Personalised Nutrition Plan Assignment

- **What is Malnutrition?**

The term malnutrition generally refers both to under nutrition and over nutrition, but in this guide we use the term to refer solely to a deficiency of nutrition. Many factors can cause malnutrition, most of which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and whether a population is able to meet its basic needs such as food, housing and health care.

Malnutrition is thus a health outcome as well as a risk factor for disease and exacerbated malnutrition and it can increase the risk both of morbidity and mortality. Although it is rarely the direct cause of death (except in extreme situations, such as famine), child malnutrition was associated with 54% of child deaths (10.8 million children) in developing countries. Malnutrition that is the direct cause of death is referred to as "protein-energy malnutrition".

Nutritional status is clearly compromised by diseases with an environmental component, such as those carried by insect or protozoan vectors, or those caused by an environment deficient in micronutrients. Environmental contamination (e.g. destruction of ecosystems, loss of biodiversity, climate change, and the effects of globalization) has contributed to an increasing number of health hazards (Johns & Eyzaguirre, 2000), and all affect nutritional status. Overpopulation, too, is a breakdown of the ecological balance in which the population may exceed the carrying capacity of the environment. This then undermines food production, which leads to inadequate food intake and/or the consumption of non-nutritious food, and thus to malnutrition.

Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development. Another group of concern is pregnant women, given that a malnourished mother is at high risk of giving birth to a LBW baby who will be prone to growth failure during infancy and early childhood, and be at increased risk of morbidity and early death. Malnourished girls, in particular, risk becoming yet another malnourished mother, thus contributing to the intergenerational cycle of malnutrition.

- **Discuss the causes and consequences of malnutrition.**

Malnutrition in developed countries is unfortunately still more common in situations of poverty, social isolation and substance misuse. However, most adult malnutrition is associated with disease and may arise due to:

Dietary intake

The single most important aetiological factor in disease-related malnutrition is reduced dietary intake. This is thought to occur due to reductions in appetite sensation as a result of changes in cytokines, glucocorticoids, insulin and insulin-like growth factors. The problem may be compounded in hospital patients by failure to provide regular nutritious meals in

an environment where they are protected from routine clinical activities, and where they are offered help and support with feeding when required.

Malabsorption

For patients with intestinal failure and those undergoing abdominal surgical procedures, malabsorption represents an independent risk factor for weight loss and malnutrition.

Energy expenditure

It was thought for many years that increased energy expenditure was predominantly responsible for disease-related malnutrition. There is now clear evidence that in many disease states total energy expenditure is actually less than in normal health. The basal hypermetabolism of disease is offset by a reduction in physical activity, with studies in intensive care patients demonstrating that energy expenditure is below 2,000 kcal/day. The exception is patients with major trauma, head injury or burns where energy expenditure may be considerably higher, although only for a short period of time.

Consequences of Malnutrition

Muscle function

Weight loss due to depletion of fat and muscle mass, including organ mass, is often the most obvious sign of malnutrition. Muscle function declines before changes in muscle mass occur, suggesting that altered nutrient intake has an important impact independent of the effects on muscle mass. Similarly, improvements in muscle function with nutrition support occur more rapidly than can be accounted for by replacement of muscle mass alone. Down regulation of energy dependent cellular membrane pumping, or reductive adaptation, is one explanation for these findings. This may occur following only a short period of starvation. If, however, dietary intake is insufficient to meet requirements over a more prolonged period of time the body draws on functional reserves in tissues such as muscle, adipose tissue and bone leading to changes in body composition. With time, there are direct consequences for tissue function, leading to loss of functional capacity and a brittle, but stable, metabolic state.

Cardio-respiratory function

Reduction in cardiac muscle mass is recognised in malnourished individuals. The resulting decrease in cardiac output has a corresponding impact on renal function by reducing renal perfusion and glomerular filtration rate. Poor diaphragmatic and respiratory muscle function reduces cough pressure and expectoration of secretions, delaying recovery from respiratory tract infections.

Gastrointestinal function

Adequate nutrition is important for preserving GI function: chronic malnutrition results in changes in pancreatic exocrine function, intestinal blood flow, villous architecture and intestinal permeability. The colon loses its ability to reabsorb water and electrolytes, and secretion of ions and fluid occurs in the small and large bowel. This may result in diarrhoea, which is associated with a high mortality rate in severely malnourished patients.

Immunity and wound healing

Immune function is also affected, increasing the risk of infection due to impaired cell-mediated immunity and cytokine, complement and phagocyte function. Delayed wound healing is also well described in malnourished surgical patients.

Psychosocial effects

In addition to these physical consequences, malnutrition also results in psychosocial effects such as apathy, depression, anxiety and self-neglect.

- **Discuss the Diet Plans for Malnourished Patients in the following SMAART Nutrition Informatics Template**

  Guideline: On the basis of your understanding and the case study given formulate the case scenario into a 7-day week plan against what the patient normally used to eat, at what time she used to eat and the portion size she used to consume.

STEP 1:

Case study

A 20-year-old college going woman has a height of 5 feet 3 inches and she weighs 40 kgs at present. She has been losing weight for the past 6 months after an episode of typhoid. Prior to fever she was 55kgs. She used to be an athlete but now she is not able to participate much in sports due to weakness. It has become difficult for her to keep pace with studies as she feels lethargic and tired. Her recent biomedical examination has indicated that she has reduced total fat, muscle mass, low haemoglobin, Vitamin B12 (serum) and serum retinal levels. She is non-vegetarian and wants to follow dietary measures to attain the ideal body weight and improve her haemoglobin, Vit B12 and Vit A levels.

Case Profile:

Sex- Female Height – 5’3 ft inches (160cm)

Age – 20yrs Weight – 40Kg

Food Preference – Non-Vegetarian

Principle of Diet:

High energy, High protein, High Carbohydrates and Moderate fat with liberal vitamins and minerals are recommended.

Broka’s Index:

IBW = height (cm) – 100

160 – 100 = 60kg

Body Mass Index:

BMI = Weight (kgs)

Height (m2)

= 40/1.6*1.6 = 40/2.56 = 15.6kg/m2 (underweight)

STEP 2:

1. RDA Calculation

Nutrients	Normal	Modified
Energy (kcal)	2130 kcal	2400 kcal
Protein(g)	36 g	83g
Carbohydrate (g)	130 g	450g
Fat(g)	20 g	40g
Vitamin B12	2.2 mg	2.2 mg
Iron	27 mg	27 g

2. Food Exchange list:

Exchange	Number of exchanges	Energy (kcal)	Protein (g)	Carbohydrates (g)	Fat (g)
Milk	4	210	12	20	3.2
Meat	2	140	20	40	10
Pulse	1	30	9	10	5.5
Cereals	11	1100	31.5	220	8.2
Roots/Tubers	2	160	2.6	40	-
Veg A (GLV)	1	45	3.6		0.4

Veg B (Others)	3	90	5.1	1.2	
Fruits	5	250			
Fats(oil)	6	270			30
Sugar	5	100		25	
Total	**38**	**2456**	**83**	**356.2**	**57.3**

Exchanges	Number of exchanges	Breakfast	Mid-morning	Lunch	Evening Tea	Dinner	Post-Dinner
Milk	4	1	-	1	1		1
Meat	2	-	-	1	-	1	-
Pulse	1	-	-	1	-	-	-
Cereals	11	2	2	3	2	2	-
Roots/Tubers	2	1	1	-	-	-	-
Veg A (GLV)	1	-	-	1	-	-	-

Veg B (Others)	3	1	-	1	-	1	-
Fruits	5	1	1	1	1	-	1
Fats(oil)	6	1	1	1	1	1	1
Sugar	5	-	1	-	2	1	1

3. Personalized menu plan

		Usual eating time	Foods you normally eat	Portion size you eat	Ideal Eating time	Foods you should eat	Portion size you should eat	Foods You should avoid	Comments
Monday	Breakfast	9:30am	Poori & Upma	1 1	8:00am	Aloo Paratha &Raitha	2	Deep fried and Processed foods Avoid Sugary beverages Deep fried and Processed foods	
	Mid Meal	12:30pm	Canned juice	1	11:00am	Veg cutlets & Chikoo Milkshake	2 1		
	Lunch	2:30pm	Biryani	1	1:00pm	Chapathi Chicken Fried Rice Palak Aloo Curry Beetroot raitha	2 2 1 1 1	Canned Beverages	
	Evening	4:30pm	Tea or Coffee	1	4:00pm	Banana Smoothie Soaked Almonds	3-4 nos	Processed Foods & Canned sauces	
	Late evening	6:30pm	Chips or Samosa	1	6:30pm	Veg Grill Sandwich Mint Chutney Fruit Custard	1 1 1		

Foundation of Healthcare Technologies Society
625 , Ansal Chamber-2, Bhikaji cama place, New Delhi-110066
Phone 91- 8288004611/ 91- 8447292004 Website: fhts.ac.in
Registration No.: *S/877/SDM/NW/2012*

	Dinner		Rice & Dal	2 1	8:00pm	Gobi Paratha Jeera Rice Egg Curry Dal Fry	2 1 1 1		
	After Dinner	10:30pm	-	-	10:00pm	Dates Smoothie	1		
Tuesday	Breakfast	9:30am	Chips	2	9:30AM	Soft amaranth Chapathi (thotakoor chapathi) Raita	2 1 1 2	Avoid foods which are deep fried early in morning No carbonated or sugary beverages foods which are not easily digested and highly processed foods	
	Mid Meal	12:30pm	Tea	1	11:00AM	Fig and almond milk shake	1 1 ½		
	Lunch	2:30pm	Puri and chutney	1 1	1:00PM	Vegetable Rice(softly cooked) Aloo kurma Sambha Curd	1 Few raisins 2-3(dates)	donot avoid such small meals as they are necessary for energy building	
	Evening	4:30pm 6:30pm	Ice cream	2	4:30 PM	Boiled Egg sandwich raisins and dates	1 2 1 1 ½		

	Late evening		Banana	1	6: 00 PM	Tomatoe soup	1 glass(150 ml)	Do not avoid carbohydrates and foods rich in greens but try to avoid the high amount of fiber Try not to avoid fruits and vegetables in meals Try not to dehydrate by drinking plenty of liquids	
	Dinner	10:30pm	Pulao Sprite	2 1 -	8:00PM	Spinach parota(soft) Soya curry Chicken curry Curd rice Coconut water banana	1		
	After Dinner		-		10:30				
Wednesday	Breakfast	9:30am	Vada & chutney	1	8:00am	Beetroot, rice flour roti & spinach chutney	2	Deep fried and processed foods	
	Mid Meal	12:30pm	Ice cream	1	11:00am	Musk melon milkshake	1	Avoid processed sugary desserts	
	Lunch	2:30pm	Fried rice	1	1:00pm	Chapathi Mutton pulao Masala paneer curry	2 1 1 1	Deep fried and processed foods	
	Evening	4:30pm	Tea or coffee	1	4:00pm	Carrot & onion raitha	3-4 nos 1		
	Late evening	7:00pm		1	6:30pm	Dates	2	Canned beverages	

			Pasta			Black grape juice	2		
	Dinner	10:30pm	Curd rice	1	8:00pm	Bread omelette	1	Processed foods	
						Cabbage paratha	1		
	After Dinner	-	-	-	10:00pm	Rice Tomato dal Curd Milk	1		
Thursday	Breakfast	9:30am	Puri & Chutney	1	8:00am	Ragi dosa & Mint chutney	2	Avoid fried foods	
	Mid Meal	12:30pm	Tea or coffee	1	11:00am	Banana milkshake with Nuts	1	Avoid caffeinated beverages	
	Lunch	2:30pm	Biryani	1	1:00pm	chapathi Rice Fish curry sambar Raitha	2 1 1 1 1	Avoid consumption of fried and processed food	
	Evening								
	Late evening	4:30pm	French fries	`1	4:00pm	vegetable sandwich Guava	2 1	Avoid consumption of junk food	

	Dinner	7:00pm	Onion pakoda	1	6:30pm	mixed Fruit chat	1	Avoid Deep fried food	
		10:30pm	Egg Fried rice	1	8:00pm	Beetroot paratha veg pulao chicken curry Raitha	2 1 1 1 1	Avoid fast food	
	After Dinner		coke	1	10:30pm	vermicelli kheer	1	Avoid canned beverages	
Friday	Breakfast	8:30am	onion dosa coconut chutney	2	8:30am	aloo paratha and pudina chutney	2	Avoid processed and salty foods.	
	Mid Meal	10:30pm	fruit custard	1	11:00am	banana milkshake veg salad	1 1cup	Avoid beverages and caffeine drinks.	
	Lunch	1:30pm	Rice Tomato curry	2 2 cups	1:00pm	chaptati veg - pulav chicken curry veg raita	2no 1 1cup 1	Avoid processed foods	

	Evening	5:00pm			4:00pm	sprouts sandwich	2no		
	Late evening	6:30pm	Tea or biscuits	1cup or 2no	6:00pm	strawberry milkshake	1 glass	-	
	Dinner	10:15pm	pakora mint chutney fried rice	3no 2cup	8:00pm	carrot paratha rice soya chunks curry curd	2no 1cup 1cup 1cup	Avoid fried foods	
	After Dinner	-	-	-	10:00pm	milk	1glass		
Saturday	Breakfast	9:30 A.M	Bread & Milk	2 1	8:00 A.M	Stuffed Chapati& Raita with Boiled Egg	2 1 1	Deep Fried and Processed foods	

	Mid Meal	12:30 P.M	Chips Rice & sabji	1 1	11:00 P.M	Veg. Poha & Orange	1 2	Empty calorie foods Lesser portions	
	Lunch	2:30 P.M	Tea or coffee	1 1	1:00 P.M	Rice Rajmah, Brinjal Curry, Carrot Raita	1 1 1 2 1	Deep fried and processed foods	
	Evening	4:30 P.M		-	4:00 P.M	Chicken Sandwich Banana Milkshake	1 1		
	Late evening	6.30 P.M	Noodles Rice & sabji		6.30 P.M				
	Dinner	10.30 P.M			8:00 P.M	Chapati Pulao Chicken Curry	2 1	Avoid Starchy food	
	After Dinner	-	-		10:00 P.M	Warm Milk Soaked Almonds	1 1		
Sunday	Breakfast	9:30 am	Chapati ladies finger fry	1	8:00 am	Dosa Coconut chutney	2 1	Processed foods Soft drinks	
	Mid Meal	12:30 pm	Chips	1	11:00 pm	Veg Poha Orange	2 1	Avoid sugary drinks	

Foundation of Healthcare Technologies Society
625 , Ansal Chamber-2, Bhikaji cama place, New Delhi-110066
Phone 91- 8288004611/ 91- 8447292004 Website: fhts.ac.in
Registration No.: *S/877/SDM/NW/2012*

	Lunch	2:30 pm	Rice and curry	1	1:00 pm	Chapati Chicken pulao Methi aloo curry Carrot raita	2 1 1 1 1	Fried foods	
	Evening	4:30 pm	Tea	1	4:00 pm	Banana milkshake Dates	1(15gm)	Canned beverages	
	Late evening	6:30 pm	Burger	1	6:30 pm	Veg sandwich Fruit bowl	2 1	Avoid canned fruits	
	Dinner	10:30 pm		2	8:00 pm	Chapati Rice Mutton curry Cauliflower and peas curry Veg Salad	2 1 1 1	Avoid fatty foods	
	After Dinner	12:00 am	Fried chicken	-	10:00 pm	Carrot kheer	1 1		

			-						

STEP 3:

ADDITIONAL INFORMATION:

- Malnourished person should be on the positive energy balance. Calorie intake should be more than the energy expended.
- Person should regular meals. He should make meals a priority and take time to plan, prepare and eat each meal.
- They should at least eat 3 major meals a day and snacks in between Underweight person should learn to eat more food at each meal. Serving size can be increased. Ex: Drinking milk in a large glass.
- Enough fluids should be taken to avoid constipation.
- Dietary supplements can be given.
- Foods should be appetizing
- Diets can be varied. New foods and recipes can be tried.
- The food may be consumed in different locations and ambience. A walk before meals can make a person feel hungrier.