Treatment of moderate acute malnutrition with ready-to-use supplementary food results in higher overall recovery rates compared with a corn-soya blend in children in southern Ethiopia: an operations research trial[1–5]

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ABSTRACT

Background: Moderate and severe acute malnutrition affects 13% of children <5 y of age worldwide. Severe acute malnutrition affects fewer children but is associated with higher rates of mortality and morbidity. Supplementary feeding programs aim to treat moderate acute malnutrition and prevent the deterioration to severe acute malnutrition.

Objective: The aim was to compare recovery rates of children with moderate acute malnutrition in supplementary feeding programs by using the newly recommended ration of ready-to-use supplementary food (RUSF) and the more conventional ration of corn-soya blend (CSB) in Ethiopia.

Design: A total of 1125 children aged 6–60 mo with moderate acute malnutrition received 16 wk of CSB or RUSF. Children were randomly assigned to receive one or the other food. The daily rations were purposely based on the conventional treatment rations distributed at the time of the study in Ethiopia: 300 g CSB and 32 g vegetable oil in the control group (1413 kcal) and 92 g RUSF in the intervention group (500 kcal). The higher ration size of CSB was provided because of expected food sharing.

Results: The HR for children in the CSB group was 0.85 (95% CI: 0.73, 0.99), which indicated that they had 15% lower recovery (P = 0.039). Recovery rates of children at the end of the 16-wk treatment period trended higher in the RUSF group (73%) than in the CSB group (67%) (P = 0.056).

Conclusion: In comparison with CSB, the treatment of moderate acute malnutrition with RUSF resulted in higher recovery rates in children, despite the large ration size and higher energy content of the conventional CSB ration. This trial was registered at www.clinicaltrials.gov as NCT 01097889. *Am J Clin Nutr* 2012;96:911–6.

INTRODUCTION

Undernutrition is a major risk factor for child mortality and is implicated in ~28% of deaths in children under the age of 5 y (1). Moderate acute malnutrition (MAM)[6] and severe acute malnutrition (SAM) affect 13% of children aged <5 y worldwide (2). MAM is defined as a weight-for-height z score between −2 and −3 or a weight-for-height percentile (WFH) between 70% and 79%, compared with a reference population (3). Supplementary feeding programs are designed to treat MAM and prevent the progression from MAM to SAM (4) and thus have the potential to reduce child mortality and morbidity.

For the past several decades, supplementary feeding programs have been used in developing countries to treat MAM despite insufficient evidence on the effectiveness of the treatment foods provided in these programs (5–7). Fortified blended flours, such as corn-soya blend (CSB), prepared as porridge, are the most widely used foods in supplementary feeding programs (8). However, concerns about the nutritional adequacy of these blended foods in combination with issues around preparation at home (making the porridge too thin or inadequate boiling of water) and the documented success of new treatment foods for SAM have led to the development of alternative foods for the treatment of MAM (9–12).

Ready-to-use foods (RUFs) are conveniently packaged, energy-dense fortified foods that do not require cooking or preparation before use (13). Ready-to-use therapeutic foods

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[2] CK and TvdB were staff members of the United Nations World Food Programme (WFP) at the time of the research design and implementation. CK and TvdB are responsible for the individual and personal views presented in this article. However, those expressed views do not represent the position or stated policy of the WFP.

[3] Supported by the United Nations World Food Programme and Action Contre la Faim–France. Both agencies were involved in the design, implementation, analysis, and interpretation of the data. The analysis and interpretation of the data were led by an independent statistician at the Hospital for Sick Children, Child Health and Evaluative Sciences Program.

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[6] Abbreviations used: CSB, corn-soya blend; MAM, moderate acute malnutrition; MUAC, midupper arm circumference; NCHS, National Center for Health Statistics; RUF, ready-to-use food; RUSF, ready-to-use supplementary food; RUTF, ready-to-use therapeutic food; SAM, severe acute malnutrition; WFH, weight-for-height percentile; WFP, World Food Programme.

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(RUTFs) have proven to be effective in the community-based treatment of SAM because of their specialized nutrient composition, the reduced risk of contamination associated with their use, and the fact that children can consume RUTF in their homes (provided they are free from clinical complications), obviating the need for inpatient treatment (14–16). Studies that compared the effectiveness of RUTF and CSB for the treatment of mild or moderate acute malnutrition have suggested that RUTF may be more effective (17–20). However, several of these studies provided large RUTF rations (>700 kcal/d), such that the energy content of the ration was higher than the current recommendations for the treatment of MAM. The current study is the first to investigate the effectiveness of ready-to-use supplementary food (RUSF) for the treatment of MAM when provided in the currently recommended ration size for this population (500 kcal/d) compared with a conventional ration size of CSB. The primary objective was to compare the recovery of the children receiving CSB or RUSF treatment by using Cox proportional HR analyses and survival analyses. The results of this study potentially have major implications for organizations and agencies implementing supplementary feeding programs because RUSF is expensive and must be targeted appropriately to ensure cost-effectiveness.

SUBJECTS AND METHODS

Setting

The current study presents data from 10 health centers and health posts in the northern region of the Sidama zone, Ethiopia, where there was a "priority 2" level of food and nutrition insecurity and where no other food assistance programs were implemented. The Emergency Nutrition Coordination Unit in Ethiopia uses a "priority" classification system to prioritize districts for nutrition services on the basis of food and nutrition security indicators and available resources. This priority classification system determines the extent to which health and nutrition services will be provided.

Subjects

Ethiopian children aged 6–60 mo were screened by midupper arm circumference (MUAC). Children with MUAC <135 mm were referred for second-stage assessment using WFH ≥70 to <80% (4) according to National Center for Health Statistics (NCHS) growth references. The NCHS growth reference was used because the new WHO growth standards had not yet been formally adopted by the Ministry of Health in Ethiopia. Recruitment was ongoing from 10 April 2009 to 30 October 2009. Recruitment was terminated after the 6-mo trial period because of an earlier agreement with the government. Exclusion criteria included the following: *1*) children with MUAC <110 mm, bilateral pitting edema, or other complications; *2*) children transferred from therapeutic feeding programs; and *3*) children with any condition preventing safe ingestion of either food (ie, peanut allergy). Children with complications or severe malnutrition were referred to inpatient facilities.

Methods

The study was a cluster-randomized effectiveness trial embedded in a conventional supplementary feeding program. Before the start of this program, 2 districts were randomly assigned to receive either CSB or RUSF by using a blinded draw from an opaque bag. Children who met the inclusion criteria were enrolled and received biweekly rations of either CSB or RUSF depending on the district in which they lived. The daily rations were equivalent to 300 g CSB and 32 g vegetable oil (1413 kcal, 47 g protein) or 92 g RUSF (500 kcal, 13 g protein). Children who received CSB are referred to as the CSB group and children who received RUSF are referred to as the RUSF group. The nutrient profile of each distributed ration is detailed in **Table 1**. Note that the quantity of the CSB ration is purposely higher because of expected household food sharing of the CSB ration.

A total of 10 supplementary feeding programs were included in the trial, 5 in the CSB district and 5 in the RUSF district. Before the 2 districts were selected for the study, livelihood and food security profiling was conducted to ensure comparability of populations and food security status. The 2 districts bordered each other and were of comparable size with very similar environments, populations, access to services, and food security levels. Similar cash crops (chat, enset, and livestock) and food crops (enset and barley) were prevalent in both districts.

In addition, 5 supplementary feeding program sites were purposely and geographically chosen in each of the 2 districts so that all beneficiaries had equal access. All of the supplementary feeding program sites were within a walking distance of ≤5 km for beneficiaries. The research study ran concurrently in both districts in the same season.

TABLE 1
Nutrient composition of the distributed rations[1]

Nutrient	300 g CSB and 32 g oil	92 g RUSF
Energy (kcal)	1413	500
Protein (g)	47	12.5
Fat (g)	50	32.9
Sodium (mg)	83	<267
Potassium (mg)	1758	511
Magnesium (mg)	432	84.6
Phosphorus (mg)	1107	276
Zinc (mg)	23	12.9
Calcium (mg)	542	276
Copper (mg)	1.4	1.6
Iron (mg)	38.5	10.6
Iodine (μg)	5	92
Thiamine (mg)	1.31	0.55
Riboflavin (mg)	2.09	1.66
Niacin (mg)	29.9	4.88
Vitamin B-6 (mg)	2.3	0.55
Vitamin B-12 (μg)	1.3	1.7
Folate (μg)	471	193
Vitamin C (mg)	149	49
Vitamin A (μg)	1792	840
Vitamin D (μg)	18	15
Vitamin E, tocopherol (mg)	28	18.4

[1] The quantity of the CSB ration was purposely higher because of expected household food sharing of the CSB ration. Nutrient values for the CSB and oil ration were calculated by using the NutVal 2006 (2.2) program (University College London and World Food Programme), and nutrient values for the RUSF ration (Supplementary Plumpy; Nutriset) were referenced from Nutriset's product sheet. CSB, corn-soya blend; RUSF, ready-to-use supplementary food.

All feeding programs were implemented in health centers under the supervision of trained nurses and research staff. Children enrolled in the study received up to 16 wk of treatment with either CSB or RUSF (Supplementary Plumpy; Nutriset) as described above. Rations were distributed biweekly as a premix of 4.2 kg CSB and 0.5 L oil or 14 sachets of RUSF. The difference in size and energy content of the rations was purposeful and largely due to the expected food sharing in the CSB households, because sharing of CSB among all family members is well described despite the targeting of CSB to malnourished children in the household (4–6). RUSF is a new product with specific instructions that it is a medicine and food for sick children and not to be shared. Notwithstanding the differences in size and energy content of the 2 foods, the objective of this effectiveness trial was to purposely compare the recovery rates by using the conventional ration size of CSB in Ethiopia and the new recommended ration size of RUSF (500 kcal/d) in a supplementary feeding program. Knowing that food sharing takes place in virtually all households that receive CSB, it would have been inappropriate (and unethical) to provide the same ration size (500 kcal) to both groups in the study.

Screening began in April 2009. Weight, height, and MUAC measurements were taken biweekly, concurrently with the food distribution. Two trained research staff conducted and recorded the measurements by using standard calibrated equipment. Weight was measured by using a hanging Salter scale to the nearest 0.1 kg. Length and height were measured by using wooden boards to the nearest 0.1 cm. WFH was calculated through standard tables generated on the basis of the NCHS growth reference. MUAC was measured by using a standard MUAC tape to the nearest 0.1 mm. Questionnaires were used to collect additional data on the child and on the household characteristics.

Children were categorized into 1 of 5 categories at the end of the 16-wk intervention: recovered (WFH ≥85% on 2 consecutive visits), nonresponse (no recovery within 16 wk), defaulted (lost to follow-up after 2 consecutive missed visits), transferred (to inpatient facility; WFH <70%, MUAC <110 mm, or edema), or died.

Outcomes

The primary objective was to compare the recovery of the children receiving CSB or RUSF treatment by using Cox proportional HR analyses and survival analyses (Kaplan-Meier curves). The intent was to evaluate the effectiveness of the 2 rations being routinely used in treatment of MAM in Ethiopia with the clear understanding that the energy and nutrient content of each was different. Thus, we defined the study as an effectiveness trial, not as an efficacy trial.

The secondary objective was to compare all program performance indicators after 16 wk compared with the SPHERE Project target rates (21). The SPHERE Project is an initiative to define and maintain the standards by which the international community responds to the plight of people affected by disasters, principally through a set of guidelines that are set out in the Humanitarian Charter and Minimum Standards in Humanitarian Response. The program performance indicators used for this study and the SPHERE Project target rates for supplementary feeding programs are defined in **Table 2** (22).

Statistical analysis

The study was conducted as an intention-to-treat analysis. The sample size was estimated in STATA (version 10; StataCorp) based on a hypothesis of an expected difference in outcomes between the 2 groups and on the following assumptions: *1*) a 75% recovery rate and *2*) a 70-d recovery time. A design effect of 1.5 was applied to compensate for variability among and between districts, and the number was rounded up to account for missing or incomplete files.

SAS (version 9.1; SAS Institute) was used to conduct survival analyses. Cox proportional HRs and Kaplan-Meier survival curves were used to analyze and describe the data. HRs and 95% CIs were estimated to assess the overall significance. The "time-to-event" was recovery from malnutrition from date of randomization. Cox proportional HRs and Kaplan-Meier survival curves were used because they are the most appropriate analyses given that they take censoring into consideration. Epi Info (version 3.5.1; CDC) was used to compute z scores and percentiles on the basis of NCHS growth references, and t tests, ANOVAs, and chi-square tests were used to assess baseline characteristics. Robust SEs were used to account for the clustered data. Two-sided P values <0.05 indicated significance.

This protocol was registered on the clinicaltrials.gov website (NCT 01097889). Research ethics approval was obtained from the Hospital for Sick Children, University of Toronto, Canada.

TABLE 2
Definitions of program performance indicators and SPHERE Project target rates[1]

Indicator	Definition	SPHERE target rates
		%
Recovered	Child meets the discharge criterion for recovery: 2 consecutive measurements of WFH >85% within a 16-wk time period	>75
Defaulted	Child is absent for 2 visits or does not return to the program and is lost to follow-up	<15
Transferred	Child's nutrition status deteriorates: WFH decreases to <70% or child becomes ill or has complications and requires transfer to inpatient care	N/A
Nonresponse	Child does not reach recovery after 16 wk of treatment	N/A
Died	Child dies while in program	<3

[1] N/A, not applicable, because the SPHERE Project does not currently have published target rates for transfer and nonresponse rates; WFH, weight-for-height percentile.

RESULTS

The trial profile is shown in **Figure 1**. The current study enrolled 1125 children aged 6–60 mo with moderate acute malnutrition in 2 districts of the Sidama zone of Ethiopia. This region was defined (by the Emergency Nutrition Coordination Unit) as a "priority 2" area for supplementary feeding programs and had no other food assistance programs being implemented in the research area. Of the total 1125 children who were enrolled in the current study, 1049 (93%) completed the 16-wk time period of the study. No caregivers declined participation in the study in either treatment group. Data were excluded from the analysis for 43 children (<1%) because of incomplete or lost files. A lower total number of children were enrolled in the study in the RUSF group (n = 375) compared with the CSB group (n = 750). In each district, as eligible children were admitted to the supplementary feeding program, caregivers were asked if they would be willing to enter the study. In the RUSF district, fewer children were found to be eligible and thus fewer were enrolled. Because enrollment was approved only for a 6-mo period, there was no opportunity to prolong the enrollment to achieve equal numbers in the 2 districts.

Baseline characteristics were compared between the CSB and RUSF groups (**Table 3**). No significant differences between the groups were identified.

Recovery rates were higher in the RUSF group than in the CSB group. The overall HR for CSB was 0.85 (95% CI: 0.73, 0.99), which indicated that the CSB group had a 15% lower overall recovery rate (P = 0.039). The Kaplan-Meier curves for the proportion of recovered children over the 16 wk of treatment in the CSB and RUSF districts are shown in **Figure 2**.

The program performance indicator rates after 16 wk of treatment in the 2 districts are shown in **Table 4**. A total of 73% of children recovered from MAM in the RUSF group compared with 67% in the CSB group (P = 0.056). There were no significant differences between the RUSF and CSB groups; defaulting and death rates were low and nonresponse rates were high. Neither group met the SPHERE criterion for recovery from malnutrition. However, it should be noted that 97% of children either recovered or remained static, whereas only 1–2% became more malnourished.

DISCUSSION

The goal of supplementary feeding programs is to treat children with MAM and prevent children from deteriorating and developing SAM. In the current study, both CSB and RUSF were relatively successful in that 67% and 73% of children recovered from MAM. However, we observed nonresponse rates of 30% of children in the CSB group and 24% in the RUSF group; thus, these children did not recover but maintained their MAM status at the end of the 16-wk study period. Only 1–2% of children were transferred to inpatient care because of medical complications or deterioration to SAM. Neither group met the SPHERE goal of 75% recovery. Children in the RUSF group showed higher recovery rates over the 16-wk period than did children in the CSB group. Both groups were similar and met the SPHERE target rates for death (<3%) and defaulting (<15%). There were no reported deaths in either group.

Nonresponse rates in children were similar and relatively high in both groups. The reason for the high nonresponse rates is unknown. Nonresponse rates were not related to the child's age, sex, initial weight, or health status. We are confident in our identification of nonresponders compared with those children who were transferred for inpatient care. A nurse was present for all biweekly assessments of children when the caregiver received

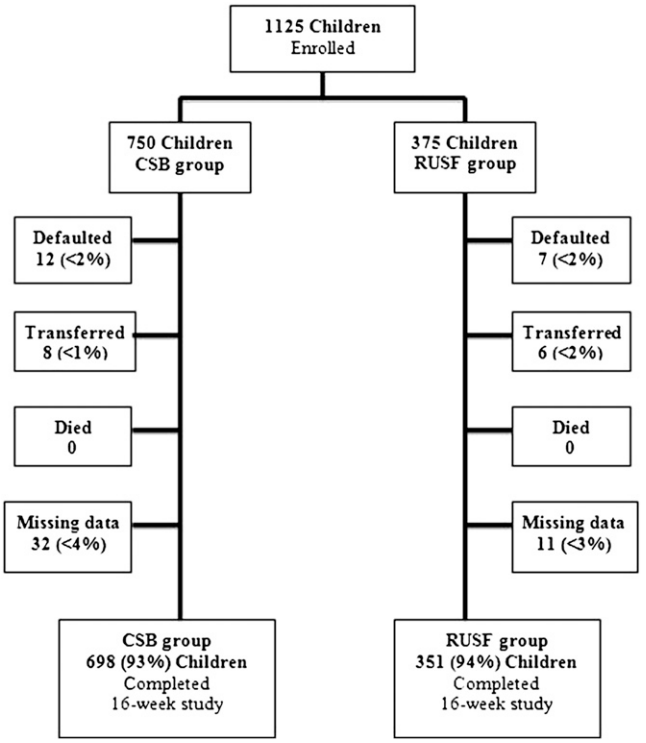

FIGURE 1. Flowchart of study enrollment and completion. There were no reports of caregivers who declined or withdrew their participation in the study. Missing data are not included in the computation of recovery rates. CSB, corn-soya blend; RUSF, ready-to-use supplementary food.

TABLE 3
Baseline characteristics of the enrolled children[1]

Baseline characteristics	CSB group	RUSF group
Per district [n (%)]	750 (67)	375 (33)
Age (mo)	36.0 ± 13.2[2]	34.6 ± 13.7
Age 6–24 mo [n (%)]	185 (25)	102 (27)
Age 25–60 mo [n (%)]	565 (75)	273 (73)
Female [n (%)]	484 (65)	213 (57)
Height (cm)	86.6 ± 10.7	85.7 ± 10.5
Weight (kg)	9.5 ± 1.9	9.3 ± 1.9
MUAC (cm)	11.7 ± 0.4	11.6 ± 0.5
Height-for-age z score	−1.9 ± 1.3	−1.9 ± 1.3
Weight-for-age z score	−3.1 ± 0.7	−3.1 ± 0.7
Weight-for-height z score	−2.5 ± 0.3	−2.6 ± 0.4
Weight-for-height percentile	77.1 ± 2.7	76.7 ± 2.8

[1] Total n = 1125. There were no significant differences between the CSB and RUSF groups at baseline. Statistical analyses for the baseline characteristics were conducted by using t tests, ANOVA, and chi-square tests with SAS software (version 9.1; SAS Institute). Two-sided P values <0.05 indicated significance. Epi Info (version 3.5.1; CDC) was used to compute z scores and percentiles on the basis of National Center for Health Statistics growth references. CSB, corn-soya blend; MUAC, midupper arm circumference; RUSF, ready-to-use supplementary food.

[2] Mean ± SD (all such values).

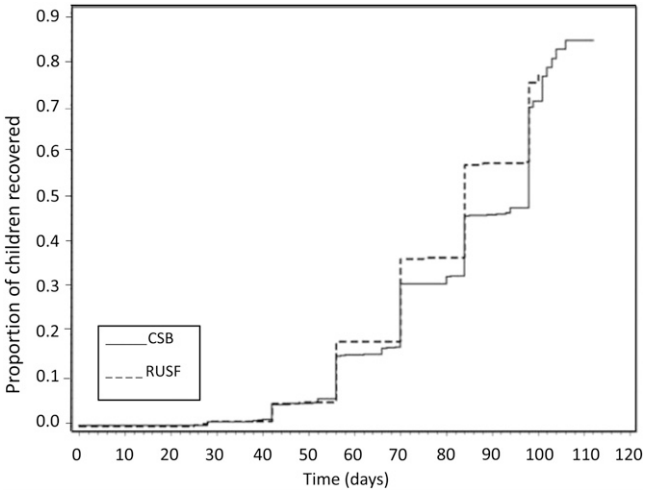

FIGURE 2. Proportion of children who recovered (Kaplan-Meier curve). Recovery rates were higher in the RUSF group than in the CSB group (P = 0.039). Statistical analysis was conducted by using survival analysis and Cox proportional HRs computed in SAS software (version 9.1; SAS Institute). Kaplan-Meier curves were used to analyze and describe the data. CSB, corn-soya blend; RUSF, ready-to-use supplementary food.

the next ration. Children who presented with bilateral pitting edema, consecutive weight loss, diarrhea or illness, or a decrease in WFH to <70% on any visit were transferred to inpatient care for more intense treatment and were classified as "transferred" children. There were no correlations found between the number of children who presented with diarrhea or illness and the rates of nonresponse and recovery. There were no reports of peanut allergies or other adverse reactions to either of the treatment foods.

In past studies, high nonresponse rates have been linked to household food sharing practices. CSB is known to be widely accepted and consumed by all members of the household, especially when food is scarce (4, 6). Given the relative scarcity of food in southern Ethiopia, it was not unexpected that food sharing would occur in the households receiving CSB. Although there is much less "field experience" with RUSF compared with CSB, it was expected that RUSF would be less susceptible to food sharing. RUSF was a new food product with specific instructions that it be used for feeding infants and young children only. Indeed, it was portrayed as a medicine not to be shared. The World Food Programme (WFP) specifically recommends supplemental CSB rations to be in the range of 1000–1200 kcal/d because of assumed food sharing. In Ethiopia, the energy content of the take-home ration (CSB and vegetable oil) was 1413 kcal, which is ~3 times what an infant or young child is expected to ingest (4). The defaulting rates were very low in both the CSB and RUSF groups (2%), which indicated that very few children dropped out of the program or were lost to follow-up during the trial. Therefore, we speculate that access to the program and acceptance of the treatment foods were comparably equal and acceptable to the households in the study in both groups.

TABLE 4
Program performance indicator rates[1]

Exit category	CSB group	RUSF group
Total children (n)	750	375
Recovered [n (%)]	482 (67)	265 (73)
Defaulted [n (%)]	12 (2)	7 (2)
Transferred [n (%)]	8 (1)	6 (2)
Nonresponse [n (%)]	216 (30)	86 (24)
Died [n (%)]	0	0
Missing data[2] [n (%)]	32 (4)	11 (3)
Met SPHERE targets[3]	No	No

[1] Statistical analyses were conducted by using t tests, ANOVA, and chi-square tests with SAS software (version 9.1; SAS Institute). Comparison of recovery rates between the 2 districts at the end of the 16-wk intervention, P = 0.056. CSB, corn-soya blend; RUSF, ready-to-use supplementary food.

[2] Missing data were not included in analyses for performance indicator percentage rates.

[3] SPHERE target rates: >75% for recovery, <15% for defaults, and <3% for deaths.

A retrospective review of 67 supplementary feeding programs reported the mean rates of the core performance indicators in children (recovery, death, and transfer rates) (6). Many supplementary feeding programs at the time did not collect data on nonresponse rates in children, because it was not included as a core performance indicator. However, when the authors reanalyzed the data from the supplementary feeding programs, they estimated that the mean recovery rate decreased from 67% to only 40% when nonresponse rates were included in the analysis (6). This recent review also reported that the majority of supplementary feeding programs were not reaching the SPHERE target of 75% recovery in children. However, this study was not based on a representative sample.

The current study is the first to compare RUSF (a 500-kcal/d ration) and the conventional ration of CSB in the treatment of MAM in supplementary feeding programs. However, other studies have compared RUF and CSB in similar environments and have reported differing recovery rates. In a recent study in Malawi, children with moderate malnutrition had significantly higher recovery rates after only 8 wk of treatment with RUF (both soy- and milk-fortified peanut-based spreads) (80%) than did those receiving CSB (72%) ($P < 0.01$). However, the energy provided by the therapeutic food in Malawi was ~40% higher than that provided in the current study. This higher energy intake likely accounted for the higher recovery rates compared with the current study. The RUF groups may have showed faster recovery within the 8-wk period of treatment in the Malawi study; however the recovery rates were ultimately not significantly different between the CSB and RUF groups (20).

In the current study we speculate that the total energy intake of the 2 groups was similar, yet the actual nutrient content of the 2 foods are quite different. RUSF includes milk proteins as a source of amino acids, essential fatty acids, and all of the essential minerals and vitamins, whereas CSB lacks milk proteins and has a higher fiber and antinutrient content that may impede mineral absorption. It is possible that the animal-based proteins and the potentially higher absorption of minerals might account for the higher recovery rates in the RUSF group.

The main limitations of the current study were typical of effectiveness trials in which all variables cannot be controlled for or measured. The results are challenging to explain because of a lack of comprehensive data on the children's actual dietary intake during the intervention and the lack of a nonsupplemented control group. Therefore, we can draw conclusions only on the relative effectiveness of CSB and RUSF on recovery in children with MAM in Ethiopia. It is also important to note that the WFP

is no longer recommending CSB for the treatment of MAM but rather the new and improved fortified blended food product Supercereal Plus (an improved CSB).

The cost and availability of the 2 treatment foods would ultimately have a direct impact on the effectiveness of these programs. In this 6-mo research trial, we estimated that the costs to treat an individual with CSB would be lower than the costs of RUSF after all program implementation costs (transport, storage, handling, staffing costs) are considered and based on the average treatment time required for both groups. The coverage rate was not assessed in this study and therefore is not included in the estimation of comparisons for cost-effectiveness. However, if coverage varied between programs distributing CSB compared with RUSF, it could directly affect the cost-effectiveness of the interventions. The significantly higher product cost of RUSF per metric ton was the primary reason for the difference in costs of the 2 interventions. It is also important to note that the new, improved CSB product, Supercereal Plus, which is now recommended by the WFP for the treatment of MAM, has a higher product cost per metric ton than the original CSB.

We conclude that recovery rates were superior with RUSF compared with CSB in children 6–60 mo of age in supplementary feeding programs in southern Ethiopia. Further research is needed to investigate the impact of other external factors on supplementary feeding programs, such as household food sharing practices, availability and cost of the treatment foods, and the presence and impact of other food assistance programs. In addition, research on the nonresponders is warranted to understand why many children did not respond to either treatment food.

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The authors' responsibilities were as follows—TvdB: initiated the study; CK: drafted the research protocol, coordinated and led the research implementation in the field, and drafted the research manuscript; SZ: provided oversight and input into all aspects of the study: and DS and CK: conducted the statistical analysis of the data and had full access to all of the data in the study and are responsible for its integrity and the accuracy of the data analysis. All of the authors contributed to the review and editing of the protocol to the final stage and contributed to the data interpretation and the review and editing of the manuscript to its final stage. CK and TvdB were staff members of the United Nations World Food Programme at the time of the research design and implementation. None of the authors declared a conflict of interest.

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