

# Assessment of Nutritional Status and Muscle Wasting in Elderly Patients with Chronic Digestive Disorders: A Multi-Tool Evaluation Approach

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**Abstract:** *With the rising aging population, maintaining optimal nutritional health in elderly individuals particularly those suffering from chronic digestive disorders has become increasingly vital. This study aimed to assess the nutritional status of elderly patients with chronic digestive diseases using a combination of tools, including the Subjective Global Assessment (SGA), calf circumference, Mid-Upper Arm Circumference (MUAC), and markers of muscle wasting. A comprehensive evaluation was performed to determine the prevalence of malnutrition and muscle degradation within this vulnerable population. Results indicated a high incidence of malnutrition and muscle wasting, with the SGA effectively categorizing patients based on their nutritional status. Additionally, calf circumference and MUAC measurements offered objective insights into muscle mass and nutritional reserves. These findings emphasize the importance of routine nutritional screenings in elderly individuals with chronic gastrointestinal conditions to identify those at risk and implement timely, individualized nutritional interventions. The study calls for further longitudinal research to assess the impact of such interventions and advocates for the integration of comprehensive nutritional evaluations into standard geriatric care to improve health outcomes and quality of life.*

**Keywords:** elderly, nutritional status, chronic digestive disorders, malnutrition, muscle wasting, Subjective Global Assessment (SGA), calf circumference, MUAC, geriatric nutrition, nutritional screening.

## 1. Introduction

Nutrition is a cornerstone of health, profoundly influencing physical, cognitive, and emotional well-being across all life stages. Adequate nutrition enhances immunity, supports maternal and child health, reduces the risk of non-communicable diseases, and promotes healthy aging and longevity. In the elderly, especially those with chronic health conditions, nutritional status plays a crucial role in maintaining independence, preventing disease, and improving quality of life.

As people age, physiological changes, co morbidities, and decreased appetite contribute to a higher risk of malnutrition, particularly in those with chronic digestive diseases. These conditions including inflammatory bowel disease, gastro esophageal reflux, and liver or pancreatic disorders can interfere with digestion, absorption, and nutrient utilization, leading to muscle wasting and nutritional deficiencies. Malnutrition in older adults is associated with increased morbidity, hospitalizations, and healthcare costs.

Global health agencies, including the WHO, recognize malnutrition as a major public health concern, with both under nutrition and over nutrition presenting significant challenges. In the elderly, under nutrition remains under diagnosed and undertreated despite its serious consequences. Understanding the unique nutritional needs of this population is essential for effective interventions. By using comprehensive assessment tools including the Subjective Global Assessment (SGA), calf circumference, and Mid-Upper Arm Circumference (MUAC) this study seeks to identify those at risk and support the implementation of

timely, personalized nutritional interventions to improve health outcomes and quality of life.

## 2. Methodology

The present study adopted a descriptive cross-sectional research design utilizing a quantitative approach to assess the nutritional status of elderly individuals diagnosed with chronic digestive diseases. Conducted in the Department of Gastroenterology at MMM Hospital, Chennai, the study included a total of 80 participants both male and female aged 65 years and above, selected through convenience sampling. Participants were classified into three age groups: 60–70 years, 70–80 years, and 80–85 years. Individuals with additional co morbidities, those below 65 years, or unwilling to participate were excluded from the study.

Data collection was carried out over a three-month period, with one month dedicated to primary data collection and the remaining time allocated for literature review and analysis. Ethical clearance was obtained from the Institutional Ethical Committee, and informed consent was secured from all participants in both English and vernacular languages.

Primary data was collected through face-to-face interviews using a structured, pre-designed questionnaire, which included sections on demographic profile, anthropometric measurements, lifestyle and medical history, dietary patterns, and food frequency. Additionally, a 3-day dietary recall was conducted to obtain a more accurate reflection of the participants' nutritional intake.

Anthropometric measurements such as height, weight, Body Mass Index (BMI), Mid-Upper Arm Circumference

(MUAC), and calf circumference were recorded. The Subjective Global Assessment (SGA) tool was employed to assess nutritional status, incorporating patient history, physical examination findings, and functional capacity evaluation.

Participants also received nutrition education through pamphlets focused on healthy eating practices tailored to their condition. Data collected was manually coded and analyzed using SPSS and Microsoft Excel. Descriptive statistics such as mean, median, standard deviation, and interquartile range were used to describe the demographic and clinical profiles. Inferential statistical tools, including the Chi-square test, Mann-Whitney U test, and Spearman's rank correlation, were applied to examine associations between variables.

This methodological framework enabled a comprehensive and multifaceted evaluation of the nutritional status among elderly individuals with chronic digestive diseases, addressing both subjective and objective indicators and providing a foundation for targeted nutritional interventions.

### 3. Results and Discussion

**Table 1:** Distribution of BMI

Groups	BMI interpretation	Frequency	Percentage
Pancreatic disease	Underweight	21	87.5
	Normal weight	2	8.3
	Obese	1	4.2
Hepatic disease	Underweight	20	87.0
	Normal weight	2	8.7
	Obese	1	4.3
Gastrointestinal disease	Underweight	24	72.7
	Normal weight	1	3.0
	Overweight	1	3.0
	Obese	7	21.2

The table 1 presents the distribution of Body Mass Index (BMI) among patients with pancreatic, hepatic, and gastrointestinal diseases. In both pancreatic and hepatic disease groups, a vast majority of patients are underweight 87.5% and 87.0% respectively indicating a high prevalence of malnutrition likely due to chronic inflammation, malabsorption, or metabolic disturbances associated with these conditions. Only a small proportion in each of these groups fall into the normal weight category (8.3% in pancreatic and 8.7% in hepatic disease), and even fewer are classified as obese (4.2% and 4.3% respectively), suggesting that weight gain or maintenance is significantly impaired in these patients.

In contrast, the gastrointestinal disease group shows slightly more variation in BMI. While 72.7% of patients are underweight a figure still considerably high—there is a notable presence of obesity at 21.2%, which is significantly higher than in the other two groups. This indicates that gastrointestinal conditions may present with a broader range of nutritional statuses, possibly due to differences in disease type, severity, and associated lifestyle factors. A very small percentage in this group are of normal weight (3.0%) or overweight (3.0%).

Overall, the data highlights the need for focused nutritional assessment and intervention in all three disease groups, with particular emphasis on addressing undernutrition in pancreatic and hepatic disease, and managing both underweight and obesity in gastrointestinal disease patients.

**Table 2:** Distribution of Calf & Mid Arm Circumference

Groups	Calf Circumference in cms	Frequency	Percentage
Pancreatic disease	Low (<31)	21	87.5
	Normal (>31)	3	12.5
Hepatic disease	Low (<31)	19	82.6
	Normal (>31)	4	17.4
Gastrointestinal disease	Low (<31)	24	72.7
	Normal (>31)	9	27.3
Groups	MUAC	Frequency	Percentage
Pancreatic disease	Low (<21)	15	62.5
	Normal (21-22)	9	37.5
Hepatic disease	Low (<21)	8	34.8
	Normal (21-22)	15	65.2
Gastrointestinal disease	Low (<21)	27	81.8
	Normal (21-22)	6	18.2

The tables 2 provide an overview of nutritional status based on calf circumference and mid-upper arm circumference (MUAC) measurements among patients with pancreatic, hepatic, and gastrointestinal diseases. Calf circumference, an indicator of muscle mass, shows that a large proportion of patients in all three groups have values below 31 cm, indicating muscle wasting. Specifically, 87.5% of patients with pancreatic disease and 82.6% with hepatic disease have low calf circumference, reflecting significant muscle depletion, likely due to malabsorption and chronic inflammation associated with these conditions. In the gastrointestinal disease group, 72.7% have low calf circumference, suggesting that while undernutrition is prevalent, a slightly higher percentage retain normal muscle mass (27.3%) compared to the other groups.

The MUAC measurements further support the presence of undernutrition. In the pancreatic disease group, 62.5% of patients have a MUAC below 21 cm, suggesting a high level of muscle and fat depletion, with only 37.5% falling within the normal range. Interestingly, hepatic disease patients show a comparatively better profile, with only 34.8% having low MUAC and 65.2% maintaining normal values, despite their poor calf circumference results. In contrast, the gastrointestinal disease group exhibits the highest level of MUAC-related malnutrition, with 81.8% of patients showing low values, indicating severe undernutrition and reduced muscle mass.

Overall, the findings highlight that undernutrition and muscle wasting are common among patients with chronic digestive diseases, especially those with pancreatic and gastrointestinal conditions. While hepatic disease patients show slightly better MUAC measurements, their calf circumference still indicates significant muscle loss. These indicators underscore the urgent need for regular nutritional assessment and early intervention to prevent further deterioration in the health status of these patients.

#### Association of SGA Nutritional Status with Anthropometric Variables

Table 3

Variables		SGA Nutritional Status			P value
Groups		Moderately Malnourished	Severely Malnourished	Well Nourished	
	Calf Circumference				
Pancreatic disease	Low	0(0)	21(100)	0(0)	<0.001*
	Normal	1(33.3)	0(0)	2(66.7)	
Hepaticdisease	Low	0(0)	19(100)	0(0)	<0.001*
	Normal	2(50)	0(0)	2(50)	
Gastrointestinal disease	Low	0(0)	24(100)	0(0)	<0.001*
	Normal	7(77.8)	0(0)	2(22.2)	
	Muscle Wasting				
Pancreatic disease	No	1(33.3)	0(0)	2(66.7)	<0.001*
	Yes	0(0)	21(100)	0(0)	
Hepaticdisease	No	2(50)	0(0)	2(50)	<0.001*
	Yes	0(0)	19(100)	0(0)	
Gastrointestinal disease	No	7(77.8)	0(0)	2(22.2)	<0.001*
	Yes	0(0)	24(100)	0(0)	
	BMI interpretation				
Pancreatic disease	Underweight	0(0)	21(100)	0(0)	<0.001*
	Normal weight	0(0)	0(0)	2(100)	
	Obese	1(100)	0(0)	0(0)	
Hepatic disease	Underweight	1(5)	19(95)	0(0)	<0.001*
	Normal weight	0(0)	0(0)	2(100)	
	Obese	1(100)	0(0)	0(0)	
Gastrointestinal disease	Underweight	0(0)	24(100)	0(0)	<0.001*
	Normal weight	0(0)	0(0)	1(100)	
	Overweight	1(100)	0(0)	0(0)	
	Obese	6(85.7)	0(0)	1(14.3)	

Table 3 presents a statistical analysis exploring the association between various clinical and anthropometric variables and the Subjective Global Assessment (SGA) of nutritional status among patients with pancreatic, hepatic, and gastrointestinal diseases. The variables assessed included gender, disease type, calf circumference, muscle wasting, and BMI interpretation.

The analysis revealed no statistically significant association between gender and nutritional status across any of the disease categories. The p-values for pancreatic ( $p = 0.234$ ), hepatic ( $p = 0.887$ ), and gastrointestinal diseases ( $p = 0.562$ ) indicate that gender did not significantly influence the SGA-based nutritional classification in these patient groups.

In contrast, calf circumference showed a strong and statistically significant association with nutritional status across all disease types. For patients with pancreatic, hepatic, and gastrointestinal diseases, a low calf circumference was consistently associated with severe malnutrition ( $p < 0.001$  for all three groups). This finding highlights the reliability of calf circumference as a practical and effective marker for detecting muscle depletion and assessing nutritional risk.

Muscle wasting also demonstrated a significant association with nutritional status in all three disease groups ( $p < 0.001$ ), suggesting that patients exhibiting signs of muscle loss were more likely to be classified as severely malnourished. This supports the understanding that muscle mass deterioration is a critical component of malnutrition in chronic disease conditions.

Similarly, BMI interpretation was significantly related to nutritional status, particularly in pancreatic disease, where a majority of underweight individuals were identified as severely malnourished ( $p < 0.001$ ). Significant associations were also found for hepatic and gastrointestinal disease groups (both  $p < 0.001$ ). Notably, in gastrointestinal conditions, obese individuals were more often categorized as well-nourished, indicating a potential protective effect of higher body mass in this context.

These findings align with previous research emphasizing the role of anthropometric indicators in nutritional assessment. Norman et al. (2008) highlighted that low BMI and muscle wasting are critical factors linked to malnutrition and poorer clinical outcomes in patients with chronic illness. Likewise, Guenter et al. (2022) stressed the value of calf circumference as a simple, yet effective, measure of muscle mass and nutritional status, especially in clinical settings lacking access to advanced diagnostic tools.

In summary, the current analysis reinforces the significance of anthropometric assessments—particularly calf circumference, muscle wasting, and BMI as reliable predictors of malnutrition severity. Their strong associations with SGA nutritional status underscore the importance of incorporating these simple, cost-effective measures into routine clinical evaluation to identify patients at risk and implement timely nutritional interventions.

#### 4. Conclusion

This study highlights the high prevalence of malnutrition and muscle wasting among elderly individuals with chronic digestive disorders, emphasizing the need for proactive

nutritional assessment and intervention. The strong associations between SGA nutritional status and indicators such as BMI, calf circumference, and muscle wasting confirm the clinical utility of these measures in identifying patients at risk of malnutrition. While gender did not influence nutritional status significantly, disease type and related anthropometric findings played a pivotal role. The findings support the integration of simple, cost-effective tools like MUAC and calf circumference into routine geriatric care for timely nutritional screening and intervention. Ultimately, a multidimensional approach combining clinical judgment with objective measures can improve health outcomes, functional capacity, and quality of life in this vulnerable population. Further longitudinal research is warranted to evaluate the long-term benefits of targeted nutritional interventions in this group.

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### Disclosure of conflict of interest

No conflict of interest was declared by the authors.

### Statement of ethical approval

Compliance with ethical standards. Disclosure of conflict of interest No conflict of interest to be disclosed. Statement of informed consent Informed consent was obtained from all individual participants included in the study.

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