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Recovery From the Brink: A Case Report of a 37-Day-Old Severely Malnourished Infant Treated at a Nutrition Rehabilitation Centre

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Abstract

Undernutrition remains a pervasive public health issue that continues to impact millions of individuals, particularly in middle- and low-income countries. This case report highlights the remarkable recovery of a 37-day-old infant suffering from severe malnutrition following treatment at a Nutrition Rehabilitation Centre (NRC). The study outlines the clinical presentation, medical interventions, and nutritional rehabilitation strategies employed during the 37-day hospitalisation period. The infant's initial condition was characterised by severe malnourishment, life-threatening complications, and a dire prognosis. However, through a comprehensive multidisciplinary approach, including therapeutic feeding, medical care, and psychosocial support, the infant made a remarkable recovery. The report underscores the importance of early intervention and a holistic approach in the management of severe malnutrition cases, offering valuable insights into the potential for positive outcomes in even the most challenging cases.

Categories: Preventive Medicine, Public Health, Nutrition
Keywords: micronutrient malnutrition, wasting, stunting, world health organization, nutrition rehabilitation centre

Introduction

The initial thousand days of a child’s life is an extremely crucial time for psychological, physical and emotional development [1]. It spans a crucial phase from their conception to their second birthday. This phase is crucial with the child needing adequate nutrition to support normal physical and emotional growth. Contrarily, the human brain is most vulnerable to potential nutritional shortages during this period. Despite all minerals and nutrients being necessary for normal development, the accurate amount of absolute essential nutrients plays the most important role in normal brain functioning and development, being the cornerstone of brain development in these 1000 days [2]. Curated and adequate healthcare during this crucial phase not only positively supports a child’s chances of survival, holistic development, and learning but ultimately breaks the cycle of poverty. Multiple studies have shown that it is much easier to support brain development by rectifying nutritional deficiencies than undertaking corrective measures later on in life [3]. As such, in the initial weeks, the newborn should be fed more than 8 times per day. It is acceptable to nurse a newborn whenever the mother's breast becomes full or whenever they show signs of hunger [4]. Without undermining the mother's breast milk, it is imperative to start a soft, solid food as complimentary feeding to the baby as soon as reaching six months of age [5]. As stressed above, the cruciality of this life stage makes it absolutely essential to pay attention to their nutritional intake. According to the statistics from the year 2020 of the World Health Organisation (WHO), there were 149 million children below the age of 5 with stunted growth, meaning they were short for their age. Along with 45 million children showing signs of wasting, too thin for their weight. Most significantly, 45 per cent of deaths in children under five years of age are attributed to undernutrition [1].

Malnutrition has been an extremely distressing bane not just in present-day India but also in many countries globally. Unfortunately, infants and young children are the ones most affected by this pressing issue. Malnutrition saps the immune system, causing them to be infected by countless infectious diseases like malaria, pneumonia and diarrhoea, which contributes to increasing rates of mortality and morbidity. Conditions such as wasting (acute malnutrition), stunting (chronic malnutrition) and general shortage of minerals and vitamins are typically known as micronutrient deficiencies [6]. India still grapples with an unacceptable rate of malnutrition, notwithstanding its economic and social growth [7]. This is a significant bottleneck in health and socioeconomic development, affecting India and many other regions of the world. Low and middle-income countries are the ones most likely to grapple with this issue. Severe acute malnutrition (SAM), however, is an extremely serious condition that requires prompt management in order to control morbidity and mortality. From the existing studies of case fatality rates, the WHO has extrapolated mortality rates of children suffering from SAM, reflecting 5-20 times higher than well-nourished children. It is estimated that globally, 20 million children are severely acutely malnourished, which contributes to 1 million deaths every year [8]. Families with inadequate access to nourishing food and unsanitary living circumstances are more likely to have SAM and recurrent illnesses. Preventive interventions are, therefore, extremely important in the context of poverty, and in the meantime, treatment

is necessary for children who are already suffering from SAM. The Global Strategy for Infant and Young Child Feeding, which advocates actively looking for malnourished infants and young children so they can be diagnosed and treated, was endorsed by the Fifty-Fifth World Health Assembly in May 2002 [8]. For the management of SAM, the development of a community-based approach should provide a new impetus for putting recommendations into practice.

Dealing with malnutrition under public health's ambits demands a comprehensive review and approach that integrates healthcare, nutrition, social programmes, education and awareness. Building resilience and enhancing a community's adaptive capacity are essential components of sustainable solutions to malnutrition. By recognising the multifaceted impacts of malnutrition on public health globally, effective strategies to promote nutritional well-being, improve health outcomes, and create more equitable societies can be developed.

Case Presentation

A 37-day-old male infant, resident of Hinganghat, Wardha district of Maharashtra, was brought to a tertiary care hospital by his mother, who was illiterate and belonged to a lower socioeconomic class and worked as a daily wage labourer. The chief complaints were loss of appetite and failure to gain weight. The patient had no history of diarrhoea or fever. He was full-term, born of normal vaginal delivery with a birth weight of 1.80 kg, had cried immediately after birth, and breastfed after half an hour of delivery. However, the mother mentioned that after a week of delivery, she breastfed the baby at irregular intervals for 10 to 15 minutes. On physical examination, post consent from the mother, the patient appeared lethargic and severely wasted (Figure *1*).

FIGURE 1: 37-day-old infant with signs of severe malnutrition

He was afebrile, weighed 1.85 kg, and was 47 cm long with a head circumference of 32 cm. The heart rate was 168 beats per minute, and the respiratory rate was 62 breaths per minute. There was no pallor, icterus, cyanosis, or lymphadenopathy. Pitting edema was present in both lower limbs and generalized to ankles. He had sunken eyes, and the skin pinch test was positive, which indicated dehydration. Severe chest in-drawing was present and accessory muscles of breathing were in use. The systemic examination revealed no significant findings. Laboratory investigations showed random blood sugar of 60 mg/dL (reference range: 45-80 mg/dL), haemoglobin 7.8 g/dL (reference range: 11.5-14 g/dL), total leucocyte count 7000/mm^3 (reference range: 4,000-12,000/mm^3), platelet count 150,000/mm^3 (reference range: 1,75,000- 6,00,000/mm^3), sodium 125 mmol/L (reference range: 138-145 mmol/L), potassium 5 mmol/L (reference range: 3.5-5.1 mmol/L), chloride 96 mmol/L (reference range: : 98-107 mmol/L), and a urine output of 0.8 ml/hour (reference range: 2-3 mL/kg/hour).

The treatment plan included administration of 100 ml/kg ringer lactate, following which the infant was initiated on a starter diet for seven days containing 75 kcal and 0.9 g protein 100ml, low in sodium and protein but rich in carbohydrates, which took care of the glucose requirement as well. Once the child had been stabilized, a catch-up diet was introduced slowly and gradually, containing calories of 100 kcal and protein of 2.9 g per 100 ml.

On general examination, after 10 days of treatment at the NRC, there was a weight gain of 500 g (Figure *2*).

FIGURE 2: Weight gain of 500 grams after treatment at the Nutritional Rehabilitation Centre.

The heart rate was 148 beats per minute, and the respiratory rate was 56 breaths per minute with no pallor, icterus, cyanosis, or lymphadenopathy. A follow-up investigation was done which showed a random blood sugar of 84 mg/dL, haemoglobin 8.4 g/dL, total leucocyte count 9400/mm^3, sodium 132 mmol/L, potassium 4.5 mmol/L, chloride 98mmol/L, and a urine output of 2.4 ml/hour. The combined clinical presentation and lab investigations conclusively confirmed the diagnosis and comprehensive care was provided to improve the infant's overall health.

Discussion

The aforementioned case study of the 37-day-old male with SAM reinforces the crucial importance of early recognition and intervention. The anthropometric measurements of the child showed measurements characteristic of SAM along with clinical dehydration, which was a medical emergency requiring immediate medical intervention. With a multi-pronged approach covering fluid replenishment, close monitoring, and nutritional correction, appropriate care was provided to the infant. The mother, too, was given effective counselling with behavioural change as a part of this intervention to adequately deal with and rectify the present clinical case. Delayed diagnosis and intervention could significantly increase the risk of long-term consequences and mortality. Gradually reintroducing nutrients, close supervision, and periodic assessments are key to successful recovery. Monitoring for potential complications, such as re-feeding syndrome, is extremely crucial during rehabilitation. In both the community and healthcare settings, fatality rates can drop as low as five per cent with improved access to care and the use of modern treatment plans [8]. The most challenging issue is providing support to infants who are unable to be breastfed, such as orphans who don’t have access to wet nurses or those who live in environments where formula feeding is the norm. Ensuring effective breastfeeding is not always easy, even when feasible. In the present case, the infant was irregularly fed due to the work timings. A study suggests that irregular feedings from mothers working during the day would ultimately diminish milk production. Broader family and social factors must also be

considered, as simply 'educating' a mother does not truly empower her [9].

Nonetheless, further endeavours are necessary to effectively facilitate feeding infants who appear undernourished or who may not be thriving. About half of the fatalities of children under the age of five are caused by undernutrition, which mainly occurs in low and moderate-income countries. The impoverished are more susceptible, making the eradication of all forms of malnutrition one of the world's most significant challenges. This study demonstrates that poverty heightens both the risk of malnutrition and the dangers associated with it. It also reduces productivity, raises healthcare costs, and hampers economic growth, creating a cycle of poverty and poor health. Being amongst the first WHO guidelines with its focus being on the management and prevention of acute malnutrition [1], it also highlights the extreme importance of focusing on these aspects, causing a vital effect on controlling the negative aspects and prevalence of acute malnutrition on families and children. Since the new guidelines have been issued on managing acute malnutrition and its prevention, the WHO is furthering the global fight against acute malnutrition in children under five. This noteworthy accomplishment suggests an essential response to the worldwide problem of acute malnutrition, impacting millions of children worldwide. Around 7.3 million children were treated for SAM in 2022 [1]. It includes a child-centred approach that views mothers and their infants as interdependent. Access to nutrient-dense household foods and breastfeeding is essential for management and prevention. Health community workers are extremely important in providing scientific, evidence-based care to pediatric patients suffering from acute malnutrition.

An NRC is a specialized section within a healthcare facility dedicated to admitting and caring for children suffering from SAM [10]. In the fiscal year 2019-20, 225,000 severely malnourished children were provided treatment across 1,072 NRCs, and in 2020-21, 104,000 severely malnourished children received treatment in 1,073 NRCs [11]. Children are admitted to the centre based on specific admission criteria and receive medical and nutritional therapeutic care. After being discharged from the centre, the child remains in the nutrition rehabilitation program until they meet the established discharge criteria [12]. In addition to providing curative treatment, there is a strong emphasis on ensuring that children receive timely, sufficient, and suitable nourishment. Additionally, steps are taken towards empowering the mothers or caregivers to deliver comprehensive age-appropriate care and feeding practices. This is not limited to offering guidance and making them aware enough to spot their newborn's nutritional and health issues.

Beyond the acute phase of treatment, it is imperative to invest in long-term follow-up and prevention, which would include effectively promoting exclusive breastfeeding for the first six months of a child’s life, encouraging improved complementary feeding practices for all children aged 6-24 months, with an emphasis on ensuring access to age-appropriate complementary food and enhancing water and sanitation systems and hygiene practices to protect children from communicable diseases. Addressing malnutrition requires a multifaceted approach, including interventions at the individual and community levels. Efforts to enhance healthcare infrastructure, improve nutrition education, and strengthen social support systems are fundamental to reducing the burden of malnutrition and promoting health in vulnerable populations.

Conclusions

The case study emphasises the importance of early detection and intervention comprising comprehensive management practices to rectify the condition. With a multi-pronged approach covering fluid replenishment, close monitoring and nutritional correction, appropriate care was provided to the infant. Promoting awareness and fostering collaborative efforts can mitigate the detrimental effects of malnutrition, thereby ensuring the well-being of vulnerable children worldwide. Adopting and promoting national policies and programmes that ensure national protocols for the management of SAM have a strong community-based component that complements facility-based activities in order to achieve high coverage of interventions through effective community mobilisation and active case finding. For improved management of SAM at all levels, community health workers should be trained to identify children who need urgent treatment and to recognise children with associated complications who need urgent referral.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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