Understanding Severe Acute Malnutrition: A Systematic Review

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Abstract

Severe acute malnutrition (SAM) affects 13 million children under the age of 5 worldwide, and contributes to 1-2 million preventable deaths each year. Malnutrition is a significant factor in approximately one third of the nearly 8 million deaths in children who are under 5 years of age worldwide. There have been many iterations of the identification and the treatment of SAM over time; however the precipitation risk factors of this preventable condition are not well understood. There are many risk factors that contribute to the development SAM as a child, and this systematic review serves to highlight the most common variables that lead to this preventable cause of mortality. An exhaustive review of PubMed was conducted to complete this review. The literature review demonstrated that the most common risk factor for the development of SAM is **low maternal education**.

Introduction

Severe Acute Malnutrition (SAM) is defined as a weight-for-height measurement of 70% or more below the median, or three SD or more below the mean National Centre for Health Statistics reference values, which is called "wasted"; the presence of bilateral pitting edema of nutritional origin, which is called "edematous malnutrition", or a mid-upper-arm circumference of less than 110 mm in children age 1–5 years. There are classically two forms of protein energy malnutrition: Kwashiorkor and Marasmus. Both forms are deficient in protein; however, their etiologies and clinical presentations are different. Marasmus, stemming from the Greek terminology meaning "withering" is classified as severe wasting. In contrast to marasmus, which is previously described as a chronic malnutrition of total calorie deprivation where the body is able to adapt the under nutrition for a prolonged period of time, Kwashiorkor is specifically a deprivation of protein in the child's diet and presents in a much different way. This type of malnutrition is often an acute process as a result of a rapidly decreasing nutrients. Severe acute malnutrition is a major condition of importance globally causing millions of preventable deaths. In order to address this epidemic, identifying the risk factors that lead to the development of this illness provide a foundation to remedy the issue. Many studies have evaluated numerous risk factors associated with SAM. This review will assess the current literature regarding the risk factors leading to SAM and create a novel platform to address this key global health concern.

Methods

A literature search was conducted throughout the NCBI Pub-med data base to complete this systematic review by one person. The search terms included keywords "Severe Acute Malnutrition" "Children" "Risk Factors". The types of studies that were included in the review included randomized control trials, case controls, cross-sectional studies, and case reports that investigated risk factors associated with the development of severe acute malnutrition. The studies included investigated children under the age of 18 with severe acute malnutrition determined by the World Health Organization criteria of weight for height <3 SD from WHO growth standards. Systematic reviews were excluded from this review. Additional exclusion criteria include any study that chose specific risk factors to evaluate prior to the study to decrease likelihood of any confirmation bias and studies that were not in English language. There were no restrictions on publication dates.

Results

PubMed Search Terms:
"Severe Acute Malnutrition"
"Children"
"Risk Factors"

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243 Articles

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15 Articles
(after inclusion and exclusion criteria applied)

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Most common risk factors:
- Low maternal education
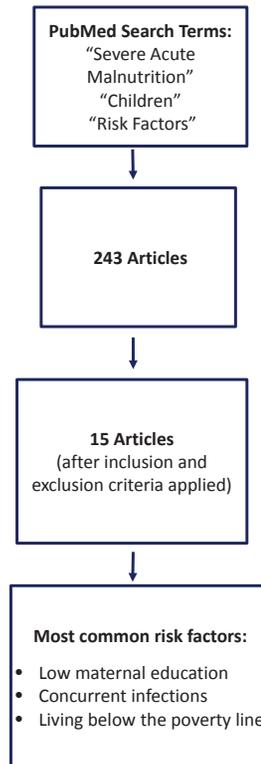- Concurrent infections
- Living below the poverty line

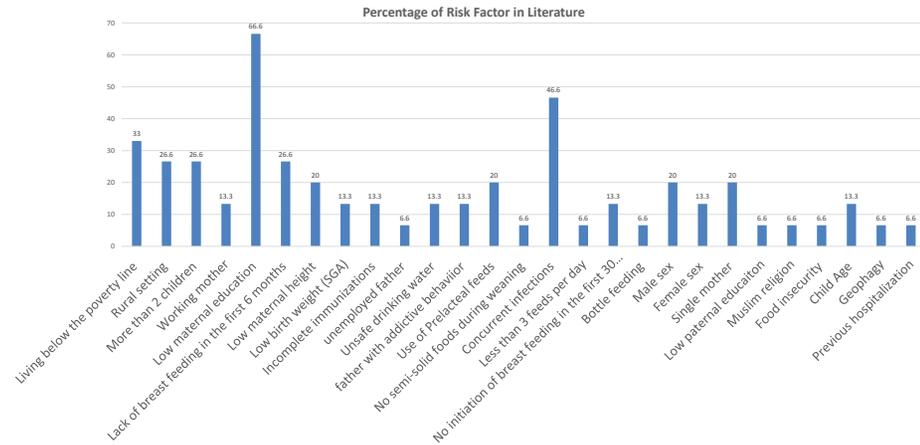Figure 1: Schematic of systematic review methods

Figure 2: The frequency with each risk factor present throughout the various publications examined

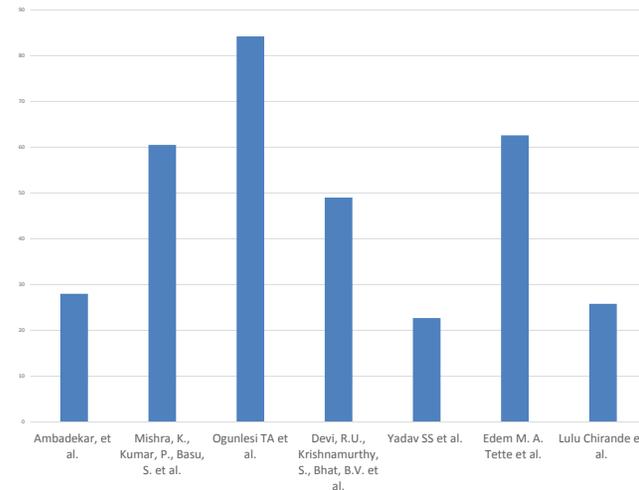**Percentage of Low Maternal Education in Children with Severe Acute Malnutrition**

Figure 3 demonstrates the percentage of children with SAM and a mother with low education status per publication.

Discussion and Conclusions

- The development of Severe Acute Malnutrition is multifactorial associated with many potential risk factors

- The most common risk factor in the current primary literature is low maternal education, followed by the presence of concurrent infections and living below the poverty line

- Measures to improve female literacy around the world can potentially make major improvements in eliminating this preventable disease

Acknowledgements