**Module 11 Questions: Malnutrition**

**I. Definitions**

**Cachexia- is** a “wasting” disorder that causes extreme weight loss and muscle wasting, and can include loss of body fat. This syndrome affects people who are in the late stages of serious diseases like cancer, HIV or AIDS, COPD, kidney disease, and congestive heart failure (CHF).

**Catabolism-** Catabolism breaks things down and releases energy; it uses larger compounds to create smaller compounds, releasing energy in the process. Catabolism provides the energy our bodies need for physical activity, from cellular processes to body movements.

**Cheilosis-** is a medical condition, in which the corners of the mouth becomes inflamed. This condition is also known as angular cheilitis, perleche or angular stomatitis.

**Cytokines**- are small secreted proteins released by cells have a specific effect on the interactions and communications between cells. Cytokine is a general name; other names include lymphokine (cytokines made by lymphocytes), monokine (cytokines made by monocytes), and chemokine.

**Sarcopenia**- is an age related, involuntary loss of skeletal muscle mass and strength.

**II. Anatomy/Physiology**

**1. Describe the process of carrying out a nutrition focused physical examination. What characteristics are indicative of malnutrition?** NFPA starts with a general observation, followed by a head-to-toe examination that includes physical observations, functional indicator assessments, and a patient interview. When conducting an exam, an observation may provoke further questioning, or a response to a habit or history question may incite further inspection. NFPA look for clues that may lead the diagnosis of malnutrition or micronutrient imbalance (vitamin/mineral deficiency or toxicity). Characteristics that are indicative of malnutrition, lack of appetite or interest in food or drink, tiredness and irritability, inability to concentrate, always feeling cold loss of fat, muscle mass, and body tissue, longer healing time for wounds. Severe cases: breathing becomes difficult, skin may become thin, dry, inelastic, pale, and cold, the cheeks appear hollow and the eyes sunken, and as fat disappears from the face hair becomes dry and sparse, falling out easily.

**III. Pathophysiology**

**1. Describe the relationship between serum protein levels and nutritional status. Serum proteins such as albumin and prealbumin are used to identify protein deficiency**. Serum albumin (as well as other serum proteins) is a negative acute-phase reactant, it decreases in the presence of inflammation, which occurs in situations that cause physical stress to the body, such as trauma, surgery, burns, or a chronic illness such as cancer, heart disease, or hepatic failure. Serum albumin increases as inflammation subsides, regardless of how much protein is consumed. Transthyretin, is affected by many of the same inflammatory conditions as albumin. PAB may be more valuable than albumin as an indicator of nutritional status due to its shorter half-life, PAB can respond more quickly to increases in nutrient intake or improvements in inflammation. Transferrin is used to evaluate protein and iron status. Inflammation leads to a decrease in transferrin; iron deficiency causes it to increase.

**2. How does malnutrition contribute to edema?**

Malnutrition result in low albumin or protein which causes the body to retain fluid. The fluid needs to be pulled into the intravascular space where it can be processed by the kidneys and excreted. A reasonable goal is an albumin level >4.0.

**3. What are the metabolic differences between malnutrition related to chronic diseases as compared to simple lack of food?** The metabolic response to starvation is primarily concerned with maintaining a supply of water-soluble substrates to supply energy to the brain. Thus there is an initial rise in metabolic rate, reflecting gluconeogenic activity. As fasting progresses, gluconeogenesis is suppressed to minimize muscle protein breakdown and ketones become the main fuel for the brain. With chronic underfeeding the basal metabolic rate per cell appears to fall, but the mechanistic basis for this is not clear. The main adaptation to chronic energy deficiency is slow growth and low adult body size, although the reduction in energy requirement achieved by this is partially offset by the preservation of the more metabolically active organs at the expense of muscle, which has a lower metabolic rate.

**IV. Nutritional Management**

**1. Describe three ways in which advocacy and policy decisions can impact malnutrition in developing and developed countries. How are these similar? How are they different?** Effective advocacy is necessary to generate human services, financial and political support for projects and maintaining successful programs. The main reason for advocacy and policy in relation to malnutrition is to decrease the rate and comorbidities that are associated with the disorder. However developed countries has the accumulation of strong human and institutional resources, good agricultural and health research and extension systems, favorable food production environments, and strong transport and physical infrastructure to help decrease the rate of malnutrition than in developing countries.

 **2. What role is the most appropriate role for enteral or parenteral nutrition support with nutrition related to chronic disease?**

**Short-Bowel Syndrome**. Provision of enteral and parenteral nutrition support has established efficacy in the prevention of life-threatening undernutrition for patients with inadequate intestinal length and/or function.

**Enterocutaneous Fistulas**. Parenteral nutrition in combination with bowel rest and pharmacologic intervention to diminish gastrointestinal secretions appears likely to improve the opportunity for spontaneous fistula closure and more favorable clinical outcomes. Studies are insufficient to address the role of enteral nutrition in fistula management.

**Inflammatory Bowel Disease**. Enteral and parenteral nutrition support is likely to be indicated for inflammatory bowel disease patients who suffer undernutrition related to compromised intestinal length and/or function.

**Pancreatitis.** The routine use of enteral and parenteral nutrition is not indicated in patients with mild or moderate pancreatitis. If the course is protracted or severe, nutrition support may be considered. Studies are inadequate to clarify the optimal timing, feeding route, or formulation for this indication. Enteral feedings may be well tolerated in selected patients.

**Liver Disease**. Enteral and parenteral nutrition may improve some laboratory measures of liver function in patients with chronic alcoholic liver diseases.

**Sources**

Nutrition in the developing world. http://www.fao.org/docrep/w0073e/w0073e07.htm R

Zhang J-M, A J. Cytokines, Inflammation and Pain. *International anesthesiology clinics*. 2007; 45(2):27-37. doi:10.1097/AIA.0b013e318034194e.

Bharadwaj S, Ginoya S, Tandon P, et al. Malnutrition: laboratory markers vs nutritional assessment. Gastroenterology Report. 2016; 4(4):272-280. doi:10.1093/gastro/gow013.

<http://www.o-wm.com/content/using-laboratory-data-evaluate-nutritional-status>

Metabolic changes in malnutrition (PDF Download Available). Available from: https://www.researchgate.net/publication/7463387\_Metabolic\_changes\_in\_malnutrition [accessed Jun 09 2018].

Institute of Medicine (US) Committee on Nutrition Services for Medicare Beneficiaries. The Role of Nutrition in Maintaining Health in the Nation's Elderly: Evaluating Coverage of Nutrition Services for the Medicare Population. Washington (DC): National Academies Press (US); 2000. 10, Nutrition Support. Available from: https://www.ncbi.nlm.nih.gov/books/NBK225301/