Statistical Analysis

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 21.0. Comparison of quantitative variables like frequency, percentage between the groups was done using the Pearson chi-square test where $p<0.05$ was considered statistically significant.

Results

(Figure 1) depicts that the results of the nutritional risk screening (NRS) showed that the majority of patients had a moderate risk and the few had a severe or mild risk. When 100 respondents underwent a nutritional assessment using the Subjective Global Assessment (SGA) tool, it was found that the majority of patients (>60) and less than 40% fell into the moderate and mild categories, while the few had severe grades.

In the current study, after assessing the level of disease severity using the GLIM criteria, it was found that over 70% of patients had moderate risk of illness and over 20% had severe risk. The analysis also showed that >70% and >25% were classified as moderate grade and severe grade, respectively, based on the GLIM criteria. Utilizing the recently developed GLIM criteria to evaluate the individual's nutritional status, the research showed that 85% of patients were at risk of malnutrition and less than 20% were not (Figure 2).

(Figure 3) demonstrates that out of 100 patients, 30 had lost nothing at all, 50% had lost moderate amounts of weight whereas less than 20

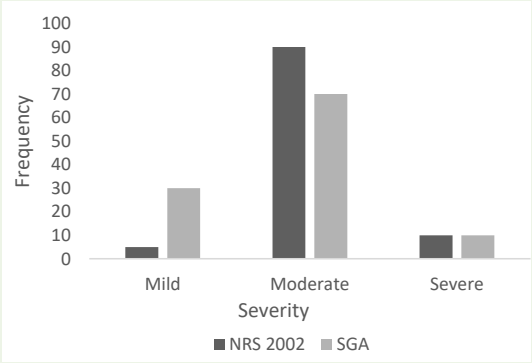

Figure 1: Nutritional assessment through NRS and SGA.

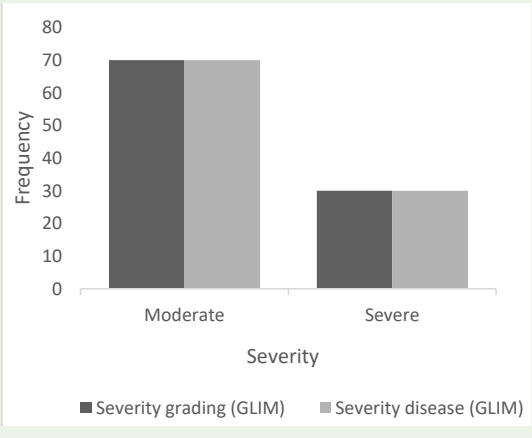

Figure 2: GLIM criteria to evaluate the level of disease severity.

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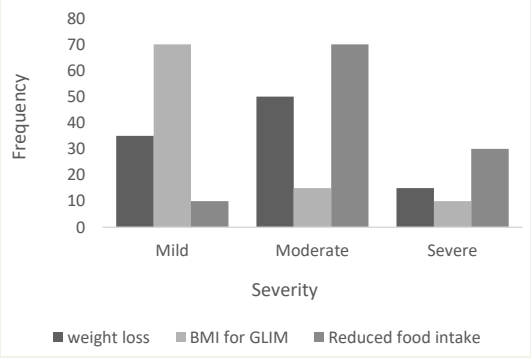

Figure 3: Assessment of nutritional status based on BMI.

percent had a significant amount of weight loss. Only the low BMI group (<18.5 kg/m^2) was included in the BMI calculation according to the GLIM assessment tool. The findings showed that, because the obesity variable is excluded from the GLIM criteria, less than 20 individuals were classified as moderately or severely underweight, and more than 75% were classified as well or overnourished. Based on patient memory, the oral food consumption data showed that most individuals (>60%) had moderate food intake (<50% of oral intake), while a minimum of (>20%) participants had very low food intake (<25% of oral intake). (Table 1) shows the prevalence of malnutrition diagnosed by GLIM and other criteria. After SGA diagnosis, 30 patients were malnourished slightly and a GLIM study disclaims that of these thirty patients, twenty-three were moderately malnourished and seven were severely malnourished. Results also show that on SGA diagnosis,65 patients were malnourished moderately and a GLIM study disclaims that of these 65 patients, 49 were moderately malnourished and 16 were severely malnourished. SGA and GLIM reports only 5, 4 patients were severely malnourished whose values were statistically significant (p= 0.023). Weight loss studies shows that 33 patients were nourished normally and GLIM shows moderately nourished. In both the studies 17 patients were severely malnourished indicating the values are statistically significant (p= 0.000). BMI study shows 77 patients were normal and GLIM reports that of these seventy-seven patients, 64 moderately malnourished and 13 were severely malnourished. Results also show that on BMI diagnosis,16 patients were malnourished moderately and GLIM depicts of these 50% were moderately malnourished and 50% were severely malnourished. BMI reports only 7 patients were severely malnourished whereas GLIM reports 6 patients were severely malnourished. These values are statistically significant (p = 0.000). Results shows maximum patients (87) were normal with hand grip, whereas with GLIM maximum (60) were moderately nourished. These values were statistically insignificant (p= 0.063). On comparison of severity of disease with GLIM study, severity shows 73% were nourished normally whereas 27% were severely malnourished. GLIM studies show that 80.8% were moderately nourished and 48.1% were severely malnourished which depict the values are statistically significant. (p= 0.004).

Studies with Arm and calf circumference shows that, 16 patients were found to be severely malnourished, Nonetheless, the GLIM study's findings indicate that 15 patients had moderate malnutrition and one patient had severe malnutrition (Table 2). These values are statistically significant (p= 0.041).

Table 1: Prevalence of malnutrition diagnosed by GLIM criteria and SGA criteria

Criteria	Severity grade	Severity grading of GLIM		Total
		Moderate	Severe	
Severity grading of SGA	Mild	23(76.7%)	7(23.3%)	30
	Moderate	49(75.4%)	16(24.6%)	65
	Severe	1(20.0%)	4(80%)	5
	Total	73(73.0%)	27(27.0%)	100
Weight loss	None	33(100%)	0(0%)	33
	Moderate	40(80%)	10(20%)	50
	Severe	0(0.0%)	17(100%)	17
	Total	73(73%)	27(27%)	100
BMI	None	64(83.1%)	13(16.9%)	77
	Moderate	8(50%)	8(50%)	16
	Severe	1(14.3%)	6(85.7%)	7
	Total	73(73%)	27(27%)	100
Hand grip	None	60(69%)	27(31%)	87
	Moderate	12(100%)	0(0%)	12
	Severe	1(100%)	0(0%)	1
	Total	73(73%)	27(27%)	100
Severity of disease	Moderate	59(80.8%)	14(19.2%)	
	Severe	14(51.9%)	13(48.1%)	
	Total	73(73%)	27(27%)	

Current study with Arm and calf circumference tool shows that, 84 patients have normal nutrition levels, whereas in the GLIM study, malnutrition was classified as moderate in 58 (69.0%) and severe in 26 (31.0%) patients, respectively.

Table 3 depicts that 60% of patients were with normal muscle circumference and less than 20 percent patients were with lowest muscle according to Mid-arm Muscle Circumference (MAMC) tool, whereas severity grading of GLIM shows that 60 patients were moderately malnourished and 13 patients were severely malnourished with low muscle. These values are statistically significant (p= 0.000).

Present results also shows that 86 patients were at the risk of malnutrition. Severity grading by GLIM study show that, malnutrition was classified as moderate in 59 (68.6%) and severe in 27 (31.4%) patients, respectively. Studies also show that 14 individuals have normal nutrition levels whereas GLIM study's findings indicate that 14 patients had moderate malnutrition and there is no patient with evere malnutrition (Table 4). These values are statistically significant (p=0.014).

Discussion

Finding out the patient's nutritional status in relation to SGA's

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Table 2: Prevalence of malnutrition diagnosed by GLIM and Arm and calf circumference

Anthropometric tools	Severity Grading	Number of participants	Severity grading of GLIM		Total
			Moderate	Severe	
ARM AND CALF CIRCUMFEENCE	NORMAL	Count	58	26	84
		% Within Arm and Calf Circumference	69.0%	31.0%	100%
	High	Count	15	1	16
		% Within Arm and Calf Circumference	93.8%	6.3%	100%
Total		Count	73	27	100
		% Within Arm and Calf Circumference	73.0%	27.0%	100%

Table 3: Prevalence of malnutrition diagnosed by GLIM and MAMC

Anthropometric tools	Severity grading	Number of participants	Severity grading of GLIM		Total
			Moderate	Severe	
MAMC ((Mid-arm Muscle Circumference)	100-90	Count	60	0	60
		% within MAMC	100.0%	0.0%	100.0%
	90-80	Count	9	2	11
		% within MAMC	81.8%	18.2%	100.0%
	80-70	Count	3	10	13
		% within MAMC	23.1%	76.9%	100.0%
	70-60	Count	1	2	3
		% within MAMC	33.3%	66.7%	100.0%
	60-50	Count	0	13	13
		% within MAMC	0.0%	100.0%	100.0%
Total		Count	73	27	100

Table 4: Risk of malnutrition Vs Severity grading by GLIM

Etiological criteria	Severity Status	Number of participants	Severity grading of GLIM		Total
			Moderate	Severe	
Risk of malnutrition	YES	Count	59	27	86
		% within .at risk of malnutrition	68.6%	31.4%	100.0%
	NO	Count	14	0	14
		% within at risk of malnutrition	100.0%	0.0%	100.0%
Total		Count	73	27	100
		% within at risk of malnutrition	73.0%	27.0%	100.0%

superior efficacy over GLIM was the study's main objective. The NRS was utilized as a nutritional screening tool in this study and SGA and GLIM were used as nutritional assessment tools. Loss of appetite, reduced intake of nutrients and altered lean body mass anabolism/catabolism play a key role in development of infections. Loss of appetite, reduced intake of nutrients and altered lean body mass anabolism/catabolism play a key role in development of infections [6]. Nutritional approach should be based on a careful and periodic assessment of nutritional status and on timely dietary counseling. When protein and energy intakes are reduced, nutritional supplementation by means of specific oral formulations administered would be the first-step intervention, and represents a valid nutritional approach in prevention and treatment of diseases since it is easy, effective and safe [7]

Systematic analysis of the data revealed that, based on the NRS 2002 tool, about 97% of the participants were moderately malnourished. Our study shows that nutritional status of the patients was determined as severely and moderately malnourished using the assessment tools SGA & GLIM. Malnutrition diagnosis of hospitalized patients presents satisfactory criterion validity and results show that patients were malnourished according to the SGA and GLIM criteria tools [8]. As a result, the study's findings indicate that the GLIM criteria were more accurate in determining malnutrition than the SGA, the accepted industry assessment instrument. Nutritional problems deserve more attention in hospitalized patients. Several studies have explored the relationship between disease prognosis and malnutrition based on the GLIM [9].

Even though the GLIM criteria have a high degree of accuracy, there are certain drawbacks in using it frequently. It includes only the low BMI category, which is being below 18.5 kg/m^2, and it excludes the overweight or obese variable, which makes it difficult to use GLIM to assess malnutrition in obese or obese sarcopenic patients [10]. Present study results with BMI criteria shows that maximum patients were normally nourished few were moderately malnourished and least were severely malnourished. Unintentional weight loss (UWL) may be used as initial screening for protein-energy malnutrition in the medical and surgery gastroenterology outpatient setting. The impact on clinical outcome and of early nutritional intervention in these settings need to be addressed [11].

Additionally, in order to determine the reduced muscle mass, the GLIM criteria recommend using DEXA (Dual X-ray absorptiometry) scans, BIA (Bioelectrical Impedance Analysis), and CT (Computerized Tomography) scans. However, because the majority of patients refused to undergo these tests, it was not economically feasible to do so. In the present study the subject's decreased muscle mass, anthropometric and functional measurement instruments including hand grip, MUAC, TSF, MAMC, and calf muscle circumference were used to access the nourishment levels which was significantly correlated with the GLIM severity of the grading.

As per the previous study, 37.8% and 32.8% of the GLIM and SGA diagnosed had been classified as malnourished which shows GLIM assesses malnutrition with a fair degree of accuracy when compared to SGA. The study also revealed that, in contrast to SGA, which allows for physical examination of the patient, GLIM required more time for patient assessment analysis, and also the manual evaluation of variables [12]. The data on decreased muscle mass was not feasible because of real-world obstacles or difficult when using BIA [13]. Malnutrition is a mostly modifiable condition with potentially deleterious consequences, if left untreated. Malnourished patients can be detected early and treated in a timely fashion through comprehensive nutritional care management. This contributes to improvements in the patient's clinical outcome [14].

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An interdisciplinary approach and nutritional therapies are effective in cost containment (improving quality of treatment, avoiding unnecessary interventions, and simplifying management), which is especially relevant for the modern healthcare policy [15].

Conclusion

The study finds that most hospitalized patients had moderate malnutrition, and that, when compared to SGA, the GLIM criteria demonstrated a fair level of sensitivity and accuracy in determining the patients' nutritional status among the two assessment instruments. Furthermore, the study concludes that GLIM tool feasibility was more difficult than SGA because of a number of real-world obstacles.

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