



REVIEW ARTICLE

# Association between nutritional status and outcomes in critically-ill pediatric patients – a systematic review<sup>☆</sup>



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## KEYWORDS

Nutritional status;  
Pediatric intensive  
care unit;  
Mortality;  
Length of stay;  
Mechanical  
ventilation

## Abstract

**Objectives:** To systematically review the evidence about the impact of nutritional status in critically-ill pediatric patients on the following outcomes during hospitalization in pediatric intensive care units: length of hospital stay, need for mechanical ventilation, and mortality.

**Data source:** The search was carried out in the following databases: Lilacs (Latin American and Caribbean Health Sciences), MEDLINE (National Library of Medicine United States) and Embase (Elsevier Database). No filters were selected.

**Results:** A total of seven relevant articles about the subject were included. The publication period was between 1982 and 2012. All articles assessed the nutritional status of patients on admission at pediatric intensive care units and correlated it to at least one assessed outcome. A methodological quality questionnaire created by the authors was applied, which was based on some references and the researchers' experience. All included studies met the quality criteria, but only four met all the items.

**Conclusion:** The studies included in this review suggest that nutritional depletion is associated with worse outcomes in pediatric intensive care units. However, studies are scarce and those existing show no methodological homogeneity, especially regarding nutritional status assessment and classification methods. Contemporary and well-designed studies are needed in order to properly assess the association between children's nutritional status and its impact on outcomes of these patients.

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**PALAVRAS-CHAVE**

Estado nutricional;  
Unidade de Terapia  
Intensiva Pediátrica;  
Mortalidade;  
Tempo de internação;  
Ventilação mecânica

## Relação do estado nutricional com desfechos em pacientes pediátricos críticos – Revisão sistemática

**Resumo**

**Objetivos:** Revisar, de forma sistemática, as evidências acerca do impacto do estado nutricional de pacientes pediátricos críticos sobre os seguintes desfechos durante a internação em Unidades de Terapia Intensiva Pediátrica: Tempo de internação, necessidade de ventilação mecânica e mortalidade.

**Fonte de dados:** A busca foi realizada nas seguintes bases de dados: *Lilacs* (Literatura Latino-Americana e do Caribe em Ciências da Saúde), *Medline* (National Library of Medicine Estados Unidos), e *Embase* (*Elsevier Base de Dados*). Não houve seleção de filtros.

**Resultados:** Foram incluídos sete artigos relevantes sobre o tema. O período de publicação variou entre 1982 e 2012. Todos avaliam o estado nutricional de pacientes no momento da internação em Terapia Intensiva Pediátrica e relacionam com pelo menos um desfecho estudado. Foi aplicado um questionário de qualidade metodológica criado pelos autores. Ele foi baseado em algumas referências e experiência dos pesquisadores. Todos os estudos incluídos alcançaram os critérios de qualidade, porém apenas quatro, atenderam à todos os itens.

**Conclusão:** Os estudos incluídos nesta revisão sugerem que a depleção do estado nutricional está relacionado com piores desfechos em Terapia Intensiva Pediátrica. Porém os estudos são escassos, e os existentes, não tem uniformidade metodológica, em especial nos métodos de avaliação e classificação do estado nutricional. São necessários estudos atuais e bem delineados com o objetivo de avaliar adequadamente esta relação entre o estado nutricional de crianças e sua repercussão nos desfechos destes pacientes.

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**Introduction**

Critically-ill pediatric patients can have a number of organic alterations, leading to a state of metabolic stress. Therefore, in many cases, the nutritional needs of these patients can be increased.<sup>1</sup> The inadequate supply of nutrients can result in worsened nutritional state leading to malnutrition, which has been associated in several studies with increased mortality and hospitalization time, as well as a higher number of organ dysfunctions and complications.<sup>2,3</sup> The analysis of the cumulative protein calorie deficit in children admitted to a pediatric intensive care unit (PICU) in the Netherlands showed a significant association between this deficit and reduced Z-score for weight and arm circumference.<sup>4</sup>

There are many barriers to adequate nutritional supply in the PICU, which contributes to nutritional status deterioration. Among them, the most often mentioned in the literature are: gastrointestinal disorders, pause for procedures, and fluid restriction; however, to what extent these barriers can be preventable is a matter of debate.<sup>5,6</sup>

This group of critically-ill patients is extremely vulnerable. Their nutritional status at admission and its possible deterioration during hospitalization can be a predictor of worse outcomes.<sup>7-9</sup>

This study aimed to systematically review the evidence about the impact of nutritional status in critically-ill pediatric patients on the following outcomes during PICU hospitalization: length of hospital stay, need for mechanical ventilation (MV), and mortality.

**Methods****Data source**

A research protocol was developed, in which the authors defined the aim, keywords, search strategies, database definition, inclusion and exclusion criteria, and methodology to be used by the reviewers. The search was carried out in the following databases: Lilacs, Medline and Embase. No filters were selected.

**Descriptors**

The descriptors used for the search were: *Nutritional Status* (Estado Nutricional) and *Intensive Care Units Pediatric* (Unidade de Terapia Intensiva Pediátrica). The combination of descriptors for the Lilacs and MEDLINE databases was: “*Nutritional Status*” AND “*Intensive Care Units Pediatric*” For the Embase database, the following combination was used: “*Nutritional Status*” AND ((*Intensive Care Units AND Pediatric*) OR (*Intensive Care Units AND Child\**)).

**Inclusion criteria**

Original studies conducted in patients aged between 1 month and 18 years, admitted to a PICU, that assessed the association between nutritional status of these patients and

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