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CAREGIVER AND HEALTH WORKERS' PERCEPTIONS OF READY-TO-USE-THERAPEUTIC FOOD AND LOCAL FOODS FOR SEVERE ACUTE MALNUTRITION MANAGEMENT AT A SECONDARY LEVEL HEALTH FACILITY IN NAIROBI, KENYA
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ABSTRACT

Background: **Child malnutrition accounts for approximately 1 million deaths among children aged less than 5 years each year globally. World Health Organization (WHO) recommends Ready-to-Use-Therapeutic-Food (RUTF), a commercially prepared high-calorie semi-solid food, for home management of severe acute malnutrition (SAM). While studies in Kenya, Senegal, Malawi and Ethiopia have reported poor adherence and misuse of RUTF by children within community settings there is paucity of data on how caregivers view use of RUTF and the role of local foods in SAM management. In this study, we sought to understand caregivers' experiences with RUTF and local foods for SAM management as well as health workers' perspectives on local foods provided to children with SAM.**

Methodology: **In November 2019, we conducted two focus group discussions (FGDs) with caregivers of children with SAM and eleven in-depth interviews (IDIs) with healthcare workers (HCWs) at Mbagathi County Hospital (MCyH), Nairobi based on saturation of ideas. Interviews and discussions were audio-recorded and transcribed verbatim. Thematic analysis using open coding was done to identify emerging themes.**

Results: **We identified the following five themes from FGDs and IDIs: 1) RUTF perceived by caregivers as beneficial in SAM management. 2) Children do not however adhere to RUTF prescriptions 3) Caregivers prefer to give home foods in place of RUTF 4) Low-nutrient home foods provided to children associated with poor caregiver knowledge 5) Need for enhanced facility-based caregiver counselling on locally available high-nutrient foods.**

Conclusion: **This paper demonstrates that despite caregivers understanding the importance of RUTF, locally available foods play a central role in the home management of severe malnutrition. It also highlights the importance of ensuring adequate caregiver counselling on appropriate local high-nutrient foods that they should provide to children.**

INTRODUCTION

Severe acute malnutrition (SAM), defined by the World Health Organization (WHO) as a weight for height falling three or more standard deviations (or z-scores) below the median weight for a child of the same height, accounts for approximately 1 million deaths among children aged less than five years each year globally[1]. Two recent studies that analysed demographic and health survey data from over 30 countries in Sub-Saharan Africa reported the overall prevalence of wasting among children below the age of five years in this region at 7%[2, 3]. Prevalence of moderate wasting was estimated at 5%, while that for severe wasting was at 2.1%. The UNICEF-WHO-World Bank Joint Child Malnutrition Estimates Report of 2023 revealed a 5% prevalence of wasting among children in the East African region, which lies above the World Health Assembly (WHA) global nutrition target of less than 5% prevalence of wasting[4]. Data from the Kenya Demographic and Health Survey (KDHS) report of 2022 indicates that 5% of children below the age of five years in Kenya are wasted[5]. Severe malnutrition is associated with an increased risk of death not only in the acute stabilization period but also post-hospital discharge[6, 7, 8, 9] . Rapid weight gain through optimal nutrition is therefore desirable post-hospital discharge.

Ready-to-Use-Therapeutic-Food (RUTF), a commercially prepared high-calorie semi-solid food, is recommended by WHO for rapid weight gain within community settings[10, 11]. When used correctly, RUTF is optimal for rapid catch-up growth. Studies, however, report varying results on acceptability and adherence to RUTF among children with SAM. One Kenyan study conducted within Nairobi reported good adherence to RUTF, with 73% of children aged 6 to 23 months having consumed the correct amounts of RUTF on the day before the survey[12]. In another Kenyan study that compared a new RUTF formulation to standard RUTF, among TB/HIV coinfected patients, although all 41 participants reported good adherence and consumed >75% of prescribed RUTF, RUTF was only offered to participants for one supervised meal a day[13]. In a third study from Senegal, more than 70% of HIV-infected children aged 5 to 18 years who received RUTF rated it as having good taste, smell, and appearance, but 30% complained of diarrhoea, vomiting, or both while on RUTF[14]. Nineteen percent of children in the Senegalese study also refused to consume RUTF on some days during the study period. Some studies have reported caregivers' misuse of RUTF. In Malawi, Matilisky found that children only received 30-40% of prescribed RUTF amounts while the rest was shared within households, and in Ethiopia, RUTF was sold by caregivers to supplement family income[12, 13].

While previous studies have identified the challenges associated with RUTF acceptability by children and caregivers, there is a paucity of data on how caregivers perceive local foods offered to children in place of RUTF. Caregiver beliefs play a major role in determining adherence by children to prescribed therapeutic and local foods within community settings. Healthcare worker (HCW) views on these foods are crucial in identifying context-specific interventions to improve treatment outcomes for children.

This qualitative study was conducted as part of formative research work towards developing a nutrition education intervention, to understand the experiences of caregivers of severely malnourished children aged 6 to 59 months, attending an outpatient nutrition clinic (OPN) within Nairobi, with RUTF and local foods for SAM management. We also sought to explore healthcare workers' perspectives on local foods provided to children in place of RUTF.

METHODOLOGY

Study design: In November 2019, we conducted a qualitative study comprising focus group discussions (FGDs) with caregivers of children with SAM and in-depth interviews (IDIs) with healthcare workers (HCWs). FGDs were conducted with caregivers because they had the common experience of providing RUTF to children with SAM and were receiving nutrition support services within the same health facility. We anticipated that caregivers would be comfortable sharing experiences within a group and that group participation would stimulate richer discussions as participants built on the contributions of others

IDIs were conducted with healthcare workers due to the natural power hierarchy that existed within the health facility. Interviewees included supervisors and service providers and having them within the same discussion group would have likely caused tension and interfered with the free flow of ideas.

Study site: The study was conducted at Mbagathi County Referral Hospital (MCyH), a level V health facility in Nairobi, Kenya. MCyH provides health services to children mainly living in informal settlements within Nairobi. The estimated prevalence of wasting among children in these settlements is 6.3%, which is higher than the national prevalence of 5%[5, 17]. MCyH receives referrals from all 9 sub-counties within Nairobi and has a well-established outpatient nutrition clinic (OPN) that provides weekly RUTF supplies and follow-up services to approximately 120 children with SAM per month.

Study population.

Inclusion criteria:

Caregivers: Caregivers were eligible to participate if they were primary caregivers to severely malnourished children aged 6-59 months on follow-up at the MCyH OPN clinic for at least 4 weeks before the study, were conversant with the national language Kiswahili, and were willing to provide informed consent.

Healthcare workers (HCWs): HCWs were eligible to participate if they had worked for at least 6 months before the study period in the OPN clinic or paediatrics unit, had been involved in prescribing RUTF to children with SAM or providing care to a child on RUTF, and were willing to participate. While ability to communicate in English was a requirement for participation, English is the official language of communication at MCyH and no health worker was excluded due to language barrier.

Sample size and sampling technique:

We used purposive sampling to select caregivers and included those who were single and married, employed and unemployed, biological parents, and other guardians. HCWs were purposively selected to include different professional cadres (paediatricians, medical officers, clinical officers, nurses, and nutritionists). Discussions and interviews were conducted until no new ideas were forthcoming. Only 2 FGDs were conducted with caregivers. From the second FGD, we only had recurring themes already identified from the first FGD with no additional information or ideas. The saturation monitoring table was used to compare concepts and themes from both FGDs (Supplementary materials Appendix 1).

Data collection:

FGDS: With assistance from the nutritionist in charge at MCyH, caregivers were consecutively approached during follow-up visits and assessed for eligibility. Contact details were obtained from potential participants after a brief explanation of the study's purpose and consent. An appropriate date and time were communicated 1 week before to participants. Sessions were conducted face-to-face in a quiet confidential room within the OPN clinic by 2 research assistants. Both were female, had a Bachelor's degree in nursing and additional training in qualitative and research ethics. They were not staff members at MCyH and were not known to study participants. Sessions were conducted in the national language, Kiswahili, and lasted approximately 90 minutes.

In-depth interviews: Sessions were conducted face-to-face with HCWs at their convenience in English in a private room within the paediatrics department by the same research assistants who conducted FGDs and lasted approximately 60 minutes each.

FGDs and IDIs were conducted concurrently and only one research assistant was present for each session. To ensure consistency in data collection, the PI conducted a training session with the research assistants at the study start, to familiarize with study objectives and protocol. FGD and IDI guides were not pilot-tested, and guide questions were discussed before the study to ensure they sufficiently addressed study objectives. Questions were reviewed to ensure clarity of understanding. Only participants and researchers were present during interviews and discussions. Sessions were audio recorded, and hand-written notes were taken during discussions and interviews. No repeat interviews or discussions were conducted, transcripts were not returned to participants for comment and participants did not provide comments on study findings.

The interview guides for FGDs and IDIs were developed for this study by the principal investigator. While no formal framework was used to formulate discussion questions, questions were centred around knowledge gaps identified through a literature review of caregivers' perceptions of RUTF and local foods offered to children with SAM at home. Semi-structured FGD and IDI guides with prompts were used to conduct sessions. FGD guide questions focussed on caregivers' experiences with RUTF and their perceptions of local foods in SAM management, while questions for IDIs focussed on health workers' perspectives of RUTF adherence by children on the quality of home foods provided to children (Supplementary materials Appendices 2 and 3).

Ethical considerations

Ethical approval was obtained from the University of Nairobi-Kenyatta National Hospital (UoN-KNH) Ethics and Research Committee. Permission was obtained from the Mbagathi Hospital Management Team to conduct the study within the facility. All participants provided written informed consent before enrolment. Confidentiality was maintained by delinking all participant identifiers from data before analysis and data was stored in a password-protected computer with access only to the research team.

Data analysis

Audio recordings from FGDs and IDIs were transcribed verbatim and transcriptions from FGDs were translated into English. Data was then imported into Atlas Ti version 8.0 software for coding. The analysis mainly relied on audio-recorded data as the hand-written notes did not yield additional information to the audio-recorded data. Thematic analysis using open coding guided by study objectives, was used to identify emerging themes and sub-themes. Transcripts were read and reread independently by the PI and one of the research assistants to allow for content familiarization. A coding frame with attached category labels was subsequently

developed. Segments of coded text were placed within relevant categories to create subthemes. Discrepancies during coding were resolved through discussions between the PI and the research assistant. Data from FGDs and IDIs was triangulated and related subthemes were linked to create themes that were presented as emerging themes. Sample quotations were identified to accompany emerging themes.

RESULTS

Sociodemographic characteristics of study participants:

FGDs:

Out of 18 caregivers approached to participate in FGDs, 4 declined to consent. Two said they would not get time off work for discussions, one who needed time to consult with the child's father could not subsequently be reached on the phone, and one was not interested in participating.

Eight and six caregivers participated in the first and second FGDs, respectively. The age range was 21 to 36 years, 4 had primary and 10 had secondary and higher levels of education. Nine were married, 4 had small businesses, 4 were casual labourers, and 6 were homemakers. One caregiver was a grandmother while 13 were biological mothers. At participant enrolment, we had no males among caregivers who accompanied children to the outpatient nutrition clinic. (Table 1)

Table 1

Sociodemographic characteristics of caregivers

Characteristic	**Category**	**N = 14**
Age (years)	Range	21, 36
Level of education (years)	Primary Secondary College	4 8 2
Marital status	Married Single/separated	9 5
Occupation	Small business Casual labourer Homemakers	4 4 6
Relationship to child	Biological mother Grandmother	13 1

IDIs:

Eleven HCWs comprising 1 paediatrician, 1 medical officer, 3 nutritionists, 4 clinical officers, and 2 nurses participated in IDIs. The age range was 25 to 49 years, 4 were male and 7 were female. Years of experience working in the OPN clinic and paediatric unit ranged from 1 to 7 years (Table 2). At screening one HCW, a nurse, was excluded because she had just transferred to the paediatric ward from the maternity unit. One nurse declined consent because they were away on leave at the time of the study. (Table 2)

Table 2
Sociodemographic characteristics of HCWs

Characteristic	**Category**	**N = 11**
Age (years)	Range	25, 49
Gender	Male Female	4 7
Professional cadre	Paediatrician Medical officer Clinical officers Nutritionists Nurses	1 1 4 3 2
Years working in the OPN/Paediatric unit	Range	1,7

Emerging themes:

Emerging themes from FGDs and IDIs were as follows:

Theme 1. Caregivers perceived RUTF as beneficial in the management of SAM.

Caregivers identified RUTF as a good source of nutrients for children and an important component in the treatment of SAM. They described good weight gain and improved health while children were on RUTF.

Quotation (FGD1, R1, 28-year-old, homemaker): "The time he got to 6 months and I started giving him peanut (RUTF), that is when he started adding weight.Other than that, just the way he was sickly, the peanut used to help him a lot. If he had nothing to boost him he would have been in a bad condition".

Theme 2: Children do not adhere to RUTF prescriptions

Despite the perceived benefit of RUTF, caregivers reported that children often did not consume the prescribed amounts. We identified 4 sub-themes on reasons for poor adherence:

Sub-theme i. Fear of associated side effects:

Caregivers associated multiple side effects with RUTF. Participants identified diarrhoea and vomiting as the most common side effects.

Quotation (FGD1, R8, 30-year-old, homemaker): "But now this child of mine when you have given him the first spoon of peanut (RUTF) and you're on to the second one, he will start vomiting, he will vomit and vomit and now you have no option but to force him to eat. Now in the evening because of forcing him, he will start to diarrhea, you feel me?"

Sub-theme ii: RUTF refusal by children due to poor taste.

Caregivers complained of high sugar content in RUTF which they associated with refusal by children to consume it.

Quotation (FGD1, R5, 24-year-old, casual labourer): "I am saying that foods should be interchanged because that thing (RUTF) has a lot of sugar… my child cannot eat it unless it is mixed with porridge…"

Sub-theme iii: Sharing of RUTF within households.

Caregivers reported that other children and household members liked the taste of RUTF and sometimes consumed it.

Quotation (FGD1, R2, 27-year-old, small business owner): "Children love it, even if they hear that someone's mum has peanut they will stay there, not only children alone but also the adults, it's loved by everyone."

Sub-theme iv: Sale of RUTF.

HCWs mentioned receiving reports of caregivers who sold RUTF to others, mainly mothers with young children and drug users.

Quotation (IDI2, 40-year-old, Clinical officer): "You have given them (sachets) for a whole week, for example, you have given them 10 sachets, they will sell 5 and give the child 5… for the slum I hear one sachet is around 25-30 shillings. And

now the men also…we have heard that they actually give the men who take some drugs."

Theme 3: Caregivers prefer to give home foods in place of RUTF

Caregivers stated that children should receive home foods during standard meal times and RUTF between meals.

Quotation (FGD2, R6, 36-year-old, homemaker): "We give them every day; For example, you give the child the peanut (RUTF) during the times you are not giving them the other foods. The child is supposed to eat three times daily and you give them the food".

There were however contradicting opinions from 2 caregivers who felt that RUTF was sufficient for malnourished children and no additional home foods were required.

Quotation (FGD1, 26-year-old, homemaker): "It is sufficient,…. I have experienced that because the one that follows this one was very weak, was not even able to stand, I used to take him to the clinic at "name "…, they helped me and it's the peanuts that helped him to be able to walk. My child is very healthy, and it is just because of the peanuts (RUTF). They used to gossip saying that I have given birth to a disabled child. I have experienced its usefulness".

Theme 4: Low-nutrient home foods provided to children are associated with poor caregiver knowledge

HCWs were concerned that home foods offered to children lacked dietary diversity. There was no special modification to home foods to improve nutrient content, and children mainly received starches with no meat, vegetables, or eggs in their diets.

Quotation (IDI3, 42-year-old, Nurse): "Children are being fed 3 or 4 types of starches, and that is what is lunch and supper every day. Even the vitamins, there is no vegetable and then protein nothing other than milk, there is no egg, there is no omena (sardines). You know these are not out of reach, they can really afford like half a kilo of meat".

HCWs highlighted inadequate caregiver counseling on appropriate local foods due to heavy workload, high staff turnover, and lack of educational materials for use during counseling sessions as contributing factors to the low-nutrient home foods.

Quotation (IDI9, 38-year-old, Nutritionist): "Then another challenge, we do not have educating materials where you can give a mother to go and read at home, we do not have such, then the last thing is about the students that am telling you, the staffs, you find that you have a student this week, next week the student is gone. You do day one of teaching the student but then she is just here up to Friday and mostly we don't have patients on Friday. It is only for three days then she is gone, so personnel are also a challenge, the staff".

Theme 5: Need for enhanced facility-based caregiver counseling on local high-nutrient foods

HCWs suggested improving caregiver counseling on these foods through provision of reading materials for mothers to take home, use of food display charts on health facility walls, telephone messages, and follow-up home visits by community health workers.

Quotation (IDI7, 33-year-old, Medical officer): "…and they can actually be followed up within the community using the different avenues, community health workers and all that. Maybe if we could use champion mothers to encourage, through education on these (local high-nutrient foods). Post-discharge SMS, this is a good way because nowadays everyone owns a phone, so you just get an sms alert".

DISCUSSION

This qualitative study explored caregivers' views on RUTF and local foods and their perceived roles in the management of acute malnutrition. Despite caregivers perceiving RUTF as beneficial for malnourished children, they reported poor adherence to RUTF. Previous studies in Kenya and

Senegal reported similar findings where, although caregivers generally understood the nutritive value of RUTF, they did not adhere to prescriptions. In the study by Ochola in Kenya, the majority of caregivers clearly understood guidelines for RUTF use and had positive attitudes towards RUTF, but 27% of children did not receive the prescribed amounts[12]. Young children aged 6 to 11 months, higher birth order, and poor caregiver knowledge of correct feeding practices were associated with poor RUTF adherence in that study. Only 54% of children aged 6 to 11 months in the study by Ochola consumed the right amount of RUTF compared to more than 80% of the older children. Caregivers with correct knowledge of RUTF use provided the right amount to children. While another Kenyan study among TB-HIV-infected patients reported 100% adherence to prescribed RUTF, we noted that RUTF was only offered once daily, and participants continued to consume usual home foods during other meals. It is therefore likely that RUTF adherence may have been lower if participants had only received RUTF and no other foods[13]. In a study conducted in Senegal, where 31% of HIV-infected children and adolescents had sub-optimal RUTF, dislike of RUTF taste, household food insecurity, and HIV non-disclosure were associated with the sub-optimal intake [14]. Our study findings underscore the fact that while caregivers understand the benefits of RUTF, there are challenges that ultimately interfere with adherence.

Caregivers in our study described fear of RUTF-associated side effects, sharing within households, and poor taste as contributing factors to poor adherence. In Bangladesh, 60% of caregivers in a study by Ali et al complained about vomiting, diarrhoea, and abdominal distension among children on RUTF[18]. Diarrhoea and vomiting were also commonly reported in Ethiopia and Burkina Faso by caregivers whose children were on RUTF[19, 17]. Caregivers in our study attributed refusal by children to consume RUTF to high sugar content. Caregivers consequently resorted to mixing RUTF with porridge to mask the taste, which is similar to what was done by caregivers in Burkina Faso[19]. In Bangladesh, 47% of caregivers reported having to force-feed RUTF to children, while 5% of children completely refused RUTF within 3 weeks of initiation[18]. Thirty percent of defaulters from an outpatient nutrition clinic in Ethiopia cited refusal of RUTF by children as a reason for defaulting. Some caregivers in the same study in Ethiopia opted to boil RUTF before offering it to children to improve palatability[20]. Although the sale of RUTF to other community members was previously reported in Ethiopia by Tadesse et al, sale to drug users was a new and interesting finding in our study[16]. HCWs in the current study noted that drug users were highly aware of the high nutritional value of RUTF, which they accessed cheaply from caregivers of malnourished children.

Based on challenges experienced with RUTF use, caregivers in our study ultimately opted to give children local foods during standard mealtimes instead of RUTF, which was offered between meals. Rachmadewi had similar findings in Indonesia, where nine in ten malnourished children consumed family foods approximately 3 times per day, despite not finishing the prescribed RUTF[21]. In a study by Puett in Ethiopia, one caregiver believed that RUTF alone was not adequate for malnourished children hence the need for additional complementary foods[20].

Of concern in the current study was the low-nutrient value of local foods provided to children in place of RUTF at home. HCWs reported that caregivers mainly offered cereals and starches to children. When meat was available, caregivers gave children the soup instead of actual meat. Our finding on the low dietary diversity of home foods mirrors what Wawire reported in Western Kenya, where caregivers only fed their

children porridge because they believed it contained all the required nutrients. Caregivers in that study also felt that children were not developmentally ready to chew, hence they did not provide meat and vegetables[22]. Earlier studies in Kenya and Tanzania by Bwibo and Raymond similarly described poor quality local diets among children, often lacking animal-source proteins and vitamin A-rich fruits and vegetables[20, 21].

HCWs in our study identified poor caregiver knowledge of locally available high-nutrient foods as a contributing factor to the low-nutrient foods offered to children at home. Poor caregiver knowledge was linked by HCWs to inadequate facility-based counselling on local foods. HCWs mentioned high staff turnover, lack of educational materials, and time constraints as barriers to in-depth caregiver counselling. Motebejana, in a study in Ethiopia where caregivers demonstrated poor knowledge of appropriate home foods for children, noted that HCWs did not adequately counsel caregivers[25].

HCWs in the current study provided several suggestions on ways to improve caregiver counselling of local high-nutrient foods for children. These included the use of educational materials, such as pamphlets given to mothers to read at home, reminder telephone messages to caregivers about appropriate foods, and home visits by community health workers. Going forward, there is a need to explore which options would be most feasible to implement, considering the available resources.

In summary, this study identified challenges experienced by children and their caregivers regarding the use of RUTF. Our findings demonstrate the central role of local foods in the home management of SAM, even while children receive RUTF, and the need to ensure that caregivers are adequately counselled on local high-nutrient foods to provide to children. There is a need for further research into ways of improving RUTF acceptability through the identification of formulations with better taste, as well as ways to address associated side effects, which were highlighted as major constraints. Our study lays a foundation for future research on context-specific interventions to equip caregivers with correct knowledge of RUTF and local high-nutrient foods for children. As demonstrated in our study, children on RUTF continue to receive home foods.

Study strengths and limitations

Our study's strength was the use of a qualitative design to provide in-depth knowledge of caregivers' and health workers' perceptions of local foods offered to children with SAM by caregivers while on RUTF. The inclusion of caregivers and health workers as study participants provided objective data on adherence to prescribed therapeutic foods by caregivers.

Our study limitations included the fact that this was a facility-based study conducted among caregivers of children living within informal settlements in Nairobi. While our study results may be generalized to severely malnourished children aged 6 to 59 months with uncomplicated severe malnutrition from low socio-economic urban settlements similar to ours, results may not apply to children of higher socioeconomic status or those living in rural areas. We relied on participant responses to obtain data, and some study participants may have modified responses, which may have resulted in response bias.

CONCLUSION

Although caregivers in this study perceived RUTF as beneficial for SAM, they continued to provide low-nutrient home foods to children due to challenges associated with the use of RUTF. There is a need to address RUTF-related challenges as well as low caregiver knowledge of local high-nutrient

foods by enhancing the facility-based caregiver counselling currently provided on these foods.

REFERENCES

1. World Health Organization. Guideline: updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013
2. Asebe H, Asmare Z, Mare K, Kase B, Tebeje T, Asgedom Y, et al. The level of wasting and associated factors among children aged 6–59 months in sub-Saharan African countries: multilevel ordinal logistic regression analysis. Front Nutr. 2024 Jun 6; 11:1336864.
3. Tamir T, Zegeye A, Workneh B, Ali M, Gonete A, Techane MA, et al. Childhood wasting and associated factors in Africa: evidence from standard demographic and health surveys from 35 countries. BMC Public Health. 2025 Feb 4;25(1):454.
4. Moumen H. UNICEF-WHO-The World Bank: Joint Child Malnutrition Estimates (JME) — Levels and Trends – 2023 edition. UNICEF DATA. 2023
5. Kenya National Bureau of Statistics (KNBS)-Ministry of Devolution and Planning-Kenya Demographic and Health Survey 2022-Main-Report-Volume-2
6. Moïsi J, Gatakaa H, Berkley J, Maitland K, Mturi N, Newton C, et al. Excess child mortality after discharge from hospital in Kilifi, Kenya: a retrospective cohort analysis. Bull World Health Organ. 2011 Oct 1;89(10):725-732A.
7. Berkley J, Ngari M, Thitiri J, Mwalekwa L, Timbwa M, Hamid F, et al. Daily co-trimoxazole prophylaxis to prevent mortality in children with complicated severe acute malnutrition: a multicentre, double-blind, randomised placebo-controlled trial. Lancet Glob Health. 2016 Jun 2;4(7): e464–73.
8. Kerac M, Bunn J, Chagaluka G, Bahwere P, Tomkins A, Collins S, et al. Follow-Up of Post-Discharge Growth and Mortality after Treatment for Severe Acute Malnutrition (FuSAM Study): A Prospective Cohort Study. PLOS ONE. 2014 Jun 3;9(6): e96030.
9. Chisti MJ, Graham SM, Duke T, Ahmed T, Faruque ASG, Ashraf H, et al. Post-Discharge Mortality in Children with Severe Malnutrition and Pneumonia in Bangladesh. PLOS ONE. 2014 Sep 16;9(9): e107663.
10. World Health Organization. Community Based Managament of Severe Malnutirition. A Joint Statement by the World Health Organization, World Food Program, the United Nations Systems Organization: 2007
11. Briend A, Lacsala R, Prudhon C, Mounier B, Grellety Y, Golden MH. Ready-to-use therapeutic food for treatment of marasmus. The Lancet. 1999 May;353(9166):1767–8.
12. Ochola S, Ogada I, Odera C. Predictors of the amount of intake of Ready-To-Use-Therapeutic foods among children in outpatient therapeutic programs in Nairobi, Kenya. Food Sci Nutr. 2022 Jan 18;10(4):1135–45.
13. Dibari F, Bahwere P, Huerga H, Irena A, Owino V, Collins S, et al. Development of a cross-over randomized trial method to determine the acceptability and safety of novel ready-to-use therapeutic foods. Nutrition. 2013 Jan 1;29(1):107–12.
14. Niasse F, Varloteaux M, Diop K, Ndiaye SM, Diouf F, Mbodj P, et al. Adherence to ready-to-use food and acceptability of outpatient nutritional therapy in HIV-infected undernourished Senegalese adolescents: research-based recommendations for routine care. BMC Public Health. 2020 May 15;20(1):695.
15. Matilsky D, Maleta K, Castleman T, Manary M. Supplementary Feeding with Fortified Spreads Results in Higher Recovery Rates Than with a Corn/Soy Blend in Moderately Wasted Children12. The Journal of Nutrition. 2009 Apr 1;139(4):773–8.
16. Tadesse E, Berhane Y, Hjern A, Olsson P, Ekström E. Perceptions of usage and unintended consequences of provision of ready-to-use therapeutic food for management of severe acute child malnutrition. A qualitative study in Southern Ethiopia. Health Policy and Planning. 2015 Dec 1;30(10):1334–41.
17. De Vita M, Scolfaro C, Santini B, Lezo A, Gobbi F, Buonfrate D, et al. Malnutrition, morbidity and infection in the informal settlements of Nairobi, Kenya: an epidemiological study. Ital J Pediatr. 2019 Jan 14; 45:12.
18. Ali E, Zachariah R, Dahmane A, Van den Boogaard W, Shams Z, Akter T, et al. Peanut-based ready-to-use therapeutic food: acceptability among malnourished children and community

workers in Bangladesh. Public Health Action. 2013 Jun 21;3(2):128–35.

19. Nikièma V, Fogny N, Kangas S, Lachat C, Salpéteur C. Availability, use, and consumption practices of ready-to-use therapeutic foods prescribed to children with uncomplicated severe acute malnutrition aged 6–59 months during outpatient treatment in Burkina Faso. Appetite. 2022 Jan 1; 168:105751.

20. Puett C, Guerrero S. Barriers to access for severe acute malnutrition treatment services in Pakistan and Ethiopia: a comparative qualitative analysis. Public Health Nutr. 2015 Jul;18(10):1873–82.

21. Rachmadewi A, Soekarjo D, Bait B, Suryantan J, Noor R, Rah J, et al. Ready-to-Use Therapeutic Foods (RUTFs) Based on Local Recipes Are as Efficacious and Have a Higher Acceptability than a Standard Peanut-Based RUTF: A Randomized Controlled Trial in Indonesia. Nutrients. 2023 Jan;15(14):3166.

22. Wawire S. Complementary Feeding Practices: Using Trial for Improved Practice (TIPs) to Improve Complementary Feeding in Migori and Kisumu, Kenya.

23. Bwibo N, Neumann C. The Need for Animal Source Foods by Kenyan Children. The Journal of Nutrition. 2003 Nov 1;133(11):3936S-3940S.

24. Raymond J, Kassim N, Rose J, Agaba M. Optimal formulations of local foods to achieve nutritional adequacy for 6–23-month-old rural Tanzanian children. Food & Nutrition Research. 2017

25. Motebejana T, Nesamvuni C, Mbhenyane X. Nutrition Knowledge of Caregivers Influences Feeding Practices and Nutritional Status of Children 2 to 5 Years Old in Sekhukhune District, South Africa. Ethiop J Health Sci. 2022 Jan;32(1):103–16.