



Malnutrition in infants under six months attending community health centres in Ethiopia

This is a summary of the following paper: *Grijalva-Eternod C, Beaumont E, Rana R et al (2021) Malnutrition in infants aged under 6 months attending community health centres: A cross sectional survey. Nutrients, 13, 2489 <https://doi.org/10.3390/nu13082489>*

The care of small and nutritionally at-risk infants under six months of age represents a critical care gap. The lack of prioritisation of care for this particular group is partly due to a poor understanding of the burden of malnutrition in this age group. This study estimated the anthropometric deficit prevalence in infants under six months of age attending health centres in East Hararge and Jimma zone, Ethiopia, and assessed the overlap between different anthropometric indicators.

This was a cross-sectional survey covering all infants aged under six months who attended the 18 selected health centres over an average period of two weeks. Anthropometric deficit was measured using the Composite Index of Anthropometric Failure (CIAF) which is an aggregated indicator for malnutrition combining the conventional indicators for wasting, stunting, and underweight. Underweight, stunting, and wasting were calculated using 2006 World Health Organization Child Growth Standards and were defined as weight-for-age (WAZ), length-for-age (LAZ), and weight-for-length (WLZ) z-scores <-2, respectively. Composite Index of Severe Anthropometric Failure (CISAF) represents all infants under six months of age severely underweight, stunted, or wasted, defined by a WAZ, LAZ, or WLZ <-3, respectively.

The study found that 21.7% of infants had some form of CIAF, of which a fifth (4% of all infants) had CISAF, and over half (11% of all infants) had multiple anthropometric deficits, i.e., a combination of wasting, stunting, or underweight. Low mid-upper-arm-circumference (MUAC), defined as <11 cm if under six weeks of age and <11.5 cm thereafter, overlapped with 47.5%, 43.8%, and 42.6% of the stunted, wasted, and CIAF prevalence, respectively. The overlap was strongly influenced by the infant's age and the threshold used to define low MUAC. As the age of the infants increased, the proportion of MUAC-identified infants with no CIAF reduced, but the overlap with CIAF also decreased. In contrast, wasting-, stunting-, underweight-, CIAF-, and CISAF-based estimates were similar across the different age categories. Furthermore, underweight as the sole case definition criterion overlapped with 63.4%, 52.7%, and 59.6% of the stunting, wasting, and CIAF prevalence, respectively. Overall, underweight identified larger proportions of CIAF and CISAF infants than any MUAC threshold.

Anthropometric deficits, single and multiple, were prevalent in infants attending the selected health centres. WAZ appears to perform better than MUAC to identify any form of anthropometric deficit, as classified by wasted, stunted, underweight, CIAF, or CISAF. Further research is needed to understand which criteria or combination of criteria would be best for future programmes and to understand the associated functional and clinical outcomes.

A summary of the CHAIN Network

This is a summary of the CHAIN Network and its recent research outputs, *The CHAIN Network (2022) CHAIN Publications. <https://chainnetwork.org/research>*

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The Childhood Acute Illness and Nutrition (CHAIN) Network was set up to address the problem that, despite significant global reductions in child mortality, the overall risk of death among acutely ill children remains high. There is also growing evidence that a large portion of mortality occurs after discharge from hospital. This may be attributed to the types of illness, underlying comorbidities such as malnutrition, HIV and other chronic conditions, social conditions such as poverty, maternal physical or mental ill health, childcare challenges or difficulty accessing services and limitations in medical or nutritional care.

The CHAIN Network (CHAIN) brought together clinicians and scientists to better understand pathways leading to death in children aged 2 to 23 months admitted to hospitals in Africa and South Asia despite aiming to follow the World Health Organization's Care and Treatment guidelines as closely as possible. CHAIN enrolled children at admission to hospital and followed up for six months after discharge, collecting exceptionally detailed data on demographics, geography, health, anthropometry, diet, economic, living and childcare circumstances and maternal characteristics. CHAIN also enrolled children of the same age in the same communities to provide an understanding of what is 'usual' at a single time-point. The CHAIN social science team also undertook detailed qualitative work to understand barriers and opportunities in participants' households.

The epidemiological findings from the 3,101 children included in the CHAIN cohort study and the social science findings have been recently published and a systems biology study utilising samples from the CHAIN cohort remains ongoing – aiming to identify metabolic, nutritional, immunological, infective and co-morbidity pathways to address in future clinical trials.

CHAIN found that admission to hospital was often in the context of a long series of interactions with various health providers regarding the child's illness. Nearly half of all deaths occurred after discharge from hospital regardless of anthropometric classification (using mid-upper-arm circumference and/or edema). Anthropometry was an important predictor of mortality risk capturing many risk exposures besides food

security and diet. However, risks such as maternal mental health and independent employment, household characteristics and access to care had direct effects on mortality risk but were not captured by anthropometry. Risks among severely, moderately or non-wasted children markedly overlapped based on other domains of risk, suggesting that anthropometry, while important, may not be sufficient to identify risk in these vulnerable children. In addition, many admitted children were found to be at very low risk of death, suggesting that de-escalation of treatment and care may be feasible and could allow more targeted allocation of limited resources towards those at highest risk.

Clinicians and families usually believed that children had 'recovered' at the time of discharge, and clinicians could not reliably predict post-discharge mortality. Where children continued to be ill or developed new symptoms after discharge, families felt 'disconnected' from the health system even when they were attending nutrition or other clinics. Consequently, among the post-discharge deaths, more than half occurred at home rather than during a re-admission to hospital.

The results from CHAIN indicate that we need to revisit how care/treatment guidelines are formulated. Currently, clinical syndrome protocols capture children with mortality risks ranging from almost none to very high. Formal risk stratification would allow some lower risk children to go home much earlier, avoiding costs to the health system and financial burden on families and also reducing exposure to the hospital environment. Hospital resources could be allocated towards children identified as higher risk.

Currently, guidelines contain very little advice on discharge or post-discharge care. CHAIN suggests that continuity of care could be improved in several ways. At discharge, communication of ongoing risks, training in danger sign recognition and facilitated access to emergency care may be beneficial. The COVID-19 era has brought forward the concept of the 'virtual ward' where the hospital team could monitor children at home by phone or SMS.

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