Healthcare Demographics, Prevalence, and Pharmacoeconomics of Hospital Malnutrition in the Oncology Setting: Indian Perspective

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Energy inefficiency and cachexia are a hallmark of cancer.[1] As a result, malnutrition is the most common comorbidity found in cancer patients.[2,3] Malnutrition is also the most common comorbid condition found among patients in hospitals, as well as in the communities where they dwell. Malnutrition depresses the immune system, delays wound healing, and promotes muscle wasting.[4] These pathophysiological changes result in increased infections, morbidity, and mortality.

From an economic viewpoint, these changes ultimately result in increased duration of hospitalization, resource utilization, and healthcare costs, as well as increased out-of-pocket expenditures.[5,6] In recent years, reasonable evidence has emerged showing that the severity of malnutrition is an important biomarker for predicting response to treatment and prognosticating the long-term survival of cancer patients.

The prevalence of malnutrition among hospitalized patients is known to vary widely between 20% and 80%, depending on the criteria used and the nature of the healthcare setting (eg, intensive care unit). India has few Indian studies on the prevalence of malnutrition in cancer patients. Clinical audits have shown that more than 80% of cancer patients with aerodigestive tract cancer have moderate to severe malnutrition.[7]

The clinical and economic impact of malnutrition is highlighted in all of the guidelines proposed by various governmental agencies, medical societies, and accreditation agencies.[8-10] In spite of all of the scientific evidence, malnutrition still is neglected and remains a major problem in communities and hospitals in all parts of the world. Sometimes, malnutrition precedes the onset of a disease (eg, esophageal cancer) or it develops along with the progression of the disease (eg, cancer of the pancreas). Such situations are generally beyond the purview of prevention and clinical interventions. What is distressing is the fact that a large

percentage of clinical malnutrition is iatrogenic, because it begins or worsens to severe grades after patients have started making their hospital visits.

To make nutrition support cost-effective, it is necessary to obtain a clear and substantial improvement to the clinical outcomes of patients with malnutrition.[11] This is only possible to achieve if clinicians begin to identify and overcome the current problems associated with nutrition support. Although the relation between malnutrition and adverse outcomes is clear, the effects of intensive nutrition support in malnourished patients are not as clear.

Several nutrition intervention studies and their meta-analyses have demonstrated improvement of soft outcomes, such as infection rates and hospital days.[11-14] Routine intensive nutrition support has not lowered treatment-related mortality or improved disease-free survival. Therefore, nutrition support is essentially an adjunct treatment that helps malnourished cancer patients complete their treatment on time. The provision of appropriate nutrition support is widely recommended as a cost-effective means to shorten hospital stays and reduce healthcare costs. Nutrition screening upon hospital admission has become mandatory in many developed countries, as well as in accredited hospitals. Nutrition screening is rarely carried out routinely in Indian hospitals.

The benefits of nutrition screening and intervention have come in small increments. The results of most all randomized clinical trials that use intensive or expensive nutrition support during the treatment of cancer are not spectacular in terms of reducing overall mortality. Furthermore, the end results of nutrition support have varied considerably among different treatment settings. Better results were seen in patients undergoing surgery for upper digestive cancer.[15]

On the contrary, the use of routine nutrition support by total parenteral nutrition during cytotoxic chemotherapy resulted in net harm. The problem with clinical nutrition therapy of yesteryear is that it was driven by simplistic attitudes such as “one size fits all” and “if little is good, lots must be better.” Failure of nutrition support (general and parenteral nutrition) to provide clear and substantial improvement in the clinical outcomes of cancer patients and thereby provide value for money is attributed to three factors—correct diagnosis of malnutrition, correct route of feeding, and correct amounts of feeding.

Identifying individuals at risk of malnutrition and grading the severity of malnutrition are the most fundamental steps toward appropriate nutrition therapies. It is surprising that in spite of having many validated tools for nutritional risk screening

and nutrition assessment, most clinicians are unable to assess or accurately identify patients who need referral and treatment for malnutrition (Table).

Table. Important Promoters of Malnutrition

Medical team not bothered or ignorant about nutrition therapies
Age-related sarcopenia
Pre-existing chronic energy deficiency: • Poverty • Food fads • Ignorance
Reduced food intake: • Anorexia • Disease related • Starving for tests • Starving during treatment • Nonavailability of appropriate foods or supplements • Apathy and depression • Disordered swallowing due to various reasons
Increased metabolic needs: • Systemic inflammatory response • Sepsis and infection • Treatment related
Treatment related: • Not monitoring food intake • Prolonged starvation • Hypocaloric intravenous fluids • Drug therapy

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Malnutrition has many faces. For example, a newly diagnosed impoverished Indian man with a cancer of buccal mucosa and a body mass index (BMI) of 18.0 kg/m^2, with no change in food intake and body weight, is classified as well nourished by subjective global assessment (SGA), but as severely malnourished by any screening tool that uses BMI as one of the components of assessment. Most of the malnutrition screening tools used in the UK and Europe employ validated tools that depend heavily on BMI and percentage of weight loss.[16,17]

Both of these simple and objectively measurable variables have validity issues in Indian patients. First, most Indian patients, particularly older Indians, do not know their usual body weight. As a result, it is impossible to calculate the percentage of weight loss.

Second, more than half of the Indian patients have adapted to live with low-calorie intakes since early childhood and hence have a very low BMI in the range of 18.5 kg/m^2 or lower. These patients continue to remain in a healthy state and yet have below-normal BMI. Using the European guidelines on these patients would result in labeling 500 million Indians with severe malnutrition, even before they have fallen sick. This we know is not true, because many very thin patients are able to withstand major cancer surgeries without increased complications.

As a result, a nonobjective method of assessment, such as SGA, is a better way to assess the nutritional status of Indian patients with cancer. SGA classifies malnutrition as either A=well nourished, B=mildly/moderately malnourished, or C=severely malnourished, with a high degree of agreement between two observers.[18] Even a patient-generated SGA is available on the Internet. SGA is widely used and because it is subjective in nature, it allows capturing changes in the pattern of clinical variables (eg, weight-loss pattern rather than absolute weight loss).

A series of prospective observational studies were performed to validate a modified SGA tool in Indian patients.[19] The studies found that SGA accurately predicts any adverse events, multiple adverse events, major adverse events, mortality, and length of postoperative hospital stay, and thus the cost of cancer treatments. Furthermore, SGA had better discriminatory properties compared to a more objective test such as the Malnutrition Universal Screening Tool (MUST). Researchers report that the use of BMI for malnutrition screening results in overestimation of severe malnutrition in the Indian population, because nearly half of the population has a BMI below 18.5 kg/m^2 (Figure).[20] As a result, the association of malnutrition by BMI-based tools and clinical outcomes was nonsignificant in Indian patients.

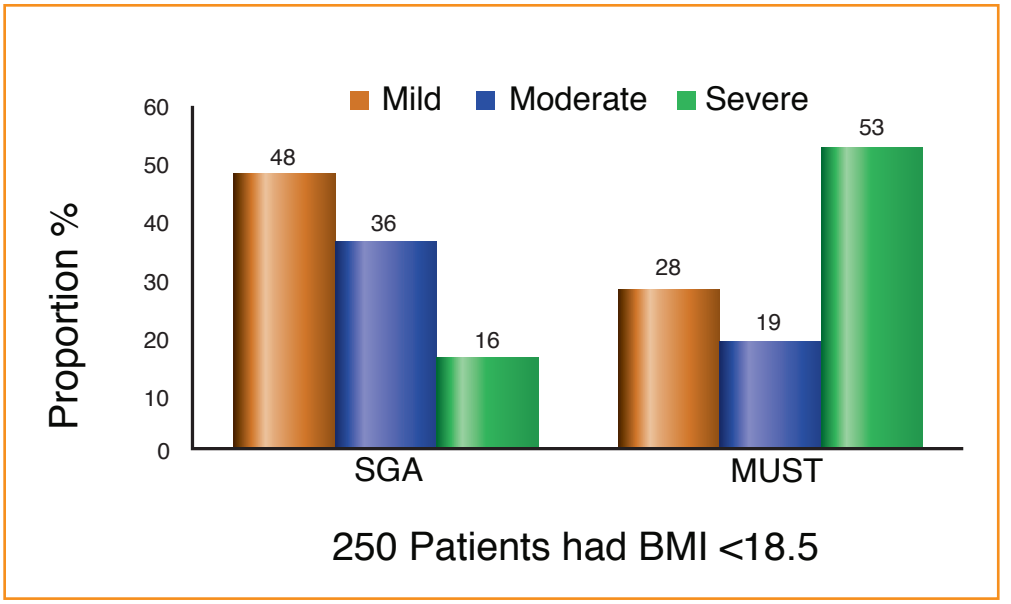

Figure. MUST places most Indians in severe malnutrition class as their BMI is <18.5.[20]

BMI=body mass index, MUST=Malnutrition Universal Screening Tool, SGA=subjective global assessment

One turf battle that was around for a while was between enteral and parenteral nutrition. In health and most illness, the gastrointestinal tract is functional and capable of providing nutrition. Nutrients administered through the gut follow a more physiological route and are less expensive. While oral feeding is the preferred route in health, the desire to take foods and beverages by mouth is diminished during illness. The lack of companionship and isolation in hospital wards or nursing homes further diminish food intake.

For individuals who cannot eat but have a functioning gut, feeding tubes are placed at various sites, using a variety of techniques. The trouble with saying “if the gut works, use it” is that you cannot use a working gut unless a proper feeding tube is placed. This is a real problem because feeding tube placement sometimes is challenging and time consuming and, as a result, the threshold for use of parenteral nutrition is low in many places. In the presence of a committed nutrition support group, we were able to place feeding tubes in 96% of our cancer patients and thereby avoid the use of total parenteral nutrition (TPN). The use of TPN is then

restricted to a small group of patients with severely increased requirements that enteral feeding cannot meet or for when the gut is not usable due to various reasons.

The availability of a nutrition support team helps to improve the delivery of nutrients. Irrespective of the route, adequate nursing care and periodic monitoring are necessary to reduce complications (eg, infections, aspirations, etc) and improve the cost-effectiveness of nutrition therapy.

Several factors are used to determine the type and amount of nutrients that are prescribed.[20] The estimation of the nutrition needs in adults is guided by mathematical formulas based on steady-state experiments done on healthy volunteers. The validity of these formulas for estimating the energy requirements in sickness sometimes is erroneous. Many healthcare professionals use a common-sense approach calculating fixed amounts of calories per kilogram body weight or continue to use formulas that are possibly not appropriate.

The uptake of prescribed nutrient requirements is affected by the inability to deliver the estimated requirements to patients or by patients who are unable to tolerate the nutrients. How much of the intolerance is due to the formulation, how much due to delivery, and how much is due to illness is difficult to quantify.

Malnutrition, the most common comorbidity associated with human disease, creates a huge opportunity for continued research. Researchers will continue to work toward understanding the mechanisms involved in the development of anorexia, weight loss, and cachexia in patients and identifying suitable targets. Malnutrition broadly is the result of reduced nutrient intake and increased nutrient needs.

Recent research suggests that many diseases create a chronic inflammatory state, with loss of taste and smell, malabsorption, prolonged starving for multiple investigations, and treatment-related side effects, all of which contribute to reduced food intake. Anorexia has a central role in cachexia and increased metabolic demands triggered by cytokines. Preferential mobilization of fat and the sparing of skeletal muscle seen in simple starvation are replaced by an equal mobilization of fat and skeletal muscle in cancer patients. The increase in basal energy expenditure is triggered by cytokines. Preferential mobilization of fat and the sparing of skeletal muscle seen in simple starvation are replaced by an equal mobilization of fat and skeletal muscle in these patients.

Testing in well-designed, adequately powered clinical trials with patient-related outcomes is needed to determine the role of nutraceuticals, such as glutamine, other omega-3 fatty acids, and immune-boosting nutrients. Cost-effectiveness studies are of great importance, because nutrition therapies generally are used as adjuncts to definitive therapies.

In summary, malnutrition is rampant worldwide and is a huge drain on cancer-care facilities, as well as on patients and their families. In spite of all the advances in medicine and oncology, cancer patients' nutrition care still is neglected, and providing nutrition support is not considered a sufficient medical priority. Malnutrition management requires a triage that starts with identifying at-risk patients as early as possible.[21]

Ideally, all healthcare staff can receive training to use a simple, quick, and inexpensive validated assessment tool, such as SGA. Once identified, at-risk individuals need to receive appropriate nutrition therapies, while those not at risk can remain under observation. Documentation and audits would ultimately help improve patient outcomes. It is important to consider nutrition therapy in the treatment plan for all cancer patients. Dietary modification and nutritional supplements can help with management of patients capable of oral intake. Some patients may need tube feeding to ensure adequate nutrient intake during their treatments and thereafter. TPN is required for a small proportion of patients. The availability of a nutrition support team will increase the cost-effectiveness of nutrition therapy.

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