وزارة الصحة
Ministry of Health

Clinical Nutrition Support Guidelines

For Patients with COVID-19 disease

General Directorate of Nutrition

Ministry of Health

Kingdom of Saudi Arabia

April 2020

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Ministry of Health

Content of the Clinical Nutrition Support Guidelines

1. Introduction:

Since the outbreak of the new corona virus (COVID-19) around the world. General Directorate of Nutrition (GDN), Ministry of Health (MOH) issued number of memos and guidelines for nutrition departments at directorates and at hospitals. The aims to provide suitable diet, for patients, medical staff and others whether in hospital or elsewhere (Health quarantines). GDN issued guidelines to encourage breastfeeding during this crisis. Here is the nutrition support guidelines to be used for patients with COVID-19 especially in intensive care unit.

Malnutrition, which encompasses under- and over nutrition, is responsible for an enormous morbidity and mortality burden globally. Undernourished patients morbidity is related to underlying immunodeficiency, even in mild forms of undernutrition. Infections are more common and more severe in people with obesity (Huttunen and Syrjanen, 2016) the most prevalent cause of immunodeficiency worldwide is severe malnutrition (Claire et al., 2016). So improve immunity is one of the measure to prevent COVID 19 beside other measures announced by Ministry of Health.

The nutrition support is important to all patients especially those who needs critical care such as patients with respiratory failure due to corona virus, which called COVID-19 disease. The physicians and dieticians must first evaluate the level of stress in a critically ill patient to determine the likelihood of deterioration in nutritional status and to assess the overall need for aggressive nutritional support. The hazards of contacted with the patients should be minimize (Todd et al ,m 2011, (Pierre and Rattanachaiwong., 2018).

1:1 The aims.

The aim of this clinical nutrition support guidelines, is to offer nutrition support both prevention and treatment for patients with COVID-19, with scientific guidelines measures to the patients and medical staff especially nutrition support for patients in intensive care unit (ICU).

1:2 The scope

- During the spread of COVID-19 pandemic, clinical dietitians as credentialed practitioners, involve in the management of patients, such as assessment of the nutritional status and plan the dietary needs of the patients. Follow up the nutrition status of the patients and the quality and safety of nutrition support in both hospitals and quarantines.
- The clinical dietitian, to fulfill his/her responsibilities cooperate and coordinate with the doctors in charge, dietitian general (food services), nurses and clinical pharmacists.
- Credentialed practitioners should ensure the duties being performed are within their individual scope of practice, and were trained to do so. Such as how to assess the nutritional status for critical ill patients in ICU and knew the skills of dealing with tube feeding accessories.

- Clinical dietitian with limited experience in caring for patients in intensive care unit should ask for training to ensure they have the demonstrated and documented competence to perform the activity and duties.

1:3 **Targeted populations:** The patients with COVID19 in ICU, or in the quarantines (guesthouses), or any epidemic in the future of similar nature affected mainly the respiratory system.

1:4 **Users of these guidelines are: -**

- Clinical dietitians: - Evaluate the nutritional status and plan the diet, other roles mentioned in section (2) the roles of the clinical dietitian.
- Physicians: - Who decide the route of feeding, when to start the feeding, and discuss any food drug interactions.
- General dietitians (food services): - Prepare the meal according to the recommendations and the dietary habits of the patient. Provide tube feedings needs such as nutrition medical formula and pumps either from the nutrition contractor or from suppliers. Assess the patient's satisfaction of the meals.
- Nurses: - Screen the patient's health, to decide whether need especial nutrition support or not. Observe and assess the tube feeding of the patients.
- Clinical pharmacists: - Responsible about the parenteral nutrition and coordinate transitional feedings from parenteral feeding to tube feeding or feeding by mouth.

1- The roles of clinical dietitian

1. Evaluate the nutritional status.
2. Plan the suitable diet.
3. Communicate with physicians to devise and prescribe optimal therapy:-
   - Suitable route of feeding whether oral, enteral nutrition (EN) or parenteral nutrition
   - Parenteral nutrition (PN) responsibilities of the clinical pharmacy.
   - Start and time of feeding for ICU patients.
   - Identify the need for adaptive feeding equipment such as tube feeding sets, pump and accessories.

4. The clinical dietitian should determine monitor of nutrition therapy, such as food intake, nitrogen balance and nutrition status
5. Participate in medical rounds or discussion through social media.
6. Coordinate transitional feedings.
7. Follow up and nutrition re-assessment of the patients at least once per day for ICU patients and every three days for patients in isolated rooms.
8. The diet plan or special diet refer to the MOH enteral nutrition guide in the (Specifications and Terms of Hospitals Nutrition- section diet menu) issued by General Administration of Nutrition, MOH, The clinical dietitian has the right to modify the diet according to the heath status of the patient.

2- Recommendations to have safe efficient nutrition support (ASPEN April 2020)

3:1 Recommendation 1: Nutrition Assessment and Dietary Plan

ASPEN April 2020) recommended

3:1:1 Measures to prevent or reduce unnecessary contact with the patients, to prevent infection from patients

- All dieticians and nurses involved in nutrition assessment of patient or suspect of carriers should to adhere to Centers for Disease Control (CDC) recommendations for personnel protection equipment's (PPE) includes protective gloves, eyewear, isolation gown, a face shield, and an N95 respirator.
- To avoid unnecessary contact with the patient.
- Clinical and general dietitians no need to enter ICUs or patient rooms (of patients in isolation).
- Using other means to collect assessment data (by telephone) collaborate and coordinate with medical staff to collect the data needed for assessment (sociomedical history, investigations) to develop a safe nutrition care plan and to assess patient satisfaction of the meal.

Most of the nutritional management in ICU patients infected with SARS-COV-2

3:1:2 Dietary plan for patients Pre intubation period: -

The patients with minor symptoms, or the carriers whether at isolated room in hospitals or elsewhere. The dietary plan same as the dietary plan of normal individuals. According to age, sex, level of physical activities, presence of diet related disease that need special diet. The recommendations is to encourage taking plenty vegetables and fruit and water, food items low salt, refined sugar and saturated fatty acid and practice suitable physical exercise (WHO., 2020, Kathleen and Raymond ., 2017).

ESPEN expert statements and practical guidance for nutritional management of individuals with SARS-CoV-2 infection-April2020

(ESPEN, Clinical Nutrition April 2020) statement

Patients at risk for poor outcomes and higher mortality following infection with SARS-COV-2, namely older adults and poly-morbid individuals, should be checked for malnutrition through screening and assessment. The check should initially comprise the MUST criteria* or, for hospitalized patients, the NRS-2002 criteria.

3:1:3 Critical Care Nutrition

Nutrition support is the provision of nutrients via a tube placed into the stomach or small intestine (enteral nutrition), or intravenously (parenteral nutrition)for patients who are unable to eat adequately when provided a normal diet. The aim is to prevent or treat malnutrition. Nutrition support usually for patients, who needs critical care, so it is considered part of critical care.

COVID-19 disease patients with respiratory failure, may need admission to Intensive care unit (ICU). Since there is no definite treatment of COVID- 19 disease. Good supportive care remains the corner stone in managing critically ill patient with COVID- 19 disease. The need to address the provision of critical care nutrition remains an integral component of these supportive measures. The nutritional management of patients with respiratory failure due to COVID, is in principle same as critical care nutrition provided to ICU patients admitted with respiratory failure. Given the lack of direct evidence on patients with COVID-19, especially those with shock, many of these recommendations are based on indirect evidence from critically ill patients in general and those with sepsis and acute respiratory distress syndrome (ARDS). Others data from recommendations of the scientific clinical nutrition and metabolism societies and data published in scientific international journals.

3:1:4 Dietary planning for ICU patients: - (ESPEN, Clinical Nutrition April 2020)

- Energy needs: -

  According to the ESPEN expert statement and practical guidance for nutritional management of SAR-COV 2 infection (April 2020) statement 2.

- Energy needs can be assessed using indirect calorimetry if safely available with ensured sterility of the measurement system, or as alternatives by prediction equations or weight-based formulae such as:

  i. 27 kcal per kg body weight and day; total energy expenditure for poly-morbid patients aged >65 years.

ii. 30 kcal per kg body weight and day; total energy expenditure for severely underweight poly-morbid patients.
iii. 30 kcal per kg body weight and day; guiding value for energy intake in older persons. This value should be individually adjusted with regard to nutritional status, physical activity level, disease status and tolerance

The target of 30 kcal/kg body weight in severely underweight patients should be cautiously and slowly achieved, as this is a population at high risk of refeeding syndrome. The society of Critical Care Medicine and the American Society of Parenteral and Enteral Nutrition, recommended that, feeding should be initiated with low dose and increase slowly to full dose to meet the energy requirement within one week (Robert et al, 2020).

Protein needs: - Usually estimated using formulae such as:

1. 1 g protein /kg body weight/day in older persons. The amount should be individually adjusted with regard to nutritional status, physical activity level, disease status and tolerance.
2. >1 g protein / kg body weight / day in poly-morbid medical inpatients, may reach 20% of total calorie, in order to prevent body weight loss, reduce the risk of complications and hospital readmission and improve functional outcome.

- Fat and carbohydrate needs: - While considering an energy ratio from fat and carbohydrates between 30:70 (subjects with no respiratory deficiency) to 50% to 50% for ventilated patients.
- Vitamins, mineral and antioxidants

  Vitamins and mineral should be individually adjusted. According to the ESPEN expert statement and practical guidance for nutritional management of SAR-COV 2 infection (Robert et al ., 2020) statement 3, stated that, subjects with malnutrition should ensure sufficient supplementation with vitamin and minerals.
- Formula with a higher caloric density

  Patients with pulmonary disease resulting in CO_2 retention, such as chronic obstructive pulmonary disease or respiratory failure, may benefit from water restriction. Therefore, a formula with a higher caloric density may be helpful in these situations.

3:1:5- steps of nutrition counseling at MOH Hospitals

Step one	Responsibility	Place
Early Nutrition Screening (Using) Early Nutrition Screening Form	Nurse	Emergency unit

Need special diet ↔ No need for special diet

Step Two	Responsibility	Place
Nutrition Assessment and diet plan (Using) Nutrition Assessment Form	Qualified Dietitian	Outpatient clinic (or) Inpatient ward (or) ICU

PN to Clinical Pharmacy ↔ Food Services Department To prepare the meals and nutrition support accessories

Step Three	Responsibility	Place
Nutritional Follow Up (Using) Nutrition Re-Assessment Form	Qualified Dietitian	Outpatient clinic (or) Hospital rooms (or) ICU

Follow at outpatient clinics ↔ Continue nutrition Support

Improve and discharge from Dietitian Services

3:2- Recommendation 2: Timing of Nutrition Delivery

(ASPEN April 2020)

The aim should be to initiate early enteral nutrition (EN) **within 24-36 hours of admission to the ICU or within 12 hours of intubation and placement mechanical ventilation,** the patient with sepsis or circulatory shock can tolerate trophic feeding (a small volume of balanced enteral nutrition insufficient for the patient's nutritional needs but producing some positive gastrointestinal or systemic benefit). The shifting to parenteral nutrition should be lowered.

(ESPEN, Clinical Nutrition April 2020) statement

- Nutritional treatment should start **early during hospitalization (within 24-48 hours).** Especially for older and poly-morbid patients whose nutritional conditions may be already compromised, nutritional treatment and targets should be met gradually to prevent refeeding syndrome

Oral nutritional supplements (ONS) should be used **whenever possible** to meet patient's needs, when dietary counseling and food fortification are not sufficient to increase dietary intake and reach nutritional goals, ONS shall provide at least 400 kcal/day including 30 g or more of protein/day and shall be continued for at least one month. Efficacy and expected benefit of ONS shall be assessed once a month

3:3- Recommendation3: Route, Tube Placement & Method of Feedings

Generally, there are three methods of feedings

1. Oral feeding.
2. Enteral or tube feeding for those who cannot eat normally and the gastrointestinal tract all or part of is functioning normally. This type of feeding profession expert in tube feeding.
3. Parenteral feeding: - Need profession expertز

3:3:1 -Indications of tube feeding

- Patients who cannot or will not eat.
- Patients who have a functional gut.
- Safe method of access is possible.

3:3:2 Methods to administer tube feedings:

1. Continuous Drip Feeding: - The continuous drip method is most commonly used, is administered via gravity or a pump and is usually tolerated better than bolus feedings.
2. Bolus Feedings: - Bolus feedings allow for more mobility than continuous drip feedings.
3. Combination: - A combination of continuous drip (at night) and bolus feedings (during the day) can be used.

Patients with COVID-19, enteral nutrition is preferred to parenteral nutrition. Infusion of formula into the stomach feeding nasogastric tube requires minimal expertise. If gastric feeding is unsuccessful due to enteral feeding intolerance, use of a prokinetic agent to enhance motility is recommended as the second step. Post pyloric EN delivery is recommended only after these strategies fail. Placement of any enteral access device may provoke coughing and should be considered an aerosol generating procedure. If possible, keep the patient's mouth covered during placement in the nares and follow CDC guidelines regarding the use of N-95 masks and PAPR during tube placement. Lastly, placement of post-pyloric feeding tubes may take longer to place than gastric tubes, increasing exposure time of the healthcare practitioner.

Early EN may not be preferential in a subset of patients with COVID-19 with gastrointestinal (GI) involvement, before the onset of respiratory symptoms, some patients initially present with diarrhea, nausea, vomiting, abdominal discomfort and in some cases gastrointestinal bleeding. when present early use of PN should be considered, transitioning to EN when GI symptoms subside.

In poly-morbid medical inpatients and in older persons with reasonable prognosis, the nutritional requirements cannot be met orally, enteral nutrition (EN) should be administered. Parenteral nutrition (PN) should be considered when EN is not indicated or unable to reach targets.

3:3:3 Delivery System (Open or Close Tube Feeding)

Depending on how a tube-feeding product is packaged, infusion is via an open or closed delivery system.

1. The open system utilizes either a large syringe or an open-top container for tube-feeding delivery. Products include flip-top cans, bottles, brick packs, or powder packages that require reconstitution with water (at formula room).
2. The closed system, a container is prefilled with the sterilized tube-feeding product; the bottle then is spiked with tubing and attached to the enteral access device. The container usually contains at least 1 L of product and formula hang time is usually between 24 and 36 hours, as long as sterile technique is used.

The closed system (reduced contamination)	The open system
	

Patients with COVID-19, in ICU unit, closed system tube feeding is recommended, if the suitable nutrition formulas are available.

ESPEN, Clinical Nutrition April 2020 statement

- In poly-morbid medical inpatients and in older persons with reasonable prognosis, whose nutritional requirements cannot be met orally, enteral nutrition (EN) should be administered. Parenteral nutrition (PN) should be considered when EN is not indicated or unable to reach targets.
- Enteral nutrition should be implemented when nutritional needs cannot be met by the oral route, e.g. if oral intake is expected to be impossible for more than three days or expected to be below half of energy requirements for more than one week. In these cases, the use of EN may be superior to PN, because of a lower risk of infectious and non-infectious complications
- Monitoring for EN potential complications should be performed.
- In COVID-19 non-intubated ICU patients not reaching the energy target with an oral diet, oral nutritional supplements (ONS) should be considered first and then enteral nutrition

treatment. If there are limitations for the enteral route, it could be advised to prescribe peripheral parenteral nutrition in the population not reaching energy-protein target by oral or enteral nutrition.

- In COVID-19 intubated and ventilated ICU patient's enteral nutrition (EN) should be started through a nasogastric tube; post-pyloric feeding should be performed in patients with gastric intolerance after prokinetic treatment or in patients at high-risk for aspiration; the prone position per se does not represent a limitation or contraindication for EN.
- Continuous rather than bolus EN should be used.

  - Five studies were identified and ESPEN Meta-analysis found a significant reduction in diarrhea with continuous versus bolus administration
  - In patients with gastric feeding intolerance not solved with prokinetic agents, post pyloric feeding should be used.
  - In critically ill patients with gastric feeding intolerance, intravenous erythromycin should be used as a first line prokinetic therapy.
  - Alternatively, intravenous metoclopramide or a combination of metoclopramide and erythromycin can be used as a prokinetic therapy.
  - Gastric access should be used as the standard approach to initiate EN.
  - In patients deemed to be at high risk for aspiration, post pyloric, mainly jejunal feeding can be performed.

3:4- Recommendation 4: Nutrition Dose, Advancing to Goal and Adjustments

With mild symptoms normal dietary intake. When patients admitted to ICU unit. Feeding should be initiated with low dose EN (hypochromic or trophic diet). Increase slowly to full dose to meet the energy requirement within one week. To reach 15- 20 kcal/kg/day actual body weight, which should be 70 to 80% of the total calorie. Protein goal of 1.2- 2.0 gram/kg/day (actual body weight) for ICU patients.

In ICU patients with dysphagia, texture-adapted food can be considered after extubation if swallowing is proven unsafe, EN should be administered. In cases with a very high aspiration risk, post pyloric EN or, if not possible, temporary PN during swallowing training with removed nasoenteral tube can be performed.

EN should be withheld in the patient with hemodynamic instability requiring vasopressor support at high or escalating doses, patients on multiple vasopressor agents, or rising lactate levels. EN may be initiated or restarted after the patient is adequately resuscitated and/or has been on a stable vasopressor dose with sustained mean arterial blood pressure of ≥ 65 mmHg (Robert et al., 2020).

EN should be held and PN strongly considered in patients with gastrointestinal intolerance such as abdominal pain, nausea, diarrhea, significant abdominal distension, dilated loops of small and large bowel with air/fluid levels, pneumatosis intestinalis or increasing nasogastric outputs in previous 6- 12 hours with start of trophic feeds or prior to initiation of EN (Robert et al., 2020).

3:4:1- Enteral Nutrition in the Mechanically Ventilated Patient.

Mechanically ventilated patients are unable to take food orally and therefore are dependent on enteral nutrition for provision of energy and protein and other nutrients requirements. Enteral nutrition is supportive therapy and may impact patient outcomes in the intensive care unit. Early enteral nutrition has been shown to decrease complications and hospital length of stay and improve the prognosis at discharge (Allen and Hoffman., 2019, Toddet al ., 2011).

3:5- Recommendation 5: Formula Selection

3:5:1- The important of choosing the appropriate formula

- Proper nutrition is needed for anabolism, recovery and maintenance of optimal nutritional status.
- Formula selection is critical to the success of nutrition therapy, both in terms of satisfying metabolic requirements and increasing gastrointestinal tolerance.
- Before initiating feeding, select an appropriate formula based on the patient's specific needs
- It is important to know the formula contents

3:5:2- Steps to select the appropriate formula

- Evaluate the nutritional status
- Determine the amount of nutrients needed
- Discuss with the doctor in charge to determine the route of feeding.
- Select the appropriate nutrition formula(s).

Categories of Enteral Formulas

- Polymeric formulas either Commercial or Blenderized
- Oligomeric formulas.
- Disease-specific formulas.
- Modular formulas (concentrated protein and carbohydrate preparations) to enhance protein and caloric content of enteral formulas.
- Standard: Intact protein, "meal replacement", may contain fiber or Hydrolyzed/Pre-Digested- Protein typically small peptides.

3:5:3- Formula suitable for pulmonary disease with CO_2 retention

(Mechanical Ventilation)

Formula clinically significant in reducing CO2 production called Pulmonary Formulas

- Formula low in carbohydrate and high in fat content while reducing CO_2 production.
- Decreased carbohydrate content and increased fat content (Provide high energy and produce less *CO_2)*
- High caloric density with intact proteins and fiber supplement.
- *Some formula contains Eicosapentaenoic* acid, gamma-linolenic acid, antioxidants no arginine supplementation.

3:5:4- Formula Room: -

To reduce the risk of infection. It is preferred to have the formula room, away from patients' side. It could be located in the nutrition department (Kitchen) of the hospital

The needs for formula room: -

1. Powder nutrition formula need reconstitution with water.
2. Use of more than one formula especially for open tube feeding system.
3. Addition of food supplement, antioxidants or medicine

3:6- Recommendation 6: Monitoring Nutrition Tolerance

Evaluation of delivery of enteral nutrition in mechanically ventilated ICU patients is very important (Keng et al., 2014). Gastric residual volume (GRV) monitoring is not reliable for monitoring nutrition tolerance (Elke et al., 2015). Recoding the protein and calories intake on daily basis. Gastric residual volume should not be used to avoid the risk of aspiration pneumonia. Patients should be monitored by laboratory investigations and passage of stool and gas.

3:6:1 Complications of tube feeding to be monitor

- Infection
- Aspiration
- Diarrhea
- Metabolic disturbances.
- Refeeding syndrome
- Alterations in drug absorption and metabolism

The complications should be minimized. In case of refeeding syndrome, 25% of caloric goal should be started, in either enteral feeding if not possible then parenteral nutrition. The assessment of serum phosphate, magnesium and potassium levels to monitor their levels. The calories are slowly increased.

Treating respiratory distress is a priority when managing critically ill patients. Non-invasive ventilation (NIV) is increasingly used as a tool to prevent endotracheal intubation. Providing oral or enteral nutritional support during NIV may be perceived as unsafe because of the possible risk of aspiration so that these patients are frequently denied adequate caloric and protein intake. Newly available therapies, such as high-flow nasal oxygen (HFNO) may allow for more appropriate oral feeding (Pierre and Rattanachaiwong., 2018).

To eat or to breathe? The answer is both! Nutritional management during noninvasive ventilation

3:7- Recommendation 7: Nutrition for the Patient Undergoing Prone Positioning

(ASPEN April 2020) recommendation

Several retrospective and small prospective trials have shown EN during prone positioning is not associated with increased risk of gastrointestinal or pulmonary complications, thus we recommend the patient requiring prone positioning receive early EN. EN is not contraindicated for patient undergoing prone positioning.

(ESPEN, Clinical Nutrition April 2020) statement

When patients are stabilized and even in prone position, enteral feeding can be started ideally after measuring indirect

- Calorimetry targeting energy supply to 30% of the measured energy expenditure.
- Energy administration will be increased progressively. During emergency times, the predictive equation recommending 20 kcal/kg/day could be used and energy increased to 50-70% of the predictive energy at day 2 to reach 80-100% at day4
- The protein target of 1.3 g/kg/day should also be reached by day 3-5. Gastric 374 tube is preferred but in case of large gastric residual volume (above 500 mL), duodenal tube should be inserted quickly.
- The use of enteral omega-3 fatty acids may improve oxygenation but strong evidence is missing. If intolerance to enteral nutrition is present, parenteral nutrition should be considered.
- Blood glucose should be maintained at target levels between 6-8 mmol/l, along with monitoring of blood triglycerides and electrolytes including phosphate, potassium and magnesium.

3:8- Recommendation 8: Nutrition Therapy During ECMO

(ASPEN April 2020) recommendation

One of the major barriers to Extracorporeal membrane oxygenation (ECMO). Enteral nutrition for patients with ECMO may be safe and tolerated. Study of patients with ECMO having EN found that 4.5% developed bowel ischemia.

Post-mechanical ventilation period and dysphagia

(ESPEN, Clinical Nutrition April 2020)statement

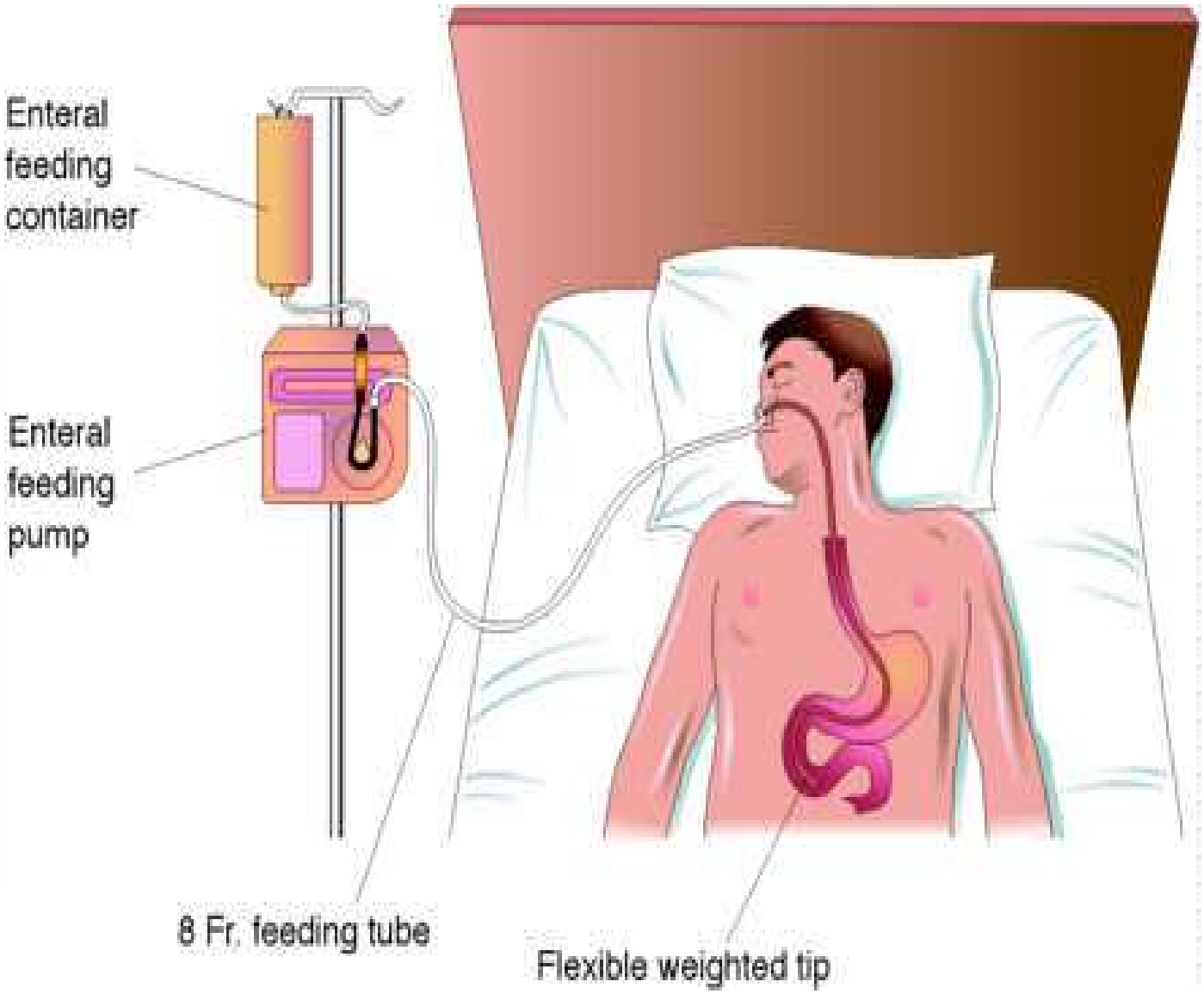
- Patients no longer needing mechanical ventilation have high incidence of swallowing problems and consequent dysphagia which may strongly limit oral nutrient intake, even at a time of general improvement of clinical conditions..
- In ICU patients with dysphagia, texture-adapted food can be considered after extubation. If swallowing is proven unsafe, EN should be administered. In cases with a very high aspiration risk, post pyloric EN or, if not possible, temporary PN during swallowing training with removed nasoenteral tube can be performed.
- The post-extubation swallowing disorder could be prolonged for to up to 21 days mainly in the elderly and after prolonged intubation , which makes this complication particularly relevant for COVID-19 patients
- The presence of severe post extubation dysphagia was associated with severe outcome including pneumonia, reintubation and hospital mortality. Recently ICU patients had prolonged post extubation swallowing disorder at discharge and some post extubation swallowing disorder has been shown 4 months after discharge

It is recommended referring patients recognized to have swallowing issues for swallowing evaluation, in order to prevent oral nutrition complications.

Next Review:- Notices and observations after implement of this clinical nutrition support guidelines for patients with COVID 19, can be send to email of the General Administration of Nutrition, MOH. (nutrition@moh.gov.sa).

God Bless

General Administration of Nutrition MOH KSA


Enteral feeding container
Enteral feeding pump
8 Fr. feeding tube
Flexible weighted tip

4- Standards (content) of the common pulmonary nutrition formula

Product Name			
	For Pulmonary Disease		
	Oxepa	Pulmocare	Nutren Pulmonary
Suggested Use	Tube	Tube/ Oral	Tube/ Oral
Flavors	Unflavored	vanilla	vanilla
Features Low CHO, caloric-dense Lactose-free, gluten-free	Unique oil blend (GLA, omega-3 FA: EPA,DHA)-anti-inflammatory, Anti-oxidants, low residue	Contains 20% of fat as MCT to enhance fat absorption Fortified with antioxidants, , low-residue	Contains 20% of fat as MCT to enhance fat absorption Fortified with antioxidants, low-residue
Indications	critically ill, mechanically ventilated patients, especially those with systemic inflammatory response syndrome, eg, sepsis, acute lung injury or ARDS (acute respiratory distress syndrome	high-calorie, low-carbohydrate formula designed to help reduce carbon dioxide production & respiratory quotient , for patients with chronic obstructive pulmonary disease (COPD), cystic fibrosis, or respiratory failure	high-calorie, low-carbohydrate formula designed to help reduce carbon dioxide production & respiratory quotient, for patients with chronic obstructive pulmonary disease), or respiratory failure
Serving Size	237 ml	250	250
Kcal/ml	1.5	1.5	1.5
Osmolality (mOsm/kgH2O)	535	489	450
PRO gm/ % kcal	14.8 / 16.7 %	16 / 17 %	17 / 18 %
CHO gm/ % kcal	25 / 28.1 %	26.5 / 28 %	25 / 27 %
FAT gm / % kcal	22.2 / 55.2 %	23 / 55 %	23.7 / 55 %
Na mg/ mEq	310 / 13.5	328 / 14.26	292 / 12.7
K mg/ mEq	465 / 11.9	490 / 12.56	468 / 12
Water (%)/ ml	79 % /186 ml	78 %/ 196 ml	78 %/ 195 ml
ml to meet 100% RDI	946 ml	947 ml	1000 ml

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Region……..

Hospital:….. ……

File No:

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Patient Name:

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ID

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Nutritional Screening Form

ADULT	INFANT	TODDLER/CHILD/ADOLESCENT
• Poor appetite > 3days • Patient on Clear liquid diet, full liquid diet, or NPO for more than 72 ours • Age is greater than 75 years. • Difficulty with swallowing/ chewing/Mouth Ulcers. • Gluten free, Glucose 6 Phosphate Dehydrogenase, Lactose. Intolerance • Psychological eating disorders. • Gastrointestinal Dysfunction (Diarrhea vomiting etc) more than 3 days. • Medical problems with special diet requirements (DM,HTN, Cardiac, Renal, Hepatic failure). • High risk pregnancy: (Hyperemesis, pregnancy Induced). • Hypertension, Pre-Eclampsia toxemia, Blood disorders, Gestational Diabetes Mellitus, Multiple Pregnancy, Pregnancy complicated with medical disorders, pregnant BMI>40). • Lactating with special diet needs, lactating BMI>40. • Obesity BMI>35. • Underweight BMI is less than 18.5. • Tube Feeding. • Pressure Ulcers. • Oncology patient on chemotherapy or radiotherapy with poor appetite and underweight. • Major surgery (Gastrointestinal tract surgery … ect).	• Poor/Inappropriate intake. • Patient on Clear Liquid diet, full liquid diet, or NPO for more than 72 hrs. • Failure to thrive. • Less than 35 weeks gestation. • Insufficient Weight gain. • Gastrointestinal Dysfunction (Diarrhea, vomiting) is greater than 2 days. • Therapeutic Formula. • Metabolic disorders such as Cow's milk allergy, gluten free, Glucose 6 phosphate Dehydrogenase, Lactose intolerance. Urea Cycle Disorder. Homcystinuria, Phenylketonuria, Maple Storage Disease, • Major surgery (brain surgery, Gastrointestinal surgery, head and jaw surgery, open heart surgery). • Pressure Ulcers. • Tube feeding. • Terminal/palliative care. • Very low birth weight less than 1.8kg. • Mouth Sores and Ulcers.	• Poor appetite > 3days • Patient on Clear liquid diet, full liquid diet, or more than 72 hrs. • Failure to thrive. • Weight for Height is less than 5 percentiles. • Weight for Height is greater than 95 percentiles. • BMI is less than 14. • Significant weight loss what is more than 2% of body weight per week. • Difficulty in swallowing / chewing. • Gastrointestinal Dysfunction (Diarrhea, Vomiting greater than 3 days. • Eating disorders (anorexia, bulimia). • Inborn errors of metabolic. • Oncology patient on chemotherapy or radiology poor appetite and underweight. • Major surgery (Gastrointestinal tract surgery … etc). • Pressure Ulcers. • Tube feeding. • Terminal/ palliative care. • Hepatic Failure. • Food and drug Interaction. • Albumin <25 mg/di

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Region……..

Hospital:….. ……

- File No: ……
- Patient Name: ……
- ID ……..……

Initial Nutritional Assessment Form

☐ Inpatient ☐ Outpatient ☐ Adult ☐ Pediatric

SUBJECTIVE

Diet History

Appetite

☐ Very good
☐ Normal
☐ Poor> 3 Days
☐ On tube Feeding
☐ Nil per oral

Complaints

☐ None ☐ Diarrhea
☐ Vomiting ☐ Nausea
☐ Constipation ☐ Bloating
☐ Heartburn ☐ Weight loss
☐ Epigastric pain ☐ Weight gain
☐ Others: ……..
……
……

Food Allergy

☐ No ……
☐ Yes ……

Eating Difficulties

☐ None
☐ Chewing
☐ Swallowing
☐ Others: ……
……
……

Activity

☐ Ambulatory
☐ Confined to bed
☐ paralyzed

Physician Diet Order

OBJECTIVE

Diagnosis ……	Age	Sex	☐ Male	☐ Female
Laboratory Results:	Weight	Pereentile		☐ NA

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		Height	Percentile		☐ NA
		IBW	BMI		☐ NA
		IBWA	IBWH		☐ NA
		Adjusted Body	Weight		☐ NA
		Corrected Age			☐ NA
		Food – Drug Interaction:			
ASSESSMENT	Nutritional Requirements	☐ Adequately Nourished ☐ Obese ☐ At risk of Malnutrition ☐ Malnourished			
PLAN	Type of Fedding	☐ Oral Feeding	☐ Tube Feeding	☐ Parenteral Feeding	

Patient and Family Education: ☐ Yes (if yes, please refer to patient/family education form)
No (please state your reoson):.....

Next appointment (outpatient) .....

Clinical Dietician's Signature:	Date and Time:
Physician's Signature:	Date and Time:

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Region: ……..

Hospital: ……

File No: ……..

Patient Name: ……

D.O.B: ……

Sex: ……..

Nutritional Re - Assessment Form

☐ Inpatient ☐ Outpatient ☐ Adult ☐ Pediatric

Subjective	Appetite	Complaints		Daily Nutritional Intake
	☐ Very good ☐ Normal ☐ Poor On tube feeding ☐ Nil per oral	☐ None ☐ Diarrhea ☐ Vomiting Nausea ☐ Epigastric pain	☐ Aspiration ☐ Heartburn ☐ Bloating ☐ Constipation ☐ Others	☐ Adequate ☐ Improved ☐ Inadequate
Objective & Assessment	New Food – Drug Interaetion	Weight Change ☐ Yes ☐ No If Yes ☐ Increased ☐ Decreased Total Energy Requirement		Laboratory Results

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	Type of Fedding	☐ Oral Feeding	☐ Tube Feeding	☐ Parenteral Feeding
PLAN				
	Discharge Plan (For Inpatients Only)			

Patient and Family Education: ☐ Yes (if yes, please refer to putient / family education form) ☐ No (please state your reoson):.....

Next appointment (outpatient) ..... Discharge plan:- .....

Clinical Dietician's Signature:	Date and Time:
Physician's Signature:	Date and Time:

1:4- Diagram illustrated the steps of nutrition counselling at MOH Hospitals