

# Kwashiorkor in an Exclusive Breastfed Infant in a Sri Lanka

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**Abstract:** Protein energy malnutrition is a common problem in developing countries rather than developed countries. Protein energy malnutrition is mainly divided into two groups, such as acute protein energy malnutrition and chronic protein energy malnutrition. In acute protein energy malnutrition mainly decreased weight gain with normal linear growth resulting in wasting. But in chronic protein energy malnutrition both weight and height will be affected, and it may cause reduction of linear growth in leading to stunting. The World Health Organization (WHO) and UNICEF recommend in using weight for height to detect acute malnutrition and if a weight for height is less than -3 standard deviation it classified as severe acute malnutrition. WHO also recommended using mid upper arm circumference to assess severe acute malnutrition and cut off point taken as 110-115mm. Protein energy malnutrition can occur in any condition in which there is severe restraint of caloric intake. Additional reasons are increased requirements, poor absorption, impaired utilization, or excessive loss of nutrients. Severe acute malnutrition can be divided in to two, based on a clinical feature such as if present with pitting edema, and fatty liver called kwashiorkor, and if not, called marasmus. Our patient was five months old, an exclusively breast-fed child presented severe acute malnutrition with features of kwashiorkor from a very poor socio-economic background. We were able to manage the child with available resources without any complications.

**Keywords:** Severe Acute Malnutrition (SAM), Kwashiorkor, Exclusively Breast Feeding, Sri Lanka

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## 1. Introduction

Children with undernutrition is a major health care problem globally. According to the World Health Organization (WHO), severe acute malnutrition (SAM) is defined as mid-upper arm circumference (MUAC) less than 115mm or by a weight-for-height Z-score (WHZ) less than -3 or by the presence of bilateral pitting oedema. Kwashiorkor is a major classification of severe acute malnutrition, and its etiology remains elusive. It is anticipated to affect hundreds of thousands of children annually, but there are no accurate global prevalence records available. It is more common in developing countries and south Asia is the one of the most affected areas. In Sri Lanka more than 90% of mothers are exclusively breastfed up with 6 months of age of their children and kwashiorkor is very difficult to see in now a day. Our patient was a 5-month-old exclusively breast-feeding baby who was diagnosed with kwashiorkor and

successfully treated and went home without any complications. This may be the 1<sup>st</sup> reported case of kwashiorkor in an exclusively breast-fed child in Sri Lanka after good establishment of the primary health care system.

## 2. Case Report

A 5-month-old baby boy who was the 3rd child of non-consanguineous healthy parents from a poor socioeconomic family with 2 healthy siblings was admitted with a history of poor feeding, irritability, and reduced urine output for 3 day's duration. The baby was exclusively breastfeeding until admission.

He had a history of abdominal distention, generalized skin rash and oral thrush and poor weight gain in the last 4 months.

His antenatal period was complicated with maternal anemia requiring a double dose of iron treatment and

gestational diabetes mellitus; pregnancy induced hypertension at 32 weeks of gestation. Due to those maternal complications, the baby was delivered at 36 gestations by lower segment cesarian section with a birth weight of 2800g. The postnatal period was also uncomplicated.

On examination, his weight, length and occipitofrontal circumference were less than minus 3 standard deviations according to the child health development record.

The baby was afebrile, ill, less active, pale, generalized body edema and hypopigmented skin rash (flaky paint dermatitis). He had a 4cm-sized firm hepatomegaly.

He has had mild gross motor and fine motor development delay.

His investigations are as follows: FBC shows WBC 19500/ $\mu$ L, N-67%, L- 25%, platelet 176000/ $\mu$ L, Hb 6.5g/dl & the blood picture was iron deficiency anemia with bacterial infection. AST and ALT were marginally elevated with very low serum albumin levels. CRP was normal and the blood culture and urine culture were sterile.

The child was diagnosed to have severe acute malnutrition with kwashiorkor and probable sepsis.

We managed a child with good hydration, intravenous (IV) antibiotics, maintained normothermia and normoglycemia, IV 20% human albumin transfused, started a diet plan as NG feeding with formula milk mixed with coconut oil 3hrly (100kcal/kg/day) initially and later via orally with increase calorie amount as well. Also started thiamin, zinc, and multivitamin. Daily weight monitoring was done. Given tender loving care. Frequently monitored serum calcium, phosphate, and electrolyte to exclude refeeding syndrome. The child improved gradually with the recovering from edema and skin rash. Once the child improved, increased calorie intake gradually with iron treatment. Started supplementary foods initially with banana and butter in addition to formula milk. The latter dietary plan has been given according to their financial status. With our interventions, the child became active, well, good weight gain and gross motor and fine motor development delay also improved. We arranged clinics follow up regularly to assess growth and neuro development in our paediatric and nutritional clinic both.

### 3. Discussion

Childhood undernutrition is a major global health care problem, contributing to childhood mortality, morbidity, diminished intellectual development, and increased risk of adulthood diseases [1]. Malnutrition can be classified into 3 categories as mild, moderate, or severe according to the WHO classification with a decline in weight-for-length/height z-score as 1 for mild, 2 for moderate, and 3 for severe [2]. Severe acute malnutrition (SAM) affects almost 20 million preschool-age children, frequently from the African Region and South-East Asia Region. Malnutrition is a significant factor in nearly one third of the 8 million deaths in children who are under 5 years of age worldwide [3]. Globally, the most affected territories include Southeast Asia, Central America, Puerto, Congo, South Africa, Rico,

Jamaica, and Uganda. Prevalence can differ, but it is seen mainly during times of famine. Rural and farming communities are often affected the severest [4].

Even with more than 80 years of research, the specific causes and mechanisms leading to the onset and progression of kwashiorkor remain vague [5]. Although, in developing countries, it occurs predominantly because of primary protein calorie malnutrition. However, in developed countries, it is usually due to chronic disease rather than primary nutritional deficiency [6]. Lack of breast feeding (93%) was the main contributory factor for SAM in the less than 6-month age group [7].

Severe acute malnutrition (SAM) is classified into three categories, such as marasmus, kwashiorkor, or marasmic-kwashiorkor. [8, 9]. SAM is at present defined by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) by a mid-upper arm circumference (MUAC) less than 115mm or by a weight-for-height Z-score (WHZ) less than -3 or by occurrence of bilateral pitting oedema (WHO UNICEF Joint statement 2009). Kwashiorkor is defined as a form of severe malnutrition with nutritional oedema with depigmentation of skin and hair [10]. Clinical symptoms and signs of kwashiorkor and marasmus vary according to the protein depletion pattern in the body. Two key distinctive features of kwashiorkor are pitting edema and fatty liver pathology, which are both absent in cases of marasmus [11, 12]. If Kwashiorkor identified early, it can be treated on an outpatient basis with ready-to-use therapeutic food, but it is dreadful when it progresses to the point that it requires hospital admission [13].

It is mostly accepted that MUAC less than 110 mm is greatly associated with mortality in infants less than 6 months old [14].

Severe acute malnutrition is managed based on a 10-step approach such as i.e., to treat and to prevent hypoglycemia, hypothermia, dehydration, correct electrolyte imbalance, treat and prevent infection, correct micronutrient deficiency, start feeding, to achieve catch up growth, provide sensory stimulation and emotional support, and to prepare and plan follow up after recovery [15]. Usually, complicated SAM patients are managed with F-75/ F-100, but our child managed with a different dietary plan and successfully recovered.

### 4. Conclusion

Severe acute malnutrition is an extremely widespread and major public health problem mainly in the developing countries like Sri Lanka due to a highly variable economic crisis. Management is also a bit difficult due to the prevailing food crisis. But we have managed the baby successfully with available food resources without any problems.

### Author Contributors

MP: Data collection, designed and wrote the paper, P, A,

HS & G: Contributed to conceptualizing the paper and critically reviewing it. All the authors scrutinized and approved submitted version of the manuscript.

## Ethical Consideration

Anonymity and confidentiality of all data was maintained. Informed written consent was obtained from the parents.

## Conflict of Interest

The authors declare that they have no competing interests.

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