Received: 13 May 2019 | Revised: 20 December 2019 | Accepted: 21 January 2020

DOI: 10.1111/mcn.12966

ORIGINAL ARTICLE

Maternal & Child Nutrition WILEY

Cash and voucher assistance and children's nutrition status in Somalia

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Funding information
Research for Health in Humanitarian Crisis (R2HC) 2017 Famine Funding Call

Abstract

To address ongoing food insecurity and acute malnutrition in Somalia, a broad range of assistance modalities are used, including in-kind food, food vouchers, and cash transfers. Evidence of the impact of cash and voucher assistance (CVA) on prevention of acute malnutrition is limited in humanitarian and development settings. This study examined the impact of CVA on prevention of child acute malnutrition in 2017/2018 in the context of the Somalia food crisis. Changes in diet and acute malnutrition were measured over a 4-month period among children age 6–59 months from households receiving household transfers of approximately US$450 delivered either as food vouchers or a mix of in-kind food, vouchers, and cash. Baseline to endline change in children's dietary diversity, meal frequency, minimum acceptable diet (MAD), mid-upper arm circumference (MUAC), and acute malnutrition (MUAC < 12.5 cm) were compared using difference-in-difference analysis with inverse probability weighting. There were no statistically significant changes in dietary diversity, meal frequency, or the proportion of children with MAD for either intervention group. Adjusted change in mean MUAC showed increases of 0.5 cm (confidence interval [CI; 0.0, 0.7 cm]) in the food voucher group and 0.1 cm (CI [−0.1, 0.4]) in the mixed transfer group. In adjusted analysis, prevalence of acute malnutrition among children under 5 years increased by 0.7% (CI [−13.4, 14.4%]) among food voucher recipients and decreased by 4.8% (CI [−9.9, 8.1%]) in mixed transfer recipients. The change over time in both mean MUAC and acute malnutrition prevalence was similar for both interventions, suggesting that cash and vouchers had similar effects on child nutrition status.

KEYWORDS
nutrition, Somalia

1 | INTRODUCTION

Food insecurity has been a persistent challenge over the past several decades in Somalia, with famines declared in both 1992 and 2011. The context has since evolved, and Somalia now has a functional but limited and fragile government. The country faced widespread drought in 2016/2017 and again faced the possibility of famine in 2017/2018 (IRIN News, 2017). In mid-2017, 3.1 million Somalis were in need of urgent humanitarian assistance and faced crises or emergency levels (integrated phase classification

Phases 3 and 4) of food insecurity, and famine was a possibility in some areas of the country (Food Security and Nutrition Analysis Unit, 2017). The nutrition situation was precarious as a result of acute and widespread food insecurity and a variety of other factors including displacement, increased morbidity, poor access to health services, and increased spread of cholera and measles. Nutrition surveys found critical levels of global acute malnutrition, with prevalence rates exceeding 15% in all affected areas and 30% in the most severely affected locations (Somalia Nutrition Cluster Update–Global Nutrition Cluster Partners Call. June, 2017). In mid-2017, there were an estimated 388,000 children under 5 years of age (CU5) that were acutely malnourished, including 87,000 with severe acute malnutrition (Famine Early Warning System Network [FEWS NET]/Food Security and Nutrition Analysis Unit, 2018). CU5 are considered a high-priority vulnerable group in food crises due to the increased nutritional demands of the rapid growth and development in early childhood and higher levels of morbidity and mortality.

A wide range of interventions are used in tandem to address food insecurity and acute malnutrition in emergencies. Preventative malnutrition strategies can be targeted at either the household or individual level, and both may operate concurrently. For example, monthly food or cash transfers may be provided to vulnerable households at the same time as supplementary feeding programmes using specialised nutrition products or food rations directly provided to individuals at increased risk of acute malnutrition, such as young children and pregnant and lactating women (PLWs). The Grand Bargain at the 2016 World Humanitarian Summit laid the framework for the expansion of cash transfers as a key component of humanitarian assistance (International Council of Voluntary Agencies, 2017). Cash and voucher assistance (CVA) can be more effective, efficient, and acceptable to beneficiaries than in-kind food assistance and is now being used, either on its own or in conjunction with in-kind provision of goods or services, to meet a wide range of needs in humanitarian settings (Austin & Frize, 2011). Given the increasing prominence of CVA in humanitarian response, which will expand from an estimated 7% of international humanitarian assistance in 2015 towards the Grand Bargain target of 25% of humanitarian assistance by 2020, more research is needed to understand how and when they should be employed to achieve maximal gains in various humanitarian outcomes, including food security and nutrition for vulnerable groups (International Council of Voluntary Agencies, 2017; Spender, Parrish, & Lattimer, 2016).

Evidence of the impact of CVA on acute malnutrition in humanitarian settings is limited, and results in development contexts are mixed. Most research has focused on household-level food security and does not include individual-level nutrition data (Fenn & Yakowenko, 2015). Some of the best evidence for child nutrition outcomes of CVA in emergency settings comes from the Research on Food Assistance for Nutritional Impact studies that were carried out in Niger, Somalia, and Pakistan (Seal, Dolan, & Trenouth, 2017). Results from Somalia showed improvements in household food security but not in the incidence of acute malnutrition among CU5 between households that received cash transfers and those that did not. Similarly, in Niger, no improvements in child acute malnutrition were observed among households receiving cash transfers, despite gains in their household's food security (Sibson et al., 2018). Two reviews that focus specifically on emergency CVA and nutrition highlight the lack of evidence for nutritional outcomes and support the need for further research (Bailey & Hedlund, 2012; Fenn & Yakowenko, 2015).

Key messages

- Drawing conclusions about the effectiveness of household transfers in a context where both household and individually targeted assistance vary is challenging.
- Changes in dietary diversity and acute malnutrition prevalence were similar during the study period for children in households receiving vouchers and mixed transfers, suggesting that outcomes of both interventions were similar.
- Alongside other evidence regarding beneficiary preferences for cash and lower implementation costs compared with vouchers, evidence supports continuing use of cash and voucher assistance in Somalia and considering expanded use of unrestricted cash transfers.

This study aims to expand the evidence base on the impact of CVA on prevention of acute malnutrition in humanitarian settings in the context of the 2017/2018 Somalia food crisis. The research was built into ongoing interventions with similar household food security objectives that were funded by different donors and implemented by World Vision in Wajid District, located in the Bakool region of South-west Somalia. Both household food-assistance interventions were implemented concurrently and in parallel to serve vulnerable households that were selected using the same vulnerability criteria. The modalities of the two interventions differed where one used paper food vouchers exclusively and the other used a combination of in-kind food, electronic vouchers, and unconditional cash. This allowed for the comparison of outcomes between different transfer modalities, which is an important issue for the humanitarian community.

2 | METHODS

This research was conducted in acute food crisis and compared the effects of ongoing household food assistance interventions on diet and acute malnutrition in CU5. Given the context and ethical considerations, random assignment was not feasible necessitating the use of advanced statistical methods to account for baseline differences between comparison groups that result from non-random assignment.

A non-randomised prospective cohort design was used to compare household food security and CU5 nutrition outcomes among beneficiaries of two ongoing food assistance programmes in neighbourhoods of Wajid, Somalia. The programmes had similar objectives and transfer amounts, used the same vulnerability criteria to determine eligibility, and were implemented by the same organisation; the principal difference between the two programmes was transfer modality (paper voucher only vs. mixed transfers consisting of food, vouchers, and unrestricted cash). The interventions were funded by different donors, neither of which had sufficient funds to cover the full population but together provided a high level of coverage of food assistance for vulnerable households in Wajid.

Each group received assistance of similar value (US$96–130/household/month) over the study period independent of this research (Table 1). Participants in the voucher group received only paper food vouchers, whereas those in the mixed transfer group received in-kind food, electronic food vouchers, and electronic unrestricted cash transfers. Additional information on the interventions, including specific values of each modality and included commodities, is provided in Table 1. Households enrolled from the food vouchers programme were provided with a small "top-up" voucher during the study period to ensure comparable assistance levels with households enrolled from the mixed transfers programme (Figure 1). Information about receipt of individual-level assistance in addition to the household-level study intervention was collected during interviews.

Study neighbourhoods were selected from a list of locations with ongoing interventions based on security and caseload, where accessible communities with more beneficiaries were prioritised. Households were eligible to participate if they met vulnerability criteria and had a PLW who was not malnourished (defined as mid-upper arm circumference [MUAC] < 21.0 cm per the national protocol; UNICEF/Banon, 2010). PLW and CU5 in eligible households were enrolled as study participants. This paper focuses on CU5 results; PLW findings are reported elsewhere (Doocy et al., n.d.).

A non-assistance comparison group was also recruited from intervention areas and adjacent neighbourhoods and met the same vulnerability criteria as beneficiary households to ensure comparability. Due to difficulties attaining a sufficient sample size for the non-assistance group (n = 60 households) and because many began receiving household food assistance (19%) or individually targeted CU5 assistance (15%) during the study period, this group is not included with the main results. Despite the significant limitations of the non-assistance group, unadjusted results are presented in Appendix A to illustrate the increase in acute malnutrition prevalence in children from households receiving no intervention and for fidelity to the original study design and analysis plan.

Sample size calculations were conducted using programme data, which indicated ~40% of beneficiary households had a PLW and thus 135 and 450 prospective PLW participants receiving paper vouchers and mixed transfers, respectively. Calculations assumed an average of 1.2 CU5 per enrolled PLW household, employed a 2:1 ratio for the mixed transfer (n = 260) and paper voucher/control groups (n = 130) to maximise the ability to detect significant differences, and were two-sided with power = 0.80. This sample size was sufficient to detect differences in children's diet outcomes ≥15% using a 50% baseline prevalence rate (the most conservative baseline estimate; differences of the same magnitude from all other baseline values will be detectable).

TABLE 1 Overview of interventions and study participants

Interventions	Paper vouchers		Mixed transfers	
Total transfer value	US$96–130/HH/month (transfer value varied monthly; however, both groups received the same amount each month)			
Modalities	Paper food voucher (US$96–130)		In-kind food (US$32–45) Food e-voucher (US$32–45) Unrestricted cash (US$30–50)	
Commodities	Whole grains, flours, pasta, legumes/pulses, vegetable oil		Whole grains, flours, pasta, legumes/pulses, vegetable oil, fruits, vegetables, milk, eggs, meat, sugar, salt, spices	
Total beneficiary HH	1,650		3,000	
HH in study communities[a]	474		700	
HH in study communities with PLWs[b]	190		280	
Study participants	Total	FFP paper vouchers	WFP/UNICEF mixed transfers	Non-assistance group
HH enrolled at baseline	514	166	288	60
HH at endline (% of enrolled)	490 (95.3)	162 (97.6)	269 (93.4)	59 (98.3)
CU5 at baseline	656	224	359	73
CU5 at endline (% of enrolled)	703 (107.2)	248 (110.7)	375 (104.4)	80 (109.6)

Abbreviations: CU5, children under 5 years of age; FFP, Food for Peace; HH, household; PLW, pregnant and lactating women; UNICEF, United Nations Children's Fund; WFP, World Food Programme.

[a]Communities of Waberi, Howlwadaag, and El-bon Camp in the District of Wajid.

[b]Estimated at 40% of all beneficiary HHs.

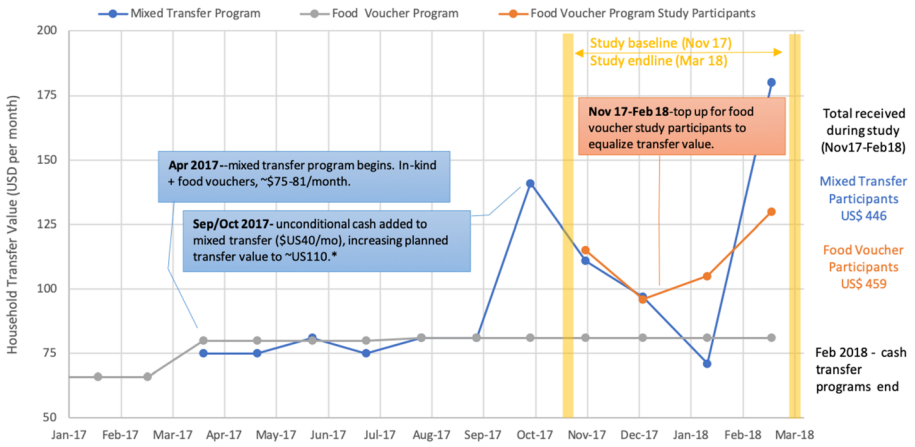

FIGURE 1 Transfer programme evolution over time. In the mixed transfer programme, food and in-kind assistance were relatively stable in terms of transfer amount and frequency. Unconditional cash was supposed to begin in September, but a bank delay caused the first transfer to be combined with the October transfer. This happened again with the January transfer, which was delivered along with the February transfer

Baseline data collection was conducted in early November 2018 and endline data collection in late March and early April 2019. The study period was planned to be 6 months; however, unexpected changes in donor funding resulted in a shortened 4-month study period. Baseline and endline data collection included a 20–40 min questionnaire-based interview that focused on socio-economic status, receipt of humanitarian assistance, household food security, and children's diet; MUAC was also obtained for children 6–59 months of age. Primary outcome measures included Household Hunger Scale (HHS) and children's dietary diversity, meal frequency, minimum acceptable diet (MAD), mean MUAC, and acute malnutrition (defined as MUAC < 12.5 cm; Ballard, Coates, Swindale, & Deitchler, 2011; UNICEF/Banon, 2010; World Health Organization, 2010). Children identified as acutely malnourished were referred for treatment. Interviews were conducted in Somali by female data collectors with prior survey experience. Enumerators received 5 days of training on the study, data collection tools, and anthropometric assessment. In addition, focus group discussions were conducted with a subset of participants in both intervention groups at the end of the study period to better understand their experiences and perceptions of transfers.

Statistical analysis was conducted in Stata 13 (College Station, TX). For children's diet indicators, consumption of ≥4 food groups was classified as achieving minimum diversity; children were classified as achieving minimum meal frequency if frequency was ≥2 for breastfed infants aged 6–8 months, ≥3 for breastfed children aged 9–23 months, and ≥4 times for non-breastfed children older than 6 months; children achieving both minimum diversity and frequency were classified as achieving MAD (World Health Organization, 2010). Diet and nutritional status indicators were reported for children 6–59 months of age only. Children with MUAC < 12.5 cm were classified as having acute malnutrition (UNICEF/Banon, 2010). Mean MUAC more accurately reflects nutritional status; however, nutrition status is also reported as dichotomous measure because of its significance in humanitarian response programming where it determines the type of intervention a child receives (i.e., children that are acutely malnourished typically are referred for therapeutic feeding, as was the case in this context).

Descriptive statistics were used to characterise baseline and endline status and change over time for each comparison group. Statistical significance of differences between intervention groups (vouchers vs. mixed transfers) was assessed using χ^2 and *t*-test methods.

To estimate differences in continuous outcomes between intervention groups from baseline to endline, a linear model was used with main terms for intervention group, time period, and the interaction between intervention group and time period. Similarly, logistic models were used to estimate differences in binary outcomes. Adjusted analyses were conducted using inverse probability of treatment weighting based on household-specific propensity scores to account for the non-randomised design (Austin, 2011; Harder, Stuart, & Anthony, 2010; Robins, Hernan, & Brumback, 2000; Rosenbaum, 1987; Xu et al., 2010). Propensity scores were calculated using logistic regression to reflect household likelihood of receiving the intervention (vouchers vs mixed transfers) given baseline characteristics. Variables that were predictive of intervention group assignment and used to generate propensity scores were respondent age, education, and marital status; beneficiary type; household head sex; size and number of CU5; HHS and meal frequency; and receipt of additional food assistance. Propensity scores were used to compute household-specific stabilised weights to adjust for baseline imbalances between intervention groups (Robins et al., 2000; Xu et al., 2010). Distribution of propensity scores and stabilised weights were examined, and covariate balance was evaluated in the unweighted and weighted samples using standardised mean differences between intervention groups (Austin & Stuart, 2015). Standardised differences <0.1 were presumed to indicate a "negligible" difference between groups (Austin, 2009). Household-specific stabilised weights were used in linear and logistic models to assess adjusted change from baseline to endline, as well as differences in change between voucher and mixed transfer beneficiaries. Models utilised cluster-robust standard errors with clustering defined at the household level, allowing for correlation between observations for each child/household. Coefficients for the interaction of intervention group and time period represent the estimated

difference in change comparing food voucher to mixed transfer beneficiaries.

The study was approved by the Somalia Ministry of Health and the Ministry of Planning and International Cooperation and reviewed by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health.

3 | RESULTS

A total of 656 children were enrolled in the study: 359 (54.7%) from households that received mixed transfers, 224 (34.2%) from households that received food vouchers, and 73 (11.1%) from households receiving neither. Baseline characteristics of participating children were similar across groups with respect to gender and age; most children were older than 24 months of age at enrolment (Table 2). There were no significant differences between intervention groups with regard to household size, the proportion of CU5, or the percentage of female-headed households. Receipt of individual-level assistance in addition to the study intervention differed significantly between intervention groups at baseline (62.7% of food voucher households compared with 85.4% of mixed transfer households; $p < .001$). In both intervention groups, 9% of households reported receiving individual assistance for a malnourished child. Households also reported receiving individual assistance for non-malnourished children and from school feeding programmes; receipt of individually targeted CU5 food assistance differed significantly between intervention groups and was highest in the mixed transfer group, followed by the food voucher group (Table 2).

Household food security differed significantly between the intervention groups at enrolment. Of households in the food voucher group, 56.0% were classified as having little to no hunger compared with 64.6% of the mixed transfer group. Mean meal consumption on the preceding day was 2.7 meals for both intervention groups.

Overall, household food security declined during the intervention period for the two intervention groups (Table 3), and by endline, food security, as measured by HHS, was similar in both groups (mean HHS = 1.8). According to HHS categories, ~80% of households then had moderate hunger and 17–20% no hunger. The decline in mean HHS score was significantly greater for mixed transfer than voucher households ($p = .004$); however, when change in HHS category was compared, no significant differences were found ($p = .252$). Meal frequency remained similar in both intervention groups over the study period. At endline, mixed transfer recipients had greater meal frequency than food voucher recipients (2.7 vs. 2.4 mean meals per day, $p < .001$; 8.0% vs. 2.2% consuming one meal or less per day, $p = .005$).

The primary outcome measures of focus were child diet, including diversity and meal frequency, and nutritional status, including mean MUAC and acute malnutrition (Table 4). At baseline, children in the mixed transfer group had better diets than children in the food voucher group: Considering both minimum dietary diversity and minimum meal frequency, 48.0% of children in the mixed transfer group had MAD at baseline compared with 33.7% in the food voucher group (intervention group comparison $p < .001$). At endline, dietary diversity remained significantly greater among children in the mixed transfer group, where 64.4% of children achieved minimum dietary diversity versus 51.0% in the food voucher group (intervention group comparison $p = .003$). Children of mixed transfer beneficiaries consumed an average of 4.0 food groups per day at endline compared with 3.4 in the food voucher group (intervention group comparison $p < .001$). Meal frequency (2.8 in the voucher group and 3.0 in the mixed transfer group) and the proportion of children achieving MAD (47.7% in the mixed transfer group and 43.8% in the voucher group) were similar across groups at endline. There were no statistically significant changes in meal frequency, dietary diversity, or proportion of children with MAD over the course of the study period for either intervention group in either unadjusted or adjusted models.

With respect to MUAC, an indicator of acute malnutrition status, mean MUAC at baseline was significantly lower among children in the food voucher group (13.8 cm) as compared with 14.7 cm in the mixed transfer group (intervention group comparison $p < .001$). Over the course of the study period, mean MUAC remained relatively constant in the mixed transfer group (−0.1, CI [−0.4, 0.2]) but increased significantly by 0.4 cm (CI [0.1, 0.8]) in the food voucher group. In adjusted models for the intervention groups, mean MUAC increased by 0.5 cm (CI [0.0, 0.7 cm]) in the food voucher group and 0.1 cm (CI [−0.1, 0.4]) in the mixed transfer group over the course of the intervention period; this difference in gains was not statistically significant ($p = .125$). When prevalence of acute malnutrition was assessed at baseline, the highest prevalence was observed in food voucher group (11.4%, CI [7.4, 16.5%]), followed by the mixed transfer group (6.1%, CI [3.8, 9.2%]). However, by endline, acute malnutrition fell to 9.3% (CI [5.6, 14.3%]) in the food voucher group and 3.1% (CI [1.4, 5.8%]) in the mixed transfer group. The adjusted change in prevalence of acute malnutrition among food voucher and mixed transfer recipients was +0.7% (CI [−13.4, 14.4%]) and −4.8% (CI [−9.9, 8.1%]), respectively, although the difference in change between intervention groups was not statistically significant ($p = .578$). CVA, including both food vouchers and mixed transfers, was successful in maintaining CU5 nutritional status.

Balancing the need for evidence and robust study design with the imperative of providing humanitarian assistance is a challenge when conducting research in acute emergencies. As such, this study attempted to characterise receipt of assistance from other sources but did not prevent participants from receiving additional assistance or dropping from the analysis. Important differences in changes to assistance were observed over the study period that must be taken into account when interpreting results. At endline, notable changes were observed in assistance targeted to PLW and CU5. Individual food assistance for CU5 decreased in both the food voucher (−6.3%, CI [−14.4, 1.9%]) and mixed transfer groups (−37.9%, CI [−45.4, −30.5%]). These changes in assistance make it difficult to attribute changes in children's diet and nutrition indicators to the household-level

TABLE 2 HH and child characteristics at baseline

	Vouchers (*N* = 224)		Mixed transfers (*N* = 359)	
	Point	**95% CI**	**Point**	**95% CI**
Child characteristics				
Sex				
Male	50.9%	[44.1, 57.6%]	48.5%	[43.2, 53.8%]
Female	49.1%	[42.4, 55.9%]	51.5%	[46.2, 56.8%]
Age in months (mean)	23.7	[21.92, 25.54]	24.3	[23.03, 25.58]
% of children by age group				
0–5.9 months	4.5%	[2.2, 8.1%]	4.5%	[2.6, 7.1%]
6–11.9 months	17.0%	[12.3, 22.5%]	11.7%	[8.6, 15.5%]
12–23.9 months	19.6%	[14.7, 25.5%]	22.0%	[17.8, 26.7%]
≥24 months	58.9%	[52.2, 65.4%]	61.8%	[56.6, 66.9%]
HH characteristics	(*N* = 166)		(*N* = 288)	
Female-headed HH	4.8%	[2.1, 9.3%]	1.7%	[0.6, 4.0%]
Mean HH size	6.6	[6.2, 7.0]	6.3	[6.0, 6.6]
Children < 5 years in HH (mean)	1.4	[1.2, 1.5]	1.3	[1.2, 1.3]
% of HH with children 3–5 years	34.3%	[27.2, 42.1%]	37.8%	[32.2, 43.7%]
% of HH with children 1–2 years	27.7%	[21.1, 35.2%]	27.8%	[22.7, 33.3%]
% of HH with children <1 year	28.9%	[22.2, 36.4%]	20.1%	[15.7, 25.2%]
Household Hunger Scale[a] (mean)	1.4	[1.18, 1.54]	1.1	[0.93, 1.19]
Little to no hunger in HH	56.0%	[48.1, 63.7%]	64.6%	[58.8, 70.1%]
Moderate hunger in HH	41.6%	[34.0, 49.5%]	34.7%	[29.2, 40.5%]
Severe hunger in HH	2.4%	[0.7, 6.1%]	0.7%	[0.1, 2.5%]
Meals consumed on preceding day (mean)	2.6	[2.5, 2.7]	2.7	[2.7, 2.8]
% consuming one meal or less	0.0%	—	0.0%	—
Receipt of food assistance				
Last time HH food assistance was received				
<1 month ago	100%	[97.8, 100%]	100%	[98.7, 100%]
1–2 months ago	0.0%	—	0.0%	—
>2 months ago	0.0%	—	0.0%	—
Do not know	0.0%	—	0.0%	—
Mean value of HH assistance (past month, USD)	81.1	[81.0, 81.1]	85.0	[85.0, 85.0]
Additional individual food assistance received[b]	62.7%	[54.8, 70.0%]	85.4%	[80.8, 89.3%]
Pregnant woman	25.9%	[19.4, 33.3%]	20.5%	[16.0, 25.6%]
Lactating woman	21.1%	[15.1, 28.1%]	10.4%	[7.1, 14.5%]
Child <5 years, not malnourished	20.5%	[14.6, 27.4%]	57.6%	[51.7, 63.4%]
Malnourished child	7.2%	[3.8, 12.3%]	9.4%	[6.3, 13.3%]
School feeding	9.0%	[5.1, 14.5%]	35.8%	[30.2, 41.6%]

Abbreviations: CI, confidence interval; HH, household.
[a]HHS is a 6-point scale depicting hunger within the past month, where 0–1 is classified as *little/no hunger*, 2–3 as *moderate*, and 4–6 as *severe*.
[b]Each assistance type as a % of all HHs; some HHs received multiple types of individual assistance.

interventions of study, and termination of CU5 individual assistance may mask the benefit of the household-level interventions of study, particularly in the mixed transfer group, where this was most common.

4 | DISCUSSION

Child undernutrition is a serious health concern in Africa and a critical problem that must be addressed in all humanitarian

TABLE 3 Endline differences and change over time in HH food security

	Vouchers		Mixed transfers		Two-group comparison
	Point	95% CI	Point	95% CI	*p* value*
Characteristics at endline	(*N* = 162)		(*N* = 269)		
Household Hunger Scale (mean)	1.8	[1.7, 1.9]	1.8	[1.8, 1.9]	.403
Little to no hunger in the HH	19.8%	[13.9, 26.7%]	19.3%	[14.8, 24.6%]	.915
Moderate hunger in the HH	80.2%	[73.3, 86.1%]	80.7%	[75.4, 85.2%]	
Severe hunger in the HH	0.0%	[0.0, 2.3%]	0.0%	[0.0, 1.4%]	
Meals consumed on preceding day (mean)	2.4	[2.3, 2.6]	2.7	[2.6, 2.7]	***<.001***
% consuming one meal or less	8.0%	[4.3, 13.3%]	2.2%	[0.8, 4.8%]	**.005**
Change from baseline to endline					
Household Hunger Scale (mean)	0.4	[0.2, 0.6]	0.8	[0.6, 0.9]	**.004**
Little to no hunger in the HH	−36.3%	[−46.0, −26.5%]	−45.3%	[−52.5, −38.0%]	.252
Moderate hunger in the HH	38.7%	[29.0, 48.4%]	45.9%	[38.7, 53.2%]	
Severe hunger in the HH	−2.4%	[−4.7, −0.1%]	−0.7%	[−1.7, 0.3%]	
Meals consumed on preceding day[a] (mean)	−0.2	[−0.3, 0.0]	−0.1	[−0.2, 0.0]	.248
% consuming one meal or less	8.0%	[4.3, 13.3%]	2.2%	[0.8, 4.8%]	**.005**

Abbreviations: CI, confidence interval; HH, household.
[a]Because all HHs consumed more than one meal daily at baseline (i.e., baseline proportions = 0%), analysis of change is equivalent to endline values.
*Two intervention group comparisons using Pearson's χ^2 for proportions and *t* test for means. Bold indicates statistically significant ($p < 0.05$) findings; bold italic indicates statistically significant ($p < 0.001$) findings.

TABLE 4 Children's dietary and nutritional status outcomes

	Vouchers (*N* = 224/248)[a]		Mixed transfers (*N* = 359/375)[a]		Two-group comparison
	Point	95% CI	Point	95% CI	*p* value*
Dietary outcome measures[b]					
Meals consumed on the preceding day (mean)					
Baseline	2.5	[2.3, 2.7]	2.8	[2.6, 3.0]	**.022**
Endline	2.8	[2.5, 3.0]	3.0	[2.8, 3.2]	.177
Baseline/endline change (unadjusted)	0.3	[−0.1, 0.7]	0.2	[−0.1, 0.5]	.653
Baseline/endline change (adjusted)[c]	0.3	[−0.1, 0.7]	0.0	[−0.2, 0.5]	.305
Difference between intervention groups (adjusted)[c]	−0.3 [−0.8, 0.3]				
Percent achieving minimum meal frequency					
Baseline	45.8%	[38.6, 53.2%]	55.9%	[50.4, 61.3%]	**.026**
Endline	53.7%	[45.7, 61.6%]	60.8%	[54.2, 67.0%]	.161
Baseline/endline change (unadjusted)	7.9%	[−4.4, 20.2%]	4.9%	[−4.2, 14.0%]	.712
Baseline/endline change (adjusted)[c]	5.6%	[−2.4, 15.8%]	5.1%	[−3.0, 14.8%]	.947
Difference between intervention groups (adjusted)[c]	−0.5% [−15.2, 12.3%]				
Dietary diversity score, preceding day (mean)					
Baseline	3.4	[3.1, 3.6]	4.0	[3.9, 4.2]	***<.001***
Endline	3.5	[3.2, 3.7]	3.9	[3.7, 4.1]	**.010**
Baseline/endline change (unadjusted)	0.1	[−0.3, 0.5]	−0.2	[−0.4, 0.1]	.282
Baseline/endline change (adjusted)[c]	0.0	[−0.5, 0.4]	−0.2	[−0.4, 0.1]	.462
Difference between intervention groups (adjusted)[c]	−0.2 [−0.7, 0.4]				
Percent achieving minimum dietary diversity					
Baseline	54.0%	[47.0, 60.8%]	72.9%	[67.9, 77.5%]	***<.001***
Endline	51.0%	[43.8, 58.2%]	64.4%	[58.7, 69.9%]	**.003**
Baseline/endline change (unadjusted)	−3.0%	[−13.1, 7.2%]	−8.5%	[−15.4, −1.5%]	.300

(Continues)

TABLE 4 (Continued)

	Vouchers (*N* = 224/248)[a] Point	95% CI	Mixed transfers (*N* = 359/375)[a] Point	95% CI	Two-group comparison *p* value*
Baseline/endline change (adjusted)[c]	−2.2%	[−8.6, 4.5%]	−10.2%	[−17.9, 0.5%]	.152
Difference between intervention groups (adjusted)[c]	−8.1% [−17.4, 3.8%]				
Percent achieving minimum acceptable diet					
Baseline	33.7%	[27.0, 40.9%]	48.0%	[42.5, 53.6%]	**.001**
Endline	43.8%	[36.1, 51.8%]	47.7%	[41.2, 54.2%]	.448
Baseline/endline change (unadjusted)	10.1%	[−1.6, 21.8%]	−0.4%	[−9.1, 8.4%]	.153
Baseline/endline change (adjusted)[c]	3.5%	[−1.7, 11.4%]	−1.8%	[−7.5, 5.0%]	.261
Difference between intervention groups (adjusted)[c]	−5.4% [−15.7, 3.5%]				
Nutritional status outcome measures[b]					
MUAC (mean)					
Baseline	13.8	[13.6, 13.9]	14.7	[14.5, 14.8]	***<.001***
Endline	14.2	[14.0, 14.4]	14.6	[14.4, 14.8]	**.009**
Baseline/endline change (unadjusted)	0.4	[0.1, 0.8]	−0.1	[−0.4, 0.2]	**.019**
Baseline/endline change (adjusted)[c]	0.5	[0.0, 0.8]	0.1	[−0.2, 0.4]	.125
Difference between intervention groups (adjusted)[c]	−0.4 [−0.9, 0.2]				
Acute malnutrition prevalence (based on a cut-off of MUAC < 12.5 cm)					
Baseline	11.4%	[7.4, 16.5%]	6.1%	[3.8, 9.2%]	**.029**
Endline	9.3%	[5.6, 14.3%]	3.1%	[1.4, 5.8%]	**.003**
Baseline/endline change (unadjusted)	−2.0%	[−8.0, 3.9%]	−3.0%	[−6.3, 0.2%]	.343
Baseline/endline change (adjusted)[c]	0.7%	[−13.1, 24.0%]	−4.8%	[−12.0, 6.4%]	.578
Difference between intervention groups (adjusted)[c]	−5.5% [−25.3, 12.3%]				

Abbreviations: CI, confidence interval; MUAC, mid-upper arm circumference.

[a]Presented as (baseline *N*/endline *N*).

[b]Among children 6–59 months.

[c]Adjusted analyses included inverse probability weighting (to account for the non-randomised design).

*Baseline and endline two-intervention group comparison using Pearson's χ^2 for proportions and *t* test for mean; *p* values for baseline/endline adjusted change and difference between intervention groups are the same. Bold indicates statistically significant ($p < 0.05$) findings; bold italic indicates statistically significant ($p < 0.001$) findings.

emergencies, especially those like Somalia, where food insecurity is a driving factor of the crisis. Acute malnutrition is associated with increased risks of morbidity and mortality; thus, effective interventions are urgently needed to prevent excess mortality (Black et al., 2008). Resource allocation and programming strategies for humanitarian response are often determined by the extent of food insecurity and prevalence of acute malnutrition, with the dual aims of preventing and curing acute malnutrition. Within preventative programming, interventions are delivered at both the household and individual levels and may consist of in-kind provision of food or CVA such as food vouchers or cash transfers. With the increasing prominence of CVA in humanitarian response, it is imperative that their effectiveness is evaluated and that differences between vouchers and cash transfers are understood. In the case of Somalia, which frequently receives international humanitarian assistance in response to food crises, an estimated 3 million people were receiving CVA in mid-2017, with monthly disbursements totalling US$48 million in May 2017 alone (United Nations Office for the Coordination of Humanitarian Affairs, 2017). CVA is routine in the Somali context and totals US$1.2 billion in 2017, accounting for 17% of international humanitarian assistance (Development Initiatives, 2018).

When the study was initiated in late 2017, Wajid was facing a food emergency (integrated phase classification Level 4) and below average rainfall. The likelihood of decreased crop yields and risk of famine resulted in calls to scale up food assistance throughout Southern Somalia (FEWS NET, 2017). By the end of the study period, regional food security improved, and the risk of famine was declining due to post-harvest seasonal improvements in food and income sources and increased humanitarian assistance (FEWS NET, 2018). Despite broader regional trends of improving food security, a decline in household food security was observed among intervention households over the study period. At endline, ~80% of households were experiencing moderate hunger and 19% little or no hunger.

Despite the overall decline in household food security, individual nutrition outcomes for CU5 were more encouraging. In this study of CVA during the 2017/2018 Somalia food crises, perhaps the most notable finding was that nutritional status of children in intervention households remained relatively stable, whereas children in non-

assistance households deteriorated.[1] There were no significant changes in children's diet indicators in any of the comparison groups over the course of the study period, which is not unexpected for the intervention groups, where nutritional status was maintained but did not improve. The cessation of individual assistance for CU5 in 38% of the mixed transfer group and 65% of the food voucher group is likely reflected in the non-significant declines in dietary diversity seen over the study period, although household transfers likely ameliorated this effect. Drawing conclusions about the effectiveness of household transfers in a context, where total household food assistance (i.e., both household and individually targeted assistance) is variable is a challenge; however, in this case, where CU5 diet and nutritional status were maintained in the intervention groups, it appears that household transfers were successful in preventing CU5 acute malnutrition, even within the context of possible declines in total household assistance.

Studies from other food insecure settings with medium to high levels of acute malnutrition, including some contexts that meet the threshold for an emergency, have shown mixed results with respect to CVA and child nutrition outcomes. In Pakistan, only double-value unconditional cash transfers were associated with reduced odds of wasting, whereas fresh food vouchers and single- and double-value cash transfers were associated with reduced odds of stunting (Fenn et al., 2017). In Burkina Faso, a study of seasonal unconditional cash transfers found no evidence that transfers reduced the incidence of acute malnutrition or reduced the prevalence of chronic malnutrition in young children (Houngbe et al., 2017). Similarly, in Niger, seasonal cash transfers were not associated with a decline in acute malnutrition prevalence despite improvements in food security, with the lack of change in acute malnutrition prevalence being attributed to a deteriorating health situation (Sibson et al., 2018). Perhaps most contextually relevant are findings from a 2016 study conducted in camps for internally displaced populations in Mogadishu, which found that unconditional cash transfers improved household food expenditures, household food security, and child dietary diversity, but did not reduce the risk of acute malnutrition among children 6–59 months of age (Grijalva-Eternod et al., 2018).

4.1 | Limitations

The limitations of this study are largely the result of conducting research in an acute emergency where ongoing assistance could not be randomised and neither changes to such assistance nor receipt of assistance from other humanitarian actors could be anticipated. This latter concern was reflected in challenges identifying a non-assistance comparison group of adequate size and in the significant proportion of this group that began receiving assistance during the intervention period. There was a notable difference in the proportion of households reporting the transition of CU5 on and off individual assistance, with 39% of mixed transfer and 7% of food voucher households reporting their children transitioned off assistance during the study period, as compared with 15% of non-assistance households that reported a transition on to individual assistance. Another significant limitation was the shorter than anticipated study period (4 vs. 6 months) due to lack of programme continuity. Seasonality is another factor, which likely influenced study outcomes, but is difficult to quantify. The combination of the small control group and abbreviated study period likely contributed to a reduced ability to detect statistically significant differences for many outcomes. Another potential concern is that households reported in focus groups that the monthly transfers lasted only between 10 and 20 days, making the timing of measurements with respect to the last transfer potentially important, especially for household food security and children's diet indicators. Efforts were made to plan data collection across the groups at similar time points relative to the transfers, but timing inconsistencies could have influenced outcome measures differentially across groups. Finally, inconsistencies in transfer timing and amount occurred, despite similarities in the total transfer over the study period, which may have influenced the behaviour of recipient households and affected outcome measures.

5 | CONCLUSIONS

There is a reasonable body of evidence indicating that CVA can improve food security and diet in humanitarian settings. However, these interventions are not always effective at preventing children from becoming malnourished, which is likely the result of complex and multicausal nature of malnutrition. In this study, we found that household food security was similar for both intervention groups at endline; however, households receiving mixed transfers consumed meals more frequently. Children in households receiving mixed transfers also had more diverse diets at the end of the study period; however, the magnitude of change in dietary diversity over the study period was similar for children in mixed transfers and vouchers. Acute malnutrition prevalence was higher among children in households that received vouchers at both baseline and endline. The change over time in both mean MUAC and acute malnutrition prevalence was similar for both interventions, suggesting that mixed transfers and food vouchers had similar effects on child nutrition status.

Other recent studies in Somalia have documented improvements in household and child diet among households receiving cash transfers (but not CU5 nutritional status; Grijalva-Eternod et al., 2018), indicating an emerging evidence base around the effectiveness of cash transfers for maintaining food security and nutritional status in acute emergencies. In Somalia, CVA was a well-accepted and significant part of the 2017 drought response, accounting for 17% of international humanitarian assistance in 2017 (US$1.2 billion reported through the financial tracking service); however, the choice between unrestricted cash transfers, conditional cash transfers, or vouchers remains an important

[1] In non-assistance households, 31.2% (CI [18.2, 44.3%]) of children became malnourished during the study period, and a decline in mean MUAC of −1.2 cm (CI [−1.6, −0.8]) was observed.

subject of debate (Daniels & Anderson, 2018; Development Initiatives, 2018; DuBois, Harvey, & Taylor, 2018; SIDA, 2018). Given evidence from this study where similar outcomes were observed with respect to prevention of CU5 acute malnutrition among recipients of food vouchers and mixed transfers, which included a sizeable amount of unconditional cash, and what is generally known about beneficiary preferences for cash and lower implementation costs of unconditional cash as compared with food vouchers, there is evidence to support the continued use of CVA in Somalia and to consider expanding the use of unrestricted cash transfers. More broadly, additional research on the impacts of CVA, including different transfer modalities, on individual-level health and nutrition outcomes is critical to informing the expansion of CVA in humanitarian response.

ACKNOWLEDGMENTS

We are grateful for the administrative support of the World Vision United Kingdom team, including Tony Locke, Rose Ndolo, and Hilary Williams, and for the work of the data collection team at World Vision Somalia; without which, this study would not have been possible. We are also grateful to Colleen Emary for reviewing the manuscript. This research was funded by the Research for Health in Humanitarian Crisis (R2HC) 2017 Famine Funding Call.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interests.

CONTRIBUTIONS

SD conceived the study, oversaw implementation, and led manuscript preparation. MB and GE oversaw study implementation and critically reviewed the manuscript. EL provided implementation support, led data analysis, and critically reviewed the manuscript. EC provided support for data analysis and critically reviewed the manuscript. BA provided technical support during implementation and critically reviewed the manuscript.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Doocy S, Busingye M, Lyles E, et al. Cash and voucher assistance and children's nutrition status in Somalia. *Matern Child Nutr*. 2020;16:e12966. https://doi.org/10.1111/mcn.12966