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The impact of malnutrition on immunity in respiratory infections

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Introduction : Pneumonia is known as one of the leading cause of death in children. Malnutrition in children under 5 years old increases the risk of death, amplifying the severity, frequency, and complications of pneumonia with an unfavorable prognosis. Malnutrition is a global health problem with different implications. The malnutrition causes are: poverty, world conflicts, lack of education, natural desaster and poor access to health care. **Fig.1.** The mechanism of this vicious circle is the disorder of immunity, thus affecting the immune responses of the host including cell-mediated immunity.

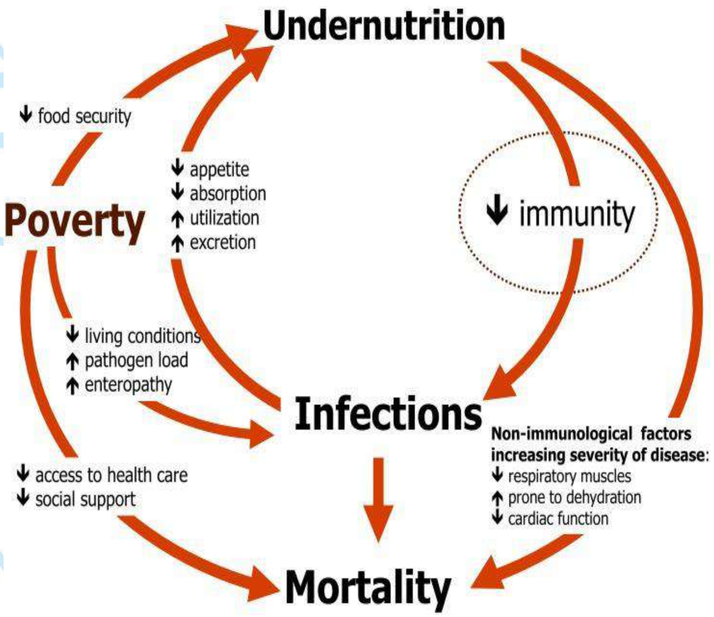

Figura 1. Conceptual framework for the relationship between malnutrition, invetions and poverty.

Keywords: pneumonia, malnutrition, immunity, children.

Purpose: to establish the link between immune status, pneumonia, and malnutrition with outlining predictive markers of worsening.

Material and methods:

The PubMed database were used for a systematic research using the articles from 2009-2019 only. This including research studies about parameters of the immune status in children with pneumonia and malnutrition between the ages of 1-60 months old.

Results: Stimulating an immune response through respiratory infection rises the demand for anabolic energy metabolic derivative, which leads to a metabolic disorder. More than that, a respiratory infection itself can cause a critical loss of protein and energy stores. During an immune response, energy expenditure increases at the same time as the infected host experiences a decrease in nutrients intake. Furthermore, the negative nitrogen balance seems to correlate with body weight loss. Thus, malnutrition can be a consequence of repeated respiratory infections.
Experimental clinical trials reports immune distress as an immediate consequence of malnutrition of thymus and bone marrow atrophy. The consequences are devastating because these organs are producing T and B cells, thus clearly affecting hematopoiesis, causing anemia, leukopenia, also decreases the ratio of CD4/CD8/CD25/CD71/CD3 lymphocytes in the spleen, and increases the number of immature lymphocytes in the peripheral blood. There is a decrease in leptin levels and an increase in secretory Ig A for patients with malnutrition in respiratory infections. There are a multitude of immune parameters which are affected in malnutrition or remain within the normal limits – **Fig.2.** Morphological changes of thymic epithelial cells associated with decreased production of thymic hormone, have also been described in malnutrition – **Fig.3.**

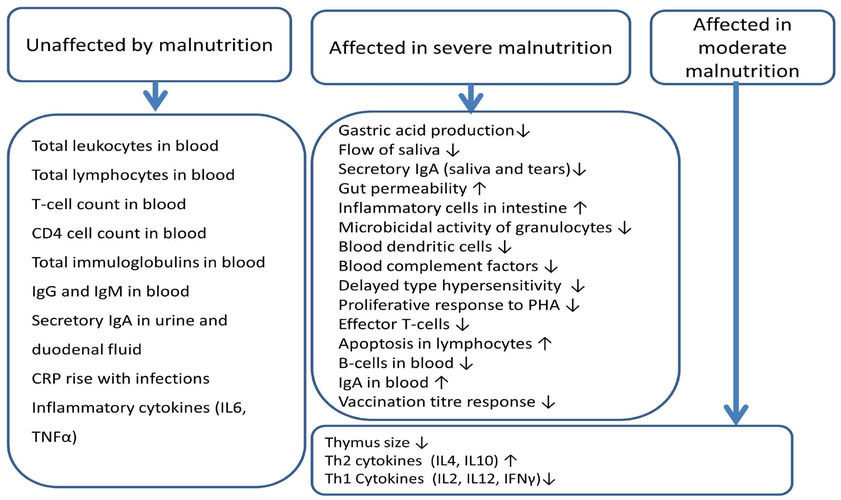

Fig.2. Summary of affected immune parameters/ unanfected by malnutrition.

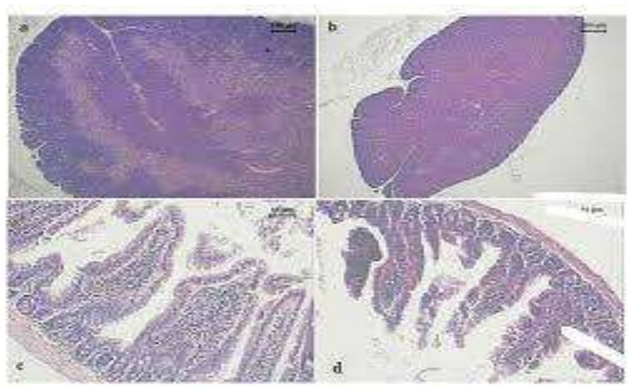

Fig.3. The effect of dietary restriction of thymus framework (a and b) and the small intestine (c and d). Mice were fed with a normal diet (left side) and 80 % from normal diet (right side. Sections were obtained 40 days late and stained with hematoxylin and eosin.

Conclusions:

Certainly, the need for the future studies is required. Those described may be used as markers of worsening in malnourished children with pneumonia, which lead to immune imbalance. It is necessary to assess the link between the imbalanced immune system and the worsening of pneumonia in malnourished children, as well as the rate of morbidity and predictive markers for worsening pneumonia in this children.