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Testing a new clinical care pathway for the management of small and nutritionally at-risk infants aged under 6 months and their mothers

Submission date
19/08/2022

Recruitment status
No longer recruiting

Registration date
22/08/2022

Overall study status
Completed

Last Edited
28/09/2026

Condition category
Nutritional, Metabolic, Endocrine

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims:
Small and nutritionally at-risk infants aged under 6 months are a vulnerable group at high risk of mortality and morbidity. However, evidence underpinning their care is sparse and low quality. Addressing this critical evidence gap, a new clinical care pathway (CP) was developed for the Management of small & nutritionally At-risk Infants and their Mothers (MAMI). This was designed to translate high-level policy guidelines (including WHO 2013 guidelines on severe malnutrition) into effective front-line clinical and patient management practices. The aim of this study is to assess the impact of the MAMI CP on the growth, feeding and health of small and nutritionally at-risk infants aged under 5 months and their mothers.

Who can participate?
Small and nutritionally at-risk infants aged under 5 months and their mother or primary caregiver who attend one of the Health Centers participating in this study during the study period.

What does the study involve?
Staff at the health centers in the intervention arm will be using the MAMI Care Pathway. The study hypothesis is that this will lead to improved study outcomes by enabling them to better manage infants and their mothers. Staff at control centres will be using current standard national guidelines/processes.
The study will invite mothers or primary caregivers who are attending the health centres with their infants aged u6m to participate in the trial and obtain written informed consent from them. Data to be collected at the Health Centre includes:
1. At baseline: detailed background demographic and socioeconomic data, measurements and proportions of the infants(anthropometry), feeding status, infant clinical status and maternal mental health and wellbeing
2. At each clinic visit (for participants in the intervention arm only): a rapid assessment that will be focusing on growth, feeding status and any changes in clinical status. The frequency of visits will consist of initial weekly visits, moving to fortnightly and then monthly as an infant improves.
3. At 6 months age (or as soon as possible after this age): this is the main end-line visit. Data will

be collected on anthropometry, feeding status, infant clinical status and maternal mental health and wellbeing.
4. At 12, 18 and 24 months of age: to explore longer-term outcomes, these visits will be similar to the 6-month visit

What are the possible benefits and risks of participating?
This is a low-risk study since the MAMI Care Pathway is fundamentally a behavioural intervention whose purpose is to help staff better manage and support infants under 6 months according to already established and approved guidelines. It involves intensive counselling and support for infants/mothers/families but no medication feeds or invasive interventions that are not currently permitted in routine clinical care. Participants in the intervention arm of the trial will receive increased monitoring and support and participants in the control arm will receive the current standard of care.
Although risks related to the intervention are low, the study recruits a vulnerable population and hence adverse events/outcomes will likely occur and will be actively looked for and recorded and reported both in the main trial paper and during in-trial reports to the data and safety monitoring board (DSMB). For eligible infants in control clinics with uncomplicated malnutrition but who meet Ethiopia 2019 criteria for initial inpatient care (i.e. weight for length z-score (WLZ) <-3 and/or growth failure), some may decline that admission. In these cases, the managing healthcare worker will decide based on other local protocols what can be offered.

Where is the study run from?
The following organisations are involved in running this trial:
1. London School of Hygiene and Tropical Medicine (UK)
2. Jimma University Clinical and Nutrition Research Partnership (Ethiopia)
3. GOAL Ethiopia (Ireland)
4. Emergency NutritionNetwork (UK)
There are two study sites in Ethiopia: in Jimma zone (supervised by JUCAN); in Deder woreda (supervised by GOAL Ethiopia)

When is the study starting and how long is it expected to run for?
February 2020 to July 2025

Who is funding the study?
Eleanor Crook Foundation (USA)

Who is the main contact?
Dr Marko Kerac (Principal Investigator), marko.kerac@lshtm.ac.uk

Contact information

Type(s)
Public, Scientific, Principal investigator

Contact name
Dr Marko Kerac

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Additional identifiers

Study information

Scientific Title
The MAMI Care Pathway RISE Study: a cluster randomised controlled trial. Management of small and nutritionally At-risk Infants aged under 6 months and their Mothers: Researching, Innovating, Scaling and Establishing a new Clinical Care Pathway

Acronym
MAMI-RISE CaP

Study objectives
Small and nutritionally at-risk infants aged under 6 months attending a health centre using the new MAMI clinical care pathway will have improved growth, feeding and health, and their mothers/carers will have improved mental health wellbeing, compared to those attending control health centres using current standard malnutrition/health guidelines.

Ethics approval required
Old ethics approval format

Ethics approval(s)
The study has been approved by three committees as per local and international requirements for this project:
1. Approved 10/08/2022, The London School of Hygiene and Tropical Medicine Observational /Interventions Research Ethics Committee (Keppel St, London, WC1E 7HT, UK; +44 (0)20 7927 2221; ethics@lshtm.ac.uk), ref: 26527
2. Approved 01/08/2022, National Research Ethics Review Committee (PO Box 1367, Addis Ababa, Ethiopia; telephone not available; nrerc2019@gmail.com); ref: 03/246/293/22
3. Approved 21/08/2021, Jimma University Institute of Health, Institutional Review Board (PO Box 376, Jimma, Ethiopia; +251 917 063 744; +251 471 111 457; ethicsjuirb@gmail.com), ref: THRPG/481/21

Primary study design
Interventional

Study design
Two-centre two-arm parallel-group open-label cluster-randomized trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Malnutrition

Interventions
Clusters are community-based health centres and their catchment populations of small and nutritionally at-risk infants aged under 6 months (u6m).

The MAMI Care Pathway is a newly developed "Clinical (Integrated) Care Pathway" clinical support package which provides healthcare workers (in our study these will be nurses based in the Health Centres) with simple, user-friendly, integrated guidance to optimally manage small and nutritionally at-risk infants under 6 months and their mothers.
The Care Pathway documents comprise a user guide, forms, counselling cards and support action booklets. These documents support the health care workers (HCWs) during each stage of the patient journey including:
1. Rapid screening of infants
2. In-depth assessment
3. Outpatient-based care
4. Main outcome review at age 6 months

MAMI care involves:
1. Tailored support & counselling:
This will focus on the issue(s) identified at assessment. HCWs will use the MAMI counselling cards as well as local guidelines to decide what best to do in each situation.
2. Counselling on six ‘core’ topics:
Irrespective of the main presenting problem(s), some issues have the potential to benefit all infants u6m. One core topic will be discussed at each visit so that over time are covered:
2.1. Relaxation: relaxation techniques aim to increase breastmilk supply and decrease breastmilk cortisol and will be promoted/reinforced at each visit.
2.2. Father, family, community support: support from family and community can play a major role in maternal empowerment and breastfeeding outcomes. Ways to optimise home/family support and deal with any conflicting messages will be discussed.
2.3. Crying/sleep: concerns with these are common reasons for prematurely stopping breastfeeding/exclusive breastfeeding. Normal/abnormal patterns will be discussed to prevent this. Safe sleep practices will also be promoted
2.4. Nurturing care (Early Child Development): the emphasis will be on the importance of interaction and sharing simple ideas of actions to take to promote development.
2.5. Family planning: if requested, referrals to local family planning services will be made.
2.6. Complementary feeding: though the target diet for infants u6m is exclusive breastfeeding, high quality, safe complementary feeding is important and will be discussed proactively as an infant approaches 6m.
Complementing the above, Kangaroo mother care (KMC) will also be recommended for smaller infants.
3. Referral as needed: if needed, referrals will be made for specialist care and support e.g., to disability services if an underlying disability is identified; to a local paediatrician or surgeon if a tongue tie associated with breastfeeding difficulty is identified.
4. Monitoring: a system of de-escalating visit frequency will balance the need for follow-up whilst not making it too onerous or time-consuming for carers

Intervention Type
Behavioural

Primary outcome(s)
Weight-for-age measured using Z-scores (WHO Growth Standards) at ages 6, 12,18 and 24 months old

Key secondary outcome(s)
1. Infant growth-related outcomes:
1.1. Stunting measured using the mean length-for-age
1.2. Wasting measured using the percentage weight-for-length <-2 or % mid-upper arm circumference <125 mm

2. Infant feeding outcome:
2.1. Breastfeeding measured according to standard WHO IYCF indicators

3. Infant clinical outcomes:
3.1. Recent morbidity measured from reported illness episodes in days of fever/diarrhoea/cough /other over the past 2 weeks
3.2. Clinically significant illness episodes measured as those resulting in an unscheduled clinic visit and/or inpatient admission

4. Maternal outcomes:
4.1. Maternal mental health measured using the PHQ-9 questionnaire
4.2. Maternal Quality of Life measured using the WHO short questionnaire

The main project report will focus on outcomes at 6 months of age, but there will also be longer-term follow-ups at ages 12,18 and 24 months

Completion date
31/07/2025

Eligibility

Key inclusion criteria
The study will enroll small and nutritionally at-risk infants aged under 5 months*, as defined by meeting at least one of the following characteristics:
1. Low weight-for-age Z-score <-2
2. Low weight-for-length Z-score <-2
3. Low length-for-age Z-score <-2
4. Low birthweight <2.5 kg
5. Low mid-upper arm circumference <110mm at ages 0 to 5 weeks and <115mm at 6 weeks to 6 months
6. Growth faltering (not regaining birth weight by 2 weeks age; weight drop: ≥1 growth centile space if birth weight <9th centile; ≥2 centiles if birth weight 9th-91st centile; ≥3 if birth weight >91st centile)
7. Infant feeding problem as reported by mother and confirmed by a healthcare worker
8. Maternal risk (mental health problem or other issue resulting in caring/feeding difficulty)

A-priori main subgroup analysis will focus on infants with low WAZ (<-2 Z-scores) who will be expected to benefit most from the intervention. This main subgroup (for whom the trial is powered) will also:
9. Be recruited <4 months age
10. Not have an underlying disability or chronic illness

11. Not be orphans or have vulnerable mothers (severe mental health issues, social isolation, adolescent mother)
12. Be from singleton pregnancies

*NB Though our target population for future programmes are all infants aged <6 months, the RCT will only recruit those aged <5 months since less than a month in the programme is too short a time for observable impact on our primary and secondary outcomes.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
0 Days

Upper age limit
5 Months

Sex
All

Total final enrolment
2215

Key exclusion criteria
1. Infants with 'complicated malnutrition':
Those needing initial inpatient care as defined by standard clinical IMCI 'danger signs' (unable to breastfeed/drink, vomits everything, severe diarrhoea, severe fever, severe cough/respiratory distress, severe pallor) or other clinical problems needing immediate inpatient care.
Though excluded at this point in time, these infants, once stabilized and improved following inpatient care are likely to return to clinics for future immunization, growth monitoring or other visits and may be screened again at those future visits. If still small/nutritionally vulnerable (but 'uncomplicated' clinically), it is possible that these may be recruited at future visits.

2. Infants with oedema, be that nutritional or non-nutritional
This is also part of the definition of 'complicated' malnutrition and requires initial inpatient care to determine the cause and offer appropriate treatment). As with infants with other forms of complicated malnutrition, they might be recruited at future visits if their oedema has resolved but they meet other inclusion criteria.

3. Infants older than age 5 months, since:
3.1. A month in the programme is insufficient time to observe the benefit of the intervention
3.2. There would be a cohort effect whereby these older infants would be overrepresented in the RCT and would lead to non-generalizable results. This is because future MAMI programmes would be tracking infants at multiple points from birth onwards. Any with problems would very likely be recruited and supported in the early months of infancy. In contrast, because our RCT

runs over a very short time period, the study would otherwise capture older infants who have never had the opportunity to be recruited/supported earlier.

4. Infant-mother dyads where a mother is unwilling or unable to commit to follow-up over the study time period (e.g., non-residents, individuals in transit, severe illness in mother).

These non-eligible infants/mothers will receive care according to standard national and local guidelines

Date of first enrolment
24/08/2022

Date of final enrolment
31/08/2023

Locations

Countries of recruitment
Ethiopia

Study participating centre
Jimma University Clinical and Nutrition Research Center (JUCAN)
PO.Box 378
Jimma University
Jimma
Ethiopia
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Study participating centre
GOAL Ethiopia
2RJJ+925, Kotebe
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Sponsor information

Organisation
London School of Hygiene & Tropical Medicine

ROR
https://ror.org/00a0jsq62

Funder(s)

Funder type
Charity

Funder Name
Eleanor Crook Foundation, USA

Results and Publications

Individual participant data (IPD) sharing plan
The fully anonymised STATA datasets generated during and/or analysed during the current study will be stored in a publicly available repository LSHTM Data Compass (https://datacompass.lshtm.ac.uk/), the data will be accessible upon request via Data Compass from the Chief Investigator, Dr Marko Kerac, marko.kerac@lshtm.ac.uk. Data will be uploaded to the repository once data collection has been completed and the data fully cleaned. Participants have consented for their anonymised data to be shared in this way, any participants who withdraw their consent will be removed from the dataset.

IPD sharing plan summary
Available on request, Stored in publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		17/05/2024	28/09/2026	Yes	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes