

## Special Article

## Nutritional Care of the COVID-19 patient

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### Abstract

**Background:** COVID-19 negatively impacts nutritional status on many levels. COVID-19 patients experience negative energy and nutrient balance due to increased nutritional needs and reduced nutrient intake. All patients with COVID-19, not only ICU patients, but even those who have moderate-to-severe infections of COVID-19 need appropriate nutritional care.

**Objective:** The aim of this special article is to revise and clearly pinpoint to key parameters related to nutritional care of individuals non ICU treated with or recovering from COVID-19, including those discharged from hospital and those managed entirely within the community.

**Methodology:** Website search engines and electronic databases such as PubMed and Cochrane were used. The literature reviewed examined guidelines, recommendations, policy/consensus statements and treatment pathways developed by scientific communities that were intended for healthcare professionals treating inpatients and outpatients with COVID-19.

**Results:** COVID-19 negatively impacts nutritional status on many levels. Pyrexia, sepsis, dyspnea increase nutritional requirements, simultaneously, food intake is reduced by the effects of the disease and its management (e.g. anorexia, breathlessness, chronic fatigue, excessive coughing, impact of management options (sedation, CPAP/NIV), loss of taste and smell, dysphagia, psychological factors (e.g. anxiety) and social restrictions associated with food access issues). Screening for malnutrition should be performed in all COVID-19 patients. Dietary advice and food fortification is a primary component of successful nutritional interventions. When dietary advice is not adequate, prescription of oral nutritional supplements (ONS) in patients with or recovering from COVID-19 in the community was proposed by scientific organizations.

**Conclusions:** Holistic care of patients with COVID-19 should incorporate nutritional screening/ assessment and appropriate nutritional care. Patients, who have severe but also those with moderate-to-severe infections of COVID-19, are at increased risk of malnutrition, which if unaddressed can deteriorate their nutritional status and affect function, rehabilitation and post COVID-19 quality of life.

**Keywords:** "COVID-19", "nutritional care", "screening for malnutrition", "dietary advice", "oral nutritional supplements", "malnutrition"

### Background

Since March 11, 2020, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection and related coronavirus disease 2019 (COVID-19) reached pandemic dimensions a number of researchers have focused on unraveling the different dimensions of successful interventions in patients afflicted by the pandemic. (Cucinotta et al, 2020)

Despite the fact that COVID-19 has recently emerged, and thus scientific data is far from robust, from the till now collected data on nutritional needs and effective nutritional interventions, it is evident from the knowledge acquired to date, that all patients with COVID-19, not only ICU patients, but even those who have moderate-to-severe infections of COVID-19 need appropriate nutritional care. Scientific research on conditions that present with similar symptoms and disease trajectories, pinpoint

towards the need for timely, measurable, achievable, relative and specific nutritional care.

Till now, epidemiological research on COVID-19 patients hospitalization rates, has shown that among this patient population, 32% patients have required hospitalization, 68% of those affected have been cared for in their own home or in residential homes (European Centre for Disease Prevention and Control, 2020). Acute COVID-19 can be nonsevere and initially managed at home in quarantine or severe and initially managed in the hospital, with possible ICU admission for critical disease and a higher likelihood of chronic/post-COVID-19 in the home setting or in the hospital. For this article the optimum nutritional care processes applicable for patients hospitalized non-ICU treated, for outpatients not needing hospitalization and for non-hospitalized chronic/post COVID-19 were examined.

**Purpose:** The aim of this special article is to revise and clearly pinpoint to key parameters related to nutritional care of individuals non ICU treated with or recovering from COVID-19, including those discharged from hospital and those managed entirely within the community. For this scope, a literature search was performed so as to identify relevant publications.

### Material and Methods

Website search engines and electronic databases such as PubMed and Cochrane were used. The literature reviewed examined guidelines, recommendations, policy/consensus statements and treatment pathways developed by scientific communities that were intended for healthcare professionals treating inpatients and outpatients with COVID-19. Our goal was to revise related information for adults with or recovering from a COVID-19. This included all inpatients non-ICU treated; those who were managed solely in the community and those discharged from a hospital admission, which may or may not have included an ICU admission. The key topic for review was nutrition support in patients hospitalized in the non-ICU COVID ward, those afflicted with COVID-19 infection not needing hospitalization, and those discharged from hospital in need of continuity of nutritional care from hospital into the community.

### Malnutrition and covid-19

COVID-19 negatively impacts nutritional status on many levels. COVID-19 patients experience negative energy and nutrient balance due to

increased nutritional needs and reduced nutrient intake. Epigrammatically, pyrexia, sepsis, dyspnea increase nutritional requirements, simultaneously, food intake is reduced by the effects of the disease and its management (e.g. anorexia, breathlessness, chronic fatigue, excessive coughing, impact of management options (sedation, CPAP/NIV), loss of taste and smell, dysphagia, psychological factors (e.g. anxiety) and social restrictions associated with food access issues (Managing Adult Malnutrition. A Community Healthcare Professional Guide to the Nutritional Management of Patients during and after COVID-19 Illness, 2020)

More analytically, the COVID-19 infection presents with a number of typical symptoms that impair dietary intake.

To begin with, patients afflicted by COVID-19 face respiratory issues that interfere with eating and drinking. Respiratory difficulties include coughing and breathlessness; gas trapping and early satiety, caused by gulping air while eating, and dry mouth due to breathing through the mouth, use of inhalers and oxygen therapy. (British Lung Foundation. 2020) All the above are potential shortcomings in patient's ability to nourish themselves properly. Among hospitalized patients with COVID-19, those with pneumonia, and hypoxemic respiratory failure managed with awake prone positioning or extracorporeal membrane oxygenation are at increased risk for acquired malnutrition because these therapies can limit nutrient intake via nutritional support. Moreover gastrointestinal symptoms and/or related to disease performed therapies can impair nutrient delivery, digestion and absorption in patients receiving enteral nutritional support.

Furthermore, a considerable number of Covid-19 patients experience loss of two valuable senses for spontaneous food intake, namely taste and smell and this can affect their appetite and desire to eat. (Xydakis et al, 2020)

Additionally, COVID-19 patients experience pyrexia, which increases nutritional requirements and are facing an unprecedented inflammatory response, which further increases nutritional requirements. (NHS, 2020)

And last but not least, COVID-19 patients treated in the community and those needing hospitalization post discharge experience

difficulties in performing activities of daily living related to shopping and cooking. These impairments in activities of daily living are attributed to fatigue and weakness that are relatively common in COVID-19 afflicted patients. Resultantly, they face additional obstacles in their efforts for a healthy and nutritious intake. Moreover, social distancing and self-isolation may reduce carer support at mealtimes and limit food provision as carers try to limit their interaction with COVID-19 patients and last but not least, as social interactions are prohibited the enhancement of dietary intake by social eating is non applicable.

Apart from the COVID-19 trajectory that increases the likelihood of malnutrition amongst patients, older age, preexisting comorbidities, and adverse social/environmental factors increase the risk of malnutrition and refeeding syndrome, in isolation but also in conjunction with the COVID-19. (Martindale et al 2019) It is indisputable and very well documented that many chronic diseases such as diabetes and cardiovascular diseases and their clustering in polymorbid individuals as well as older age per se are also very commonly associated with high risk and prevalence of malnutrition and worse outcomes. (Gomes et al 2018, Volkert et al 2019) COVID-19 patients facing more complications from the infection are those that also demonstrate chronic disease. Consequently the synergically effects of the infection and the chronic comorbidities on the nutritional status of COVID-19 patients are high.

An additional predisposing risk factor for malnutrition in post COVID-19 patients is ICU stay. It is well documented that the long-term prognosis of patients surviving intensive care is affected by physical, cognition and mental impairment that occurs following ICU stay. (Inoue et al 2019) Loss of skeletal muscle mass and muscle function may be tremendous and a major problem in ICU survivors. (Landi et al 2019) This may particularly apply to older adults and comorbid patients that are more prone to present with pre-existing catabolic conditions and impaired skeletal muscle mass and function. Prolonged reported duration of ICU stay above two weeks is likely to further enhance muscle-catabolic conditions.

This long duration of ICU stay, that is commonly the case amongst COVID-19 patients, is per se a well-documented cause of malnutrition leading

to poor quality of life, disability and morbidities long after ICU discharge. (Singer et al 2019)

In addition, inflammation and sepsis development in ICU may further and primarily contribute to enhance all the above alterations in the presence of SARS-CoV-2 infections.

### **Screening for malnutrition**

Screening for malnutrition should be performed in all COVID-19 patients in their first encounter with a health-care professional, irrespective of where the patient is placed (after hospital admission or at the primary setting). Moreover all patients with a negative screening test (meaning not at risk or at malnourished state) is recommended to be reassessed when there is clinical concern.

Special consideration and strict adherence to this guideline is impertinent for patients at risk of poorer outcomes, namely older adults and those with polymorbid conditions. The screening tool most widely used is the Malnutrition Universal Screening Tool ("MUST"), especially within the community, but across settings as well. A specific point should be emphasized: the need for screening for malnutrition amongst obese and overweight patients. Screening should be completed regardless of a person's BMI, as obesity can mask malnutrition and sarcopenia in patients with COVID-19. Nevertheless social distancing may prohibit screening for malnutrition. When clinically indicated; a patient can and should be screened for malnutrition risk by remote consultation. In order to ease the process and make it feasible, recalled and subjective measures (for weight and height) have been proposed by BAPEN (developer of MUST) and should be used if necessary with some screening tools. (British Association of Parenteral and Enteral Nutrition: Malnutrition Advisory Group.2020) Moreover, self-screening with a validated tool is also appropriate due to social distancing limitations associated with COVID-19 pandemic.

Screening for malnutrition is of limited use unless, the outcome of malnutrition screening is linked to a thorough nutritional assessment and a documented management plan appropriate for the patient's level of risk, with monitoring plans included. (British Dietetic Association Older People Specialist Group, 2020, British Dietetic Association Older People Specialist Group, 2020)

### **Diet prescription for a COVID-19 patient**

Energy and protein intake should be adjusted to meet the increased demands presented previously. Nevertheless special emphasis should be given to inhibitors of adequate micronutrient provision.

ESPEN (European Society for Parenteral and Enteral Nutrition) recommended malnourished patients with COVID-19 to consume 100% of the recommended daily intake (RDA) unless there are identified deficiencies, when higher intakes are required. In those unlikely to reach this due to poor dietary intake, over-the-counter once daily multivitamin and mineral supplements could be useful in the recovery phase. Another intriguing question is the relationship between vitamin D status and COVID-19. Vitamin D is the micronutrient most frequently discussed in the guidelines reviewed. Guidance from many organizations, including the BDA (British Dietetic Association), EFAD (European Federal Association of Dietitians) and ESPEN highlighted that vitamin D requires specific attention, particularly in adult patients with limited time outside, for whom it is recommended to consume supplementary 10 micrograms (400 International units) per day. However, it should be noted that this is an area of emerging evidence. (Dietheek, 2020)

### **Dietary advice**

Dietary advice is a primary component of successful nutritional interventions. Dietary advice aims to optimize dietary intake and incorporates practical personalized suggestions for meals and snacks, and for dealing with specific COVID-19 symptoms such as fatigue, nausea, or loss of taste. Social distancing is an inhibiting factor in delivery of dietetic advice. Nevertheless a dietary advice could be verbal including via remote consultation if required and supplemented via written patient information sheets.

Food fortification (a strategy to enhance the nutritional content of meals and snacks) should simultaneously be used. Nevertheless, quality and not only quantity should be emphasized when food fortification is proposed, and care should be taken to focus not just on increasing energy intake (calories) but to also ensure adequate protein, vitamin and mineral intakes are achieved. It is well documented that protein requirements are higher in those recovering from

illness, and in individuals with sarcopenia, which is relevant to COVID-19. For appropriate management of sarcopenic or non-sarcopenic patients, protein intake should ideally be spread across the day and included in all meals and snacks. Food fortification can be achieved either by "natural" food or by the use of over the counter nutritional supplements, which can be purchased from supermarkets, pharmacies or online to assist in fortifying the diet. (Brugliera et al 2020)

### **Oral Nutritional Supplements**

When dietary advice is not adequate or appropriate so as to enhance energy and overall nutrient intake, prescription of oral nutritional supplements (ONS) in patients with or recovering from COVID-19 in the community was proposed by scientific organizations. (Managing Adult Malnutrition, 2020)

Nevertheless, special emphasis should be placed on identifying those that would benefit more from ONS and to appropriately prescribe ONS as a supplement to fortified meals and snacks and not as a meal replacement as is often the case in clinical practice. (Ingadottir et al 2019) Moreover, amongst different products it is impertinent that the clinician chooses the most appropriate one. A general guideline is to prescribe in this patient population ONS that provide at least 400 kcal/day including 30 g or more of protein/day for at least one month. Efficacy and expected benefit of ONS shall be assessed once a month. When compliance is questioned, more frequent evaluation of treatment and potential indication to modify ONS could be needed (e.g. weekly).

Prescription should be tailored to flavour preferences and consider the patient's physical function and the potential presence of dysphasia.

Limited research on the topic indicates that high protein ONS may be beneficial in certain subgroups with COVID-19, such as older patients, those with chronic conditions or those who have been recently discharged from the ICU; smaller volume (more energy and nutrient dense) ONS seem to be more suitable for those struggling with large volumes; for powdered ONS, as they require the ability to mix and the availability of other ingredients (e.g. milk), it was recommended that consideration needed to be given to the convenience of such a format during the pandemic, with some documents

highlighting patient suitability questions. (British Dietetic Association, 2020)

## Conclusion

Holistic care of patients with COVID-19 should incorporate nutritional screening and appropriate nutritional care. Patients, who have severe but also those with moderate-to-severe infections of COVID-19, are at increased risk of malnutrition, which if unaddressed can deteriorate their nutritional status and affect function, rehabilitation and post COVID-19 quality of life. Nutritional rehabilitation is important for patients recovering from COVID-19 infection, particularly for those who have spent a period of time in intensive care. A number of parameters related to infection with COVID-19 predispose afflicted patients to malnutrition and sarcopenia.

Personalized dietary advice, food fortification and consumption of ONS may compact malnutrition in malnourished COVID-19 patients, particularly patients who are likely to struggle to consume adequate amounts of protein-rich foods, for example, older patients, those with chronic co morbid conditions and patients who have been discharged from intensive care.

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