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Narrative Review of Optimizing Nutritional Support in Critical Situations: Strategies and Considerations for Enhanced Outcomes

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Abstract

Context: In critical situations, such as severe illness, trauma, or surgical interventions, adequate nutrition plays a crucial role in supporting patient recovery and improving outcomes. Optimizing nutritional support becomes paramount during these challenging circumstances. This manuscript aims to explore various strategies for enhancing nutritional support in critical situations.

Evidence Acquisition: A search on the subject of electronic journals and databases, including PubMed, Scopus, SID, Iran Medex, and Google Scholar, was conducted from 2018 to 2023.

Results: By examining the latest research and evidence-based practices, the results of this study highlight several key strategies and considerations for optimizing nutritional support in critical situations, ultimately leading to enhanced patient outcomes. Firstly, individualized nutrition plans tailored to the specific needs of each patient emerged as a crucial factor. By considering factors such as age, underlying medical conditions, severity of illness, and metabolic demands, healthcare professionals can design personalized nutrition interventions that meet the unique requirements of critically ill patients. This approach ensures that patients receive adequate macronutrients, micronutrients, and fluid balance, promoting optimal healing and recovery. Additionally, close monitoring and regular reassessment of nutritional status are essential components of optimizing nutritional support in critical situations. Regular assessment of weight, body composition, biochemical markers, and functional parameters allows healthcare providers to identify any deficiencies or imbalances promptly. Adjustments to the nutrition plan can then be made accordingly, ensuring ongoing adequacy and preventing complications related to undernutrition or overfeeding.

Conclusions: By implementing these strategies and considerations, healthcare professionals can optimize nutritional support in critical situations, leading to enhanced patient outcomes, reduced complications, and improved overall well-being.

Keywords: Nutritional Support, Critical Situations, Strategies

1. Context

Nutritional problems, including malnutrition, are observed in 40% of patients with critical conditions, as well as in about 60% of patients hospitalized in the intensive care unit (ICU) due to digestive issues (such as intestinal motility disorders or malabsorption) and low-calories consumption (1). Acute malnutrition associated with disease leads to muscle wasting, delayed wound healing, failure to wean off the ventilator, and possibly a higher rate of infection due to prolonged hospitalization (2). In fact, during conditions such as severe diseases, sepsis, respiratory failure, trauma, and burns, the body is in critical and uncontrolled hypercatabolic states, which cause energy depletion and loss of muscle mass. On the other hand, nutrients are quickly consumed, proteolysis occurs, and a negative nitrogen balance is created. Meanwhile, a temporary but strong resistance to insulin is established in the muscles, which exacerbates the patient's condition. All these factors manifest as weight loss, sarcopenia, and malnutrition in the patient. This situation increases the

duration of the patient's hospitalization, delays recovery, raises complications, and ultimately increases mortality (3, 4).

Another condition that causes disturbances in the feeding process and digestive problems is long-term, strenuous activities for people who have not experienced such situations. For example, the Arbaeen walk is one of the largest religious gatherings in the world, where the large population results in various problems and diseases in the body. We witness the occurrence of infectious diseases, non-observance of hygiene measures, respiratory diseases, and nutritional and digestive issues. Factors such as fatigue and inadequate nutrition present significant health challenges for people participating in this event. Regarding digestive problems, factors such as lack of coordination between people's eating habits, the use of non-packaged foods, and even the use of common consumables, along with the desire of people to try new foods offered along the walking route, can be considered contributors to this issue. Here, individuals require effective and appropriate nutritional support to help them reduce complications. For example, by providing enough food, water, and medical assistance to a large number of participants, it is possible to help prevent diseases and related problems (5, 6). Nowadays, artificial nutrition has also become a primary therapeutic intervention to prevent complications in critical situations (7).

The current study was carried out with the aim of examining nutritional support in critical situations, focusing on optimizing nutrition and protecting individuals against these situations.

2. Evidence Acquisition

This study is a narrative review aimed at identifying and evaluating strategies for optimizing nutritional support in critical situations, including mass gatherings. The objective is to provide healthcare professionals with evidence-based recommendations to enhance patient outcomes in such circumstances (8-10).

An advanced search was conducted in both Persian and English databases using the following keywords: "Nutritional support," "strategies," "critical situations," and "mass gatherings." These keywords were used individually and in combination. The databases searched included PubMed, Scopus, SID, Iran Medex, and Google Scholar, covering publications from 2018 to 2023. The search was further refined to include only those articles that focused specifically on nutritional support in critical conditions, such as trauma, ICU patients, or during mass gatherings like religious events. To ensure comprehensiveness, the following strategy was applied:

(1) Keyword combinations such as "nutritional support and critical illness," "nutritional strategies and ICU," "nutrition and trauma," "mass gatherings and nutrition," and "nutrition and infectious diseases in mass gatherings" were utilized.

(2) The search was limited to articles in both languages (Persian and English) and publication types that focused on clinical trials, systematic reviews, meta-analyses, and relevant observational studies.

(3) The inclusion criteria required articles to specifically address nutritional support methods, outcomes, and challenges in critical conditions and mass gatherings.

(4) Studies that did not directly address critical situations or mass gatherings or lacked detailed nutritional recommendations were excluded.

In total, articles were selected and thoroughly reviewed based on their relevance to the study objectives, which are:

- To explore various strategies for nutritional support in critical situations,

- To identify the role of individualized nutritional plans for critically ill patients,

- To provide insights into the challenges and solutions for both enteral and parenteral nutrition,

- To address nutritional concerns in mass gatherings, with a focus on large-scale religious events, such as the Arbaeen pilgrimage.

3. Results

Early identification and management of nutritional problems are very important. To provide nutritional support to patients in critical conditions, it is necessary to first assess needs, prioritize, screen, and evaluate nutritional status. Assessing nutritional needs is essential to identify vulnerable groups and determine intervention priorities (11).

In nutritional assessment, we seek to diagnose nutritional problems such as malnutrition in patients and determine its degree. However, in screening, we identify patients who are at risk of malnutrition, which can help us prevent future complications. Screening and

its tools are quick and relatively accurate methods to identify nutritional problems, including malnutrition. The Malnutrition Universal Screening Tool (MUST), Malnutrition Screening Tool (MST), and Short Nutrition Assessment Form (MNA-SF) are among the common screening tools. To classify patients based on these tools, it is necessary for a physician to examine the patient from this perspective (11-13). In this way, to plan nutritional support, we need to identify patients at risk in the first step, which we accomplish using screening tools. Screening should be conducted for all patients within 24 to 48 hours of hospital admission, as well as for patients in general and ICUs. This screening should be followed up by a physician or nursing team. After examining the patient, if the person is found to be malnourished, a nutritional care plan should be developed based on the assessments and severity of malnutrition (14).

3.1. Nutritional Support Methods

Nutritional support can be provided in different ways, including enteral and intravenous nutrition.

3.1.1. Enteral Nutrition and Challenges

Enteral nutrition is implemented in various ways such as continuous, cyclic, intermittent, and bolus techniques. These methods can be used alone or in combination. Continuous feeding consists of hourly administration of nutrition over a 24-hour period using a feeding pump, which is used for critically ill patients. Cyclic feeding includes a period of time less than 24 hours in which a feeding pump is typically used. Intermittent feeding is defined by the administration of bouts lasting 20 - 60 minutes, three to six times per day, using a pump or gravity drip. Bolus feeding is administered over 4 to 10 minutes using a syringe or gravity drop. Intermittent feeding or bolus feeding can be more beneficial than continuous feeding for critically ill patients, as well as for patients who are in stable condition and have feeding tubes placed in the stomach, because it provides the patient with more mobility and freedom in terms of comfort (15).

There are also challenging situations in the field of enteral nutrition. For example, incorrect tube positioning can be an issue. Initially, a gastric tube may be suitable, but in patients who have a possibility of aspiration, intubation in the jejunum is more appropriate. To reduce the error in tube placement, it is necessary to perform ultrasound and imaging to identify the correct position of the tube. Additionally, it is important to calculate the duration of tube use so that it can be replaced with a new tube if needed. In patients who require respiratory assistance, such as those on a ventilator, determining the volume of oxygen consumption requires knowledge of the calories consumed by the patient, which can present a challenge in this nutritional method. In a specialized care environment, there is a risk of contamination with this type of feeding, which requires additional training on how to maintain and protect these tubes. Moreover, the use of enteral nutrition in certain diseases can cause complications for the patient, necessitating a more detailed examination and careful consideration of the individual's condition before choosing the right time for intubation. Nutritional interruptions are other issues that patients may encounter at times, such as being NPO (nothing by mouth) for surgery, food intolerance, and tube dysfunction, which can reduce the patient's caloric intake. Long-term hospitalizations in ICUs and prolonged use of feeding tubes can lead to digestive complications such as vomiting, diarrhea, and intestinal ischemia. This scenario requires closer monitoring of the patient and efforts to improve nutritional status. A lack of specialized staff, such as nurses in the ward, can also negatively affect the implementation of this feeding method (16).

3.1.2. Intravenous Nutrition and Challenges

Intravenous nutrition is useful for patients who cannot tolerate enteral nutrition or who suffer from conditions such as intestinal failure, ileus, and intestinal ischemia. This type of nutrition contains carbohydrates, hydrolyzed amino acids, and lipid emulsions with vitamins. Despite its advantages, this method of nutritional support also has complications. For instance, central venous catheters, both short-term and long-term, are associated with infectious complications. Additionally, due to the development of safe and less inflammatory fat emulsions in the composition of this nutrition, there is often a decrease in carbohydrate content, leading to hyperglycemia, which remains the most common complication of this method. To prevent this complication, we should start feeding slowly while continuously monitoring blood glucose levels. Lipid emulsions are a crucial component of intravenous nutrition; however, high concentrations of linoleic acid can suppress the immune system due to

its pro-inflammatory properties. Currently, other types of lipids are used in the formulation of these products, which can partially mitigate this complication (17).

In general, the diversity and flexibility of nutritional support programs are necessary according to critical conditions and target groups. After the implementation of the program, monitoring and evaluation are required to ensure the achievement of goals and their effectiveness. Key indicators such as malnutrition recovery rates, access to nutritional services, and stakeholder satisfaction should be monitored regularly. In this context, common challenges include a lack of financial resources, insecurity, limited access to infrastructure, and shortages of specialized human resources. Coordinating different organizations, utilizing new technologies, and garnering political and public support are among the key solutions to overcoming these challenges.

4. Conclusions

Based on the above findings, it can be concluded that optimizing nutrition in critical situations requires comprehensive planning, food diversity, the use of local resources, education and awareness, as well as cooperation and partnership between different organizations. In fact, in the first step, planning and forecasting play a vital role in ensuring access to sufficient and healthy food. In the second step, by creating a variety of food options, it is possible to maintain health and improve an individual's immune system. Continuing to utilize local resources enhances the stability and flexibility of food systems during times of crisis.

In addition, educating and informing people about proper eating methods and effective solutions can prevent malnutrition and the development of health problems. Finally, cooperation and participation among various governmental and non-governmental institutions are essential for the fair distribution of food, resources, and the improvement of nutrition quality during crises. In this context, healthcare professionals can optimize nutritional support in critical situations by implementing effective strategies and solutions to enhance nutrition, leading to improved patient outcomes, reduced complications, and better overall patient well-being.

Footnotes

Authors' Contribution: Mahdieh Razi and Monir Ramezani conducted title and full-text screening. Fatemeh Shaban extracted data. Mahdieh Razi and Fatemeh Shaban drafted the first version of the manuscript. Mahdieh Razi conceived the study, provided methodologic and content expertise, and supervised all steps of the study. All authors reviewed the article and approved its content.

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