



## Impact of maternal mental health on recovery from severe acute malnutrition in Malawi

MSc summer project<sup>1</sup>

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### MALAWI

**What we know:** Women face the biggest burden of mental illness globally. Maternal mental illness affects childcare practices which is one of the underlying causes of childhood malnutrition.

**What this article adds:** This article is a follow up study of children in Malawi treated for severe acute malnutrition seven years prior. It adds to the limited literature base on the relationship between maternal mental health and child health and growth outcomes in low and middle-income countries. The study shows the complex relationship between maternal mental health and child health, as the study finds no association between mothers at high risk of common mental disorders and children's nutritional status. There are several possible contributing factors to this finding including the study methodology, loss to follow-up, the age of the children, shared parenting and the socio-economic context. The study did find that mothers reporting intimate partner violence and low social support are at a high risk of reporting symptoms of depression and anxiety. The complexity of the interaction between maternal mental health and child nutritional status highlights the need for holistic approaches when addressing these issues.

### Background

Malnutrition is one of the leading causes of mortality and morbidity amongst children under the age of five years (under-5) in Malawi (Ministry of Health et al, 2015). Over a third of children under-5 (36%) are stunted and 12% are underweight (NSO Malawi and ICF, 2015). Additionally, 33% of deaths in children under-5 are associated with malnutrition (UNICEF, 2011). It is estimated that approximately 10% of Malawi's Gross Domestic Product (GDP) is lost due to childhood malnutrition (~MKW 147 billion/USD597 million per year) of which 60% is from reduced potential productivity due to nutrition related mortality and morbidity (Ministry of Health et al, 2015).

Mental disorders are the fifth leading cause of global disability-adjusted life years (DALYs) and account for 32% of years lived with disability (Rehm & Shield, 2019). Over the past three decades, mental health disorders have increased significantly (by 36.7%) with the highest burden of these mental disorders being among women

of reproductive age (Rehm & Shield, 2019). Maternal mental illness has severe negative long-term effects on both mothers and infants. Mothers with a mental illness are more likely to have poor mother-child interaction and poor parenting practices resulting in poor childcare and feeding practices and unstimulating environments, indirectly resulting in poor child growth. However, the effects of maternal illnesses, especially depressive symptoms, on child growth have been given less attention in developing countries, especially in sub-Saharan Africa (SSA). The prevalence of a common mental disorder (CMD) amongst Malawian women is up to 30%, two times higher than the weighted prevalence of maternal mental disorders in the SSA region (Stewart et al, 2014). Depressive and anxiety disorders are the fourth leading cause of morbidity in Malawi with the majority affecting women (Stewart et al, 2014). Maternal mental illness and childhood undernutrition share similar risk factors including poverty, increased disease burden, illiteracy, unemployment and food insecurity.

As previously mentioned, there has been little research to assess the relationship between maternal mental health and child outcomes in low and middle-income countries despite evidence that mental health problems are four times higher and more persistent in developing countries compared to developed countries (Bennett et al, 2017). Even so, studies that have assessed this relationship are usually of short postpartum periods and do not further explore the effects of maternal mental health in later childhood. Additionally, no studies have further explored the relationship between mothers at risk of a CMD and the recovery of children with severe acute malnutrition (SAM). Maternal mental health has been identified as one of the nutrition-sensitive interventions that has the potential to optimise child growth and development. Despite the increasing attention to interventions on the immediate causes of malnutrition, there are still gaps in addressing maternal mental illness as a risk factor for child malnutrition in settings like Malawi.

The Chronic Diseases Outcome after Severe Acute Malnutrition (ChroSAM) explores the hypothesis that maternal illness affects child growth beyond the early years of life. It also explores the potential impact of maternal depression/anxiety on the recovery of children who had been treated for malnutrition after discharge. This presents an opportunity for untapped potential for interventions that aim at improving child outcomes in women at risk of CMDs. This is important as it contributes to the existing literature since there is now increasing interest in addressing maternal mental health as a platform for improving child growth and health outcomes.

The ChroSAM study is a prospective cohort study that followed 320 children admitted for the treatment of SAM seven years prior in Malawi. The aim of the ChroSAM study was to assess the long-term effects of malnutrition on

<sup>1</sup> Summary of full MSc summer project paper which is available on request from the author.

children previously exposed to SAM. A secondary analysis was conducted of the ChroSAM findings to explore the potential association between mothers at risk of a CMD and the recovery of children with SAM in this setting.

## Methodology

The ChroSAM study followed 320 children who were admitted for treatment for SAM while under five years of age at Queen Elizabeth Hospital, Malawi, seven years prior to the analysis. The study also included 219 siblings of these cases and 184 children within the community as comparison groups. The community controls were randomly selected by spinning a bottle close to the cases' house and matched by sex and age ( $\pm 12$  months). Multiple data on risk factors associated with malnutrition was collected at this follow-up including information about maternal mental health status. Amongst this cohort, 450 main carers/mothers were assessed for a CMD using the World Health Organization (WHO) self-reported questionnaire (SRQ-20).

The SRQ-20 is a screening tool developed by WHO to assess the risk of a CMD, including depression and anxiety/stress, in communities in developing countries. The SRQ-20 has 20 yes/no questions related to the recent wellbeing of the respondent in the past four weeks. A Chichewa version of SRQ-20 has been translated and validated for use in Malawi (Stewart et al, 2009). The questionnaire suggested cut-off points of  $\leq 8/20$  as low risk for a CMD and  $>9/20$  scores as increased risk of a CMD requiring further referral or assessments. Children's nutritional status was assessed according to weight-for-age z-score (WAZ), height-for-age z-score (HAZ) and body mass index-for-age z-score (BAZ) using WHO growth standards. In addition to basic child characteristics (including age, sex, birth order and HIV status), information was also collected on the mothers' general wellbeing including HIV status, education levels and the mothers' ability to read or write.

## Findings

A total of 295 out of 450 women who were administered the SRQ-20 questionnaire were mothers of children previously exposed to SAM (cases) and 155 were mothers of community control children. A total of 83 out of 450 of mothers (18%) were at risk of having a CMD, of which 56 (67%) were mothers of cases. About one in four mothers (26%) reported having experienced intimate partner violence in the past. Additionally, two-thirds of mothers (63%) reported having available social support and only 4% of mothers reported having low social support. There was a high prevalence of HIV status among mothers (30%), of which the majority were mothers to cases compared to mothers of community controls (37% vs 16%,  $p$ -value  $<0.001$ ). More mothers of community controls had experienced intimate partner violence compared to mothers to cases (34% vs 21%,  $p$ -value 0.019).

The mean age for the children in the study was 11.2 years ( $\pm 7.8$ ) and 410 of children

(53%) were female. The overall HIV prevalence amongst the children was 14% although 28% of the participants had an unknown HIV status. Cases had the highest HIV prevalence of 27% compared to the sibling and community control (4% and 3% respectively,  $p$ -value  $<0.001$ ).

Overall, there was a high prevalence of underweight and stunting amongst the study population (46% and 36% respectively). Additionally, cases had a significantly lower WAZ, HAZ and BAZ score compared to the sibling control and these were also much lower than for community controls.

There was no association between SRQ-20 and nutritional status even after adjusting for parity, maternal age, maternal employment, intimate partner violence and child's sex and HIV status. However, mothers who had a high SRQ score had a two-fold increase in the odds of reporting intimate partner violence (OR 2.5 95% CI 1.5-4.4,  $p$ -value  $<0.001$ ) and a four-fold increase in the odds of having low social support (OR 4.7 95% CI 1.6-13.9  $p$ -value  $<0.001$ ). This strong association was seen amongst mothers to cases for both intimate partner violence and social support but was lost amongst the community controls. There was also some association between having a high SRQ-20 score and being HIV positive or having a female child.

## Discussion

This study showed no association between mothers at a high risk of a CMD and children's nutritional status seven years after treatment for SAM. Results do, however, highlight that mothers reporting intimate partner violence and low social support are at a high risk of reporting symptoms of depression and anxiety.

In a cross-sectional study assessing mental disorders amongst women with young infants in rural Malawi, Stewart et al found that infants of mothers with a CMD had significantly lower nutritional indices compared to infants of mothers without a CMD (Stewart et al, 2014). Similarly, a meta-analysis undertaken to assess the effect of maternal mental health on child nutrition in developing countries found a moderate association with children of depressed mothers having 1.5 times the odds of stunting and underweight compared to children of mothers who were not depressed (Surkan et al, 2011). However, some studies in South Africa and Ethiopia, which are similar settings to Malawi, found no association with maternal mental health and child growth even after controlling for all factors associated with both (Nguyen et al, 2014).

Interestingly, studies in Asia have consistently found a strong and significant association between maternal mental health and child growth (Nguyen et al, 2018; Saeed et al, 2017; Surkan et al, 2011). In a multicentre study assessing the impact of maternal mental health in Ethiopia, Bangladesh and Vietnam, despite the high rates of stunting and undernutrition seen in Ethiopia, there was no association between stunting and maternal

mental health as was seen in Bangladesh and Vietnam (Nguyen et al, 2018). Similarly, a community based prospective study in Peru, India, Vietnam and Ethiopia found a strong and persistent association between mothers at risk of CMD and child growth at one, five and eight years in India and Vietnam unlike in Ethiopia or Peru (Bennett et al, 2017).

When interpreting the absence of association in the Ethiopian studies, the authors suggested that the shared parenting in such a setting probably dilutes the negative effects of a CMD on child growth compared to other settings like South Asia. Additionally, the timing when assessing the effects of maternal mental illness on child growth affects the association between a CMD and child nutrition status. Studies assessing the impact of maternal depression in children over 12 months are less likely to see an impact of a CMD on growth as, beyond this point in settings like Malawi, childcare is not entirely dependent on the mother but also her family members/communities (Stewart, 2007). Additionally, the socio-economic context plays a major role in the association between maternal mental health and infant growth. In areas with high food insecurity and poverty rates, any association between maternal mental health and any measurable impact may be masked/diluted by these factors that are associated with both undernutrition and depression. Overall, the different findings in the different settings are attributed to different study methods such as clinical vs population-based studies, different CMD measurement scales and times and different sample sizes.

It is also important to consider that only 47% of the cases were identified in the ChroSAM study with the major reason for loss to follow-up being death from nutrition-related illnesses. Considering that a major loss/traumatic event like the loss of a child is a strong risk factor for a CMD, mothers of surviving children are less likely to present with symptoms of a CMD compared to those that were lost to follow-up. This could potentially dilute the association between a CMD and the nutrition status of children.

The lack of association in this study emphasises that the pathways and interactions for the association between malnutrition and mental illness are complex and should therefore be addressed holistically. In settings like Malawi that have high rates of poverty and food insecurity, which are both important risk factors for undernutrition and maternal mental disorders, multi-sector interventions are needed that approach these issues holistically. Context-specific, targeted interventions aimed at addressing intimate partner violence have the potential to reduce the risk of a CMD and thus improve childcare practices among mothers. As social support plays a major role in childcare, mothers'/carers' support should be assessed in communities and primary health care settings. This would also require training primary health care and community health workers to identify mothers at risk of depression.

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# Response to malnutrition treatment in low weight-for-age children: secondary analyses of ComPAS trial data

Research summary<sup>1</sup>



## KENYA AND SOUTH SUDAN

What we know: Children who are concurrently wasted and stunted (WaSt) have a very high mortality risk but current programmes tend to focus on addressing stunting or wasting, not both.

What this article adds: A secondary analysis of moderately and severely wasted children treated in the ‘ComPAS’ trial was undertaken to assess the response to treatment according to weight-for-age z-score (WAZ) and mid-upper arm circumference (MUAC) and the type of feeding protocol given. The analysis of 4,020 children confirms that WAZ<-3 identifies the majority of children as WaSt. Those with moderately low MUAC (11.5–12.5 cm) and a severely low WAZ (<-3), not currently eligible for therapeutic care, respond similarly to treatment when provided with a supplementary diet of either one sachet per day of ready-to-use therapeutic food (RUTF) or a standard dose of ready-to-use supplementary food. Their recovery rate (54%) was better than those with severe wasting (19.6%) who were provided with a therapeutic diet and slightly worse than others with moderate wasting (59.5%). Children with a severely low MUAC (<11.5 cm) had similar recovery rates whether they were provided with a standard dose of RUTF or a simplified, reduced dosage of two sachets per day. A model that supports moderately wasted children with WAZ<-3 with a supplementary dose of lipid nutrients and those with severe wasting with a reduced therapeutic dosage should therefore be explored in order to efficiently reach the majority of children at high risk of mortality.

### Background

Children who are concurrently wasted and stunted (WaSt) are among the most vulnerable of all malnourished children with a higher mortality risk than either wasting or stunting alone and about a 12 times greater risk of mortality in the absence of treatment than those with normal anthropometry (Myatt et al, 2018). Current conventions in policy and practice mean that programmes tend to focus on addressing either stunting or wasting, not

both. Current therapeutic feeding programmes use mid-upper arm circumference (MUAC) < 11.5 cm, weight for height z-score (WHZ) <-3 and/or the presence of oedema as independent admission criteria. Some children who are severely wasted and concurrently stunted are included according to these criteria but moderately wasted children who are concurrently stunted will not be captured for therapeutic feeding despite having a similar near-term mortality risk to severely

wasted children. Exploration of practical anthropometric criteria for identifying children with WaSt has found that severely low weight-for-age z-score (WAZ) has the highest (>90%) sensitivity and specificity for identifying these children across multiple settings (Myatt et al, 2018) and that a combination of severely low MUAC (already well evidenced to identify those at high risk of mortality and easy to use) plus a severely low WAZ could best identify those malnourished children at most risk of dying including those with WaSt and those with a severely low WHZ (Myatt et al, 2019). However, given that WAZ<-3 is not currently one of the criteria for admission to therapeutic feeding programmes, the intensity of treatment required by this additional group of children and the impact of their inclusion on therapeutic programme caseloads is yet to be evaluated. To help fill this evidence gap, a secondary analysis of data from a recent trial in Kenya and South Sudan (‘ComPAS trial’) was conducted.

### Methods

The ComPAS trial database includes children with MUAC<125 mm who were treated with either a simplified, combined protocol (two sachets of ready-to-use therapeutic food (RUTF) per day for severe wasting and one sachet (2092

<sup>1</sup> Bailey, J, Lelijveld, N, Khara, T, Dolan, C, Stobaugh, H, Sadler, K, Lino Lako, R, Briend, A, Opondo, C, Kerac, M and Myatt, M (2021) Response to Malnutrition Treatment in Low Weight-for-Age Children: Secondary Analyses of Children 6-59 Months in the ComPAS Cluster Randomized Controlled Trial. *Nutrients*, 13(4), p.1054.