Chapter 17
Protein Energy Malnutrition in Children:
Prevention System

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ABSTRACT

The current management to prevent Protein Energy Malnutrition (PEM) is examined and the use of technological tools such as Electronic Health Records (EHR) systems and mobile solutions are employed to prevent the development of PEM and its complications. Implementation of technological solutions in healthcare is a critical factor in achieving better health outcomes as documented in some parts of the world. Sub-Saharan Africa is behind on the adoption of electronic health records and other health information technology solutions due to several challenges such as lack of funding and infrastructure required to implement its use. Recent studies show that Sub-Saharan Africa is slowly gravitating towards adoption of health information technology particularly EHR systems and mobile solutions because of the need to find solutions to its healthcare crisis. Development of a PEM prevention system using these tools to enhance the current management will improve patient health outcomes and decrease the mortality rate of PEM.

INTRODUCTION

According to World Health Organization (2020) Malnutrition refers to "deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers two broad groups of conditions. One is 'undernutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related noncommunicable diseases." 52 million under-fives were suffering from wasting having a low weight for height, approximately 45% of deaths among children under five are due to under nutrition-WHO (2020). Several factors such as poverty, lack of education by the caregiver, culture and other socioeconomic reasons interplay

resulting in malnutrition, of these factors poverty was a major contributor. In 2015, the first goal of the United Nations Millenial Development Goal(MDG) was to eradicate extreme poverty and hunger. This is because of the burden of disease to public health, causing an increase in the number of undernourished people globally particularly in the developing countries of the world. United Nations set forth strategies to eradicate poverty since 1990, however in 2011, it was noted that all developing regions except sub-Saharan Africa had met the target of halving the proportion of people who live in extreme poverty. According to the 2015 MDG report, one third of undernourished children globally are from sub-Saharan Africa, this is not surprising because the world bank reported that in 2015, 27 countries out of the world's 28 poorest countries were located in Sub Saharan Africa. This indicates a possible correlation between poverty and malnutrition, as evidenced by the number of undernourished children in that region. Poverty alleviation and medical management has not significantly reduced the morbidity and mortality from malnutrition in children. Exploration of technological tools such as the implementation of an interoperable Electronic Medical System and the use of mobile solutions to increase the efficiency of the current management strategies in place is by creating a prevention system. It was shown that mobile health apps helped to improve the relationship between physicians and patients thereby resulting in better health outcomes and increased patient satisfaction (Lu et al, 2010). The implementation of such technological health monitoring tools will be achieved by creating a robust network that ensures that end users are actively involved by having access to the required systems. This will require a lot of effort from all the stakeholders to implement and sustain the systems. This chapter also provides a review of challenges and barriers to implementation, with the aim of developing an interoperable EHR and custom made mobile solutions based on the peculiarities of the community that will benefit from the Protein Energy Malnutrition prevention system that will be created.

BACKGROUND AND AIMS

Malnutrition in children is endemic in developing countries and nations like Sub-Saharan Africa. Protein Energy Malnutrition is a form of Malnutrition, an energy deficit caused by deficiency of macro and micronutrients. Protein Energy Malnutrition can be primary, which is caused by an inadequate nutrient intake or secondary resulting from disorders or drugs which affect the use of nutrients in the body. The type commonly seen in children is the primary Protein Energy Malnutrition. Protein Energy Malnutrition comprises 3 types namely, Kwashiokor, Marasmus and Marasmic Kwashiokor. Protein malnutrition is predominant in Kwashiokor, Marasmus is marked by a deficiency in calorie intake while Marasmic Kwashiokor is defined by a marked calorie insufficiency and marked protein deficiency. Marasmic Kwashiokor is the most severe form of malnutrition.

Marasmus is caused by a diet which is low in energy, protein and essential nutrients. In developing countries it is commonly seen in infants born to poor parents, due to a combination of undernutrition and poor hygiene. Some of the reasons are that the children are weaned too early or abruptly, inability to buy food and lack of access to potable water to cook leading to contamination by bacteria. This predisposes to illnesses and poor appetite which causes a depletion of the child's energy. Children with marasmus are thin, lack subcutaneous fat and muscles. Kwashiokor is mostly seen in the second year of life after the child is weaned from breast milk to a starchy diet low in protein. Usually symptoms are pronounced following an infection such as measles and severe malaria. The child is not thin as seen with marasmus and the abdomen protrudes. The skin is dry and wrinkled, hair color is altered, and falls out easily leaving

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