

Comparing the management of children presenting with severe acute malnutrition to a rural hospital in Uganda with current guidance.

Defining the problem.

Malnutrition, in this case undernutrition, is defined either as acute (wasting), chronic (stunted growth) or general underweight. Malnutrition is endemic in children under 5-years living in Uganda, with roughly 4% of children acutely malnourished and a further third of these severely wasted. There are multiple factors contributing to this including the high birth rate, high proportions of young mothers, poor access to clean water and sanitation, high burden of childhood disease, poor infant feeding practices and substantial food insecurity. The consequences are significant including increased infant morbidity and mortality, negative effects on long-term health into adulthood and detrimental effects on the Ugandan economy.

A recent meta-analysis found that despite some improvement, Uganda still has the 6th highest level of wasting in children in the Eastern region of Sub-Saharan Africa and progress is still required for Uganda to achieve the WHO global nutrition targets for children by 2025. This highlights the need both for effective prevention and high quality, evidence-based management of the many children presenting to hospitals malnourished.

I have experienced working as a medical student on the paediatric ward of Kisiizi hospital, a rural missionary hospital in the Rukungiri district, South-West Uganda. This enabled me to reflect upon case studies and key learning points surrounding the diagnosis, admission, management and discharge of children presenting with SAM to Kisiizi. I have then compared this practice with the updated 2013 World Health organisation (WHO) publications on childhood malnutrition and the 2016 'Integrated management of acute malnutrition' (IMAM) guidance produced by the Ugandan Ministry of Health, to assess how closely these are followed. Given the high rates of children presenting with SAM to hospitals in Uganda including Kisiizi the high rates of consequent mortality and the discrepancy between practice and guidance, I believe that this is an important topic to consider. I have chosen to research this area due to my interest in global health and my desire to pursue a career in paediatrics in the future.



a. Diagnosis and admission criteria

The diagnostic protocols for SAM used at Kisiizi closely match WHO and IMAM guidance and include a weight-for-height (WFH) z-score less than -3 standard deviations (SDs) from the mean, a mid-upper arm circumference (MUAC) less than 115mm or presence of bilateral pitting oedema. The WHO document states that the indications for admission with SAM in order to receive inpatient therapeutic feeding should include the presence of medical complications, loss of appetite, significant bilateral oedema or younger than 6-months old. At Kisiizi, the admission criteria is based purely on the diagnosis of SAM and does not directly refer to loss of appetite.

From my observations, most of these children were admitted according to the discussed Kisiizi guidelines. However, I did identify a few patients who received inpatient SAM intervention despite not meeting the diagnostic criteria set out by Kisiizi and described in the guidance.

Gentleness was a 7-month old female admitted with pneumonia and treated under a diagnosis of SAM despite having a WFH less than -2SDs but greater than -3SDs corresponding with moderate acute malnutrition. Despite not meeting the criteria, she was diagnosed with SAM and treated accordingly. These few cases where the diagnostic anthropometric thresholds are used more loosely and the fact that 'no appetite' is not in Kisiizi's official admission criteria suggest to me how staff working in a location such as Kisiizi have had to adapt their care to the fact that there is no outpatient nutritional management for malnourished children in the local community. This ensures that acutely malnourished children do not remain in the community where they will not receive any treatment, however, this must be weighted up with the increased risk of hospital acquired infection and financial costs for families.



b. Inpatient Management

The most recent 2015 Kisiizi malnutrition protocol follows WHO and IMAM guidance and states that all children presenting with SAM should first be investigated and treated for any complications including hypothermia, hypoglycaemia, infection, electrolyte imbalance, anaemia and vitamin deficiency. One child at Kisiizi, Kevin, was admitted one evening with a diagnosis of acute watery diarrhoea and SAM. The following morning it became evident that Kevin was in shock and needed urgent fluid resuscitation. Over the following 2 hours, the above acute management was performed effectively, and he was eventually stabilised but required management on the paediatric high-dependency-unit bed and then ward for 4 weeks. From Kevin's case, I can see that either the above acute investigations had not been immediately followed when Kevin was admitted, or at least that he was not monitored sufficiently overnight to identify any deterioration.

When a child with SAM is then stable, they are started on a high-energy milk (HEM) formula-feeding schedule. F75 is a start-up formula containing oil, sugar, milk, water and CMV (vitamin and electrolyte complex) which is given alone during the initial phase of treatment and contains 75kcal/100ml. F100 is a catch-up formula given once the child has regained their appetite and provides 100kcal/100ml. Each child has a 3-hourly feeding regimen given either orally or via nasogastric (NG) tube and which is based on their daily weight and any presence of oedema. WHO guidance advises that initially all children should receive between 80-100kcal/kg/day using F75 HEM and then ready-to-use therapeutic foods (RUTF) or F100 HEM should be introduced. Assuming the above regime, the nutritional management provided at Kisiizi



meets these requirements. Where an NG tube is required, WHO advises that the location of any NG tube in situ should always be confirmed through aspiration pH before feeds are given. At Kisiizi, from my observations, NG tubes were not always aspirated before feeds were given. One child, David, was very unwell and being treated for SAM and sepsis as a result of a harmful traditional medicine technique called 'Millet Extraction'. During his management, he was fed through his NG tube by his parents, having not been aspirated in advance. Tragically the child rapidly developed an aspiration pneumonia and died. Although very rare, I was made aware of other similar cases occurring due to checking NG tube location not being part of the normal routine.

All children admitted with SAM at Kisiizi are also treated with a 5-day antibiotic regimen, high-dose supplements of Vitamin A and regular doses of folic acid and multivitamin supplements. These accompanying treatments match WHO guidance and are very similar to IMAM guidance. The children's ward at Kisiizi also has its own chicken enclosure which produces eggs for the children over 6 months who can tolerate such foods. This is a clearly a successful effort to use available resources and skills to sustainably improve nutritional care for these children.

c. Discharge criteria and follow-up care:

In their daily practice, the Kisiizi staff use a 15% target weight gain as their discharge criteria. This follows the guidance of a 2012 WHO document regarding Child growth standards. However, this appears to be outdated as it is in discrepancy with the 2015 Kisiizi malnutrition protocol as well as the updated WHO guidance and IMAM which advise against using a target weight gain but instead using anthropometric targets including a WFH z-score greater than -2SDs or a MUAC greater than 125mm. The current practice at Kisiizi risks children being discharged whilst still moderately or severely malnourished. I can see from observation and discussion that the reasons for this outdated practice at Kisiizi is likely due to both the difficulty in changing long-term practice and that the percentage weight gain often takes less time to achieve and therefore reduces financial implications for the family.

On discharge, all children at Kisiizi treated for SAM receive a donation of 'Plumpy-nut' sachets (RUTF) and a new goat project provides a free goat for the family of the child on discharge to provide milk for the child for the foreseeable future. These are important attempts to prevent the child becoming malnourished again with consequent morbidity and further admissions. WHO recommends that children discharged following treatment for SAM should be periodically followed-up as outpatients to avoid relapse. This follow-up does not occur at Kisiizi which may be due to the lack of sufficient resources and staffing to review every child in clinic and the difficulty in persuading guardians to travel a significant distance to bring their, often well, children back to Kisiizi after discharge.

On occasions parents discharged their children from Kisiizi when they had not yet fully reached their target weight. It was challenging to witness this area of tension between the child's guardians who would push for early discharge and staff who would discourage this. The main factor causing early-discharge against medical advice (DAMA) at Kisiizi, and also found to be the case in other African countries, was the cost of daily inpatient treatment, which was often more than a family could afford given all of the individuals in their care. Kisiizi hospital is forward thinking in its approaches to supporting its many patients with financial constraints; the hospital receives charity donations to ensure that the milk, RUTF and eggs are completely free; it also runs a highly successful insurance scheme and a Samaritan fund to support patients unable to afford their care. However, further reduction of costs would be required to prevent this tension and such cases of early discharge.

Discussion and taking things forward.

Clearly, in most aspects of care of children presenting with SAM to Kisiizi, practice follows the available guidance, however, there are some discrepancies with significant implications. Changes could be made to

follow guidance more closely, for example, introducing regular checking of NG tubes prior to each feed and the use of anthropometric targets as discharge criteria and not the use of a target weight. I intend to take the opportunity to discuss these potential changes with staff at the hospital and hope that these suggestions can be of some benefit. It is evident that larger scale changes could significantly improve the care of these children including reducing the cost of daily treatment and a sustainable outpatient nutritional programme in the community to reduce readmission rates and improve recovery.

The conclusions made in this reflective project are based on my observations and a small number of case studies from Kisiizi and therefore the findings cannot necessarily be generalised to other hospital settings. There is the potential for great benefit from a well conducted audit to answer this question, however, I believe the conclusions from this report have the potential to bring positive change to care of children at Kisiizi.