REFANI

RESEARCH ON FOOD ASSISTANCE
FOR NUTRITIONAL IMPACT

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ACTION AGAINST HUNGER

CONCERN worldwide

ENN

UCL

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CONTENTS

ABBREVIATIONS AND ACRONYMS

ARI	Acute respiratory infection
BMI	Body mass index
CBI	Cash-based interventions
CG	Control group
CI	Confidence interval
cRCT	Cluster randomised controlled trial
CSI	Coping strategies index
CTP	Cash transfer programme
CWW	Concern Worldwide
DC	Double cash
DDE	Difference-in-difference estimate
DFID	Department for International Development
ECHO	European Civil Protection and Humanitarian Aid Operations
EU	European Union
FFV	Fresh food voucher
FSNAU	Food Security and Nutrition Analysis Unit
GAM	Global acute malnutrition
HAZ	Height-for-age Z-score
Hb	Haemoglobin
HFIAS	Household Food Insecurity Access Scale
IDP	Internally Displaced Person
IQR	Interquartile range
MCHN	Maternal and Child Health and Nutrition
MUAC	Mid-upper arm circumference
ODK	Open Data Kit
OR	Odds ratio
PKR	Pakistan Rupees
PI	Principle investigator
PINS	Pakistan integrated nutrition strategy
PLW	Pregnant and lactating women
REFANI	Research on Food Assistance for Nutrition Impact
SAM	Severe acute malnutrition
SC	Standard cash
SD	standard deviation
SUN	Scaling-up Nutrition
UCL	University College London
UCT	Unconditional cash transfer
WASH	Water, sanitation, and hygiene
WHA	World Health Assembly
WHO	World Health Organisation
WHZ	Weight-for-height Z-score
WINS	Women and Children Nutrition in Sindh

REPORT OVERVIEW

This report is divided into four sections; Section 1 provides an overview of the Research on Food Assistance for Nutritional Impact (REFANI) project including a summary of the study sites and country contexts in which the studies were conducted. Section 2 describes the cash or voucher transfer interventions that were implemented in each site and the study designs that were used to test their effectiveness. Section 3 highlights the primary and secondary results for all three studies, and provides a summary table for ease of comparison. Study cost and cost-effectiveness findings are also contained in this section. Finally, Section 4 provides the discussion and conclusions which highlight the common findings across the three studies, as well as any key departures and differences.

SECTION 1
INTRODUCTION

1.0   THE REFANI PROJECT

The REFANI project was implemented to strengthen the evidence base on the nutritional impact and cost-effectiveness of cash and voucher transfers to populations affected by humanitarian emergencies. The REFANI Consortium was comprised of two research partners, ENN and University College London (UCL), and two operational partners, Action Against Hunger and Concern Worldwide. The REFANI project was conducted over a four-year period between 2014 and 2017, with funding provided by UK aid from the UK government, and co-financing through humanitarian aid from the European Commission. Throughout this report cash and voucher transfer programmes are collectively referred to as cash based interventions (CBI).

As part of a comprehensive literature review, REFANI partners identified what was known about the nutritional impact of CBIs as well as the gaps that remained in the evidence base. We also developed a theory of change to explain the possible mechanisms through which CBI might impact on nutritional outcomes. Informed by our analysis of evidence gaps and the theory of change that we developed (see Annex), we then engaged in discussions with REFANI partners and others who were based in potential study countries. Together with our in-country partners, the consortium defined the specific research questions and designs which were implemented in a series of nutrition impact studies in Pakistan, Niger, and Somalia. In tandem with the nutritional effectiveness research, REFANI also conducted a costing and cost-effectiveness analysis (CEA) of the interventions.

This report provides a comparative analysis of the three country studies. It examines the commonality of findings as well as key differences and the implications of these findings for policy and decision makers and for programme implementers. For all three studies, the primary outcomes of interest were the effect of CBI on the risk of acute malnutrition and on mean weight for height (WHZ) in children 6-59 months of age. The studies also examined a set of secondary outcomes including household expenditure, assets, food security, diet diversity, coping strategies, morbidity, water, sanitation, and hygiene (WASH), access to health care, maternal nutrition, linear growth of children, stunting, and haemoglobin (Hb) concentration. These secondary outcomes were not measured in all studies due to operational reasons but there was considerable overlap which is described in this report.

The Primary REFANI Research Question:
Can CBI protect nutritional status in children (aged 6-59 months) in a range of crisis contexts?

It is recognised that the findings of three country studies, which were undertaken in markedly different country contexts (TABLE 1), cannot lead to generalisations that can be applied to the myriad of emergency contexts in which CBI are implemented. However, our findings should be of value to those concerned with CBI, particularly in humanitarian and fragile contexts.

TABLE 1 Characteristics of the REFANI Study Sites

Study Country	Study Area (district)	Humanitarian context	Study Population
Niger	Affala and Takanamatt communes, Tahoua Department, rural	Resident population affected by high levels of poverty and recurrent seasonal hunger gaps	Children aged 6-59 months and their mothers or carers
Pakistan	Dadu District, Sindh Province, rural and semi-urban	Resident population with recurrent periods of high wasting during seasonal lean period and prone to flooding	Children aged 6-48 months at baseline and their mothers or carers
Somalia	Afgoye Corridor, Mogadishu, peri-urban	Internally displaced persons (IDP) living in camps; displaced by on-going conflict and drought	Children aged 6-59 months and their mothers or carers

1.1 THE REFANI-NIGER STUDY SITE

The study was implemented in the communes of Affala and Takanamatt in the district of Tahoua in south west Niger. The majority ethnic group is Hausa, followed by Tuareg and Fulani. The patriarchal culture is often associated with female disempowerment and literacy rates are very low, particularly among women.

Tahoua is arid with a chronic lack of water, and agricultural and agro-pastoral livelihoods predominate. There is a single, short, and unpredictable rainy season between June and September which allows rain fed cultivation of millet, the staple crop. This period is also considered the 'lean season' as most households are unable to produce sufficient cereals for their own consumption for the full year, even in 'normal years'. Households rely heavily on daily wage labour, labour migration, petty trade, taking credit and selling assets to maintain food access. Besides food insecurity, challenges in the public health, social, and care environments, known risk factors for malnutrition, also exist. Access to water and latrine coverage is low, and poor hygiene and sanitation practices are common. Malaria is endemic and diarrhoea and acute respiratory infection rates are also high. Despite the existence of free health care for children under five and pregnant women, geographic inaccessibility and the poor quality of the formal health service leads to low utilisation.

As a consequence of these challenges, nutrition surveys indicate that the prevalence of acute malnutrition in Tahoua is persistently above 10% during the lean season, and is similar in the post-rains and post-harvest period in December. As well as working with government health services to treat children with acute malnutrition, Concern Worldwide has been implementing multisector programmes to address the causes of undernutrition since 2003.

1.2 THE REFANI-PAKISTAN STUDY SITE

The Pakistan study was set in Dadu District in Sindh Province, south-east Pakistan. Here, the economy is largely agrarian; dependent on crop production, livestock keeping, and agriculture labour, with a lack of alternative income sources. Most of the population, especially the poorest households, are highly vulnerable to climatic shocks such as flooding. Approximately two thirds of the population are classified as poor and very poor (ACF Household Economy Approach Analysis Report 2013 (HEA)) with limited access to land. A high proportion of very poor households (87%) are dependent on incomes from casual labour or self-employment; and 90% of these households are reliant on the markets for food purchase throughout the year. Because of highly insecure cash incomes and a high reliance on food purchased from markets, very poor households do not typically meet the average daily recommended energy intake for adults, consuming only 1,911 kcal/day.

Over the past fifteen years there has been little progress in addressing the nutritional vulnerability of children in Pakistan[5]. This is especially so in Sindh Province which has the highest proportion of childhood wasting and stunting in Pakistan[6]. The most recently available population data in Sindh Province estimates that the prevalence of wasting and stunting is 15.4% and 48.0% in the 6-59 month age group respectively[7]. Levels of anaemia and vitamin A deficiency in Sindh have increased since 2001 with 73% of children reported to be anaemic in 2011 (Hb concentration <11.0 g/dL). These population data highlight an ongoing and serious public nutrition problem.

Across-sectional anthropometric nutrition survey carried out in Dadu in November 2014, showed that the prevalence of acute malnutrition was 14.3% (95% CI 10.8– 18.7%) in children 6– 59 months. The prevalence is higher during the summer lean season (June to August), when Dadu frequently experiences localised flooding and droughts as well as temperatures exceeding 45°C.

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5 Aga Khan University, Ministry of National Health Services, Regulations & Coordination (Pakistan), Ministry of Planning and Development (Pakistan), Pakistan Medical Research Council, United Nations Children's Fund (UNICEF). (2011). Pakistan National Nutrition Survey.

6 National Institute of Population Studies (NIPS) [Pakistan] and ICF International. (2013). Pakistan Demographic and Health Survey 2012-13. Islamabad, Pakistan, and Calverton, Maryland, USA: NIPS and ICF International.

7 Sindh Bureau of Statistics and UNICEF. (2015). Sindh Multiple Indicator Cluster Survey 2014, Final Report. Karachi, Pakistan: Sindh Bureau of Statistics and UNICEF.

1.3 THE REFANI-SOMALIA STUDY SITE

The REFANI Somalia study was conducted in IDP camps located in Weydow area, Deyniile district, Mogadishu. Due to a prolonged state of instability and conflict, coupled with natural disasters, Somalia has one of the highest global prevalences of child acute malnutrition with the south-central region consistently exceeding the critical prevalence threshold of 15%. The ongoing conflict has disrupted not only regional agriculture and trade, but also humanitarian access, resulting in high levels of internal displacement. An estimated 304,700 children aged <5 years were acutely malnourished in Somalia in early 2016, of which 58,300 were severely malnourished[8].

The group most affected by food insecurity and acute malnutrition are IDPs, who often live in camps in peri-urban areas. Deyniile and Dharkenley, two of the 17 districts of Banaadir region, host the majority of IDP in Mogadishu, who are primarily from marginalised tribes or minority groups[9]. The IDP camps in the Weydow area are privately run, spontaneous settlements that are often overcrowded, may lack sanitation and health services, and face recurrent evictions. Morbidity (diarrhoea, pneumonia, and fever) estimates in these camps are high and may be a major driver of acute malnutrition. During the wet seasons (Gu and Deyr, Apr-Jun and Oct-Dec, respectively), morbidity estimates are particularly high, mainly due to diarrhoea[5].

Most of the IDPs were previously agro-pastoralists and riverine farmers that lived in the Bay, Bakool, and Shabelle regions[6]. Following migration, their primary livelihoods sources are casual labour, petty trading, and humanitarian assistance received from local and international humanitarian organisations. Concern Worldwide has been implementing multi-sector development and humanitarian assistance programmes in this setting since 1992.

8 FSNAU. Somalia nutrition analysis: post Deyr 2015/16. Technical Series Report, Nairobi; 2016.
9 Majid N, McDowell S. Hidden dimensions of the Somalia famine. Glob Food Sec. 2012;1:36–42.

SECTION 2
INTERVENTIONS AND STUDY DESIGNS

A comparison of the interventions in the three sites (**TABLE 2**) and the study designs used to test their effectiveness (**TABLE 3**) is presented below.

TABLE 2 Interventions delivered in the study sites

Study Country and Arm		Type of Cash or voucher transfer	Amount of transfer per month		Duration and dates of distribution programme	Total amount of transfer $US	Target recipient or cash or voucher transfer	Complementary interventions
			Local currency	$US				
Niger	Standard Cash	Seasonal unconditional cash transfer	CFA 32,500	58	4 months, Jun-Sep 2015	233	Mothers	4 months supplementary feeding
	Modified Cash	Earlier and longer seasonal unconditional cash transfer	CFA 21,666	39	6 months, Apr-Sep 2015	233	Mothers	4 months supplementary feeding
Pakistan	Control			0	6 months, Jul–Dec 2015	0		WINS
	Standard Cash	Unconditional cash transfer	PKR 1,500	15	6 months, Jul–Dec 2015	88	Mothers	WINS
	Double Cash	Unconditional cash transfer	PKR 3,000	29	6 months, Jul–Dec 2015	175	Mothers	WINS
	Fresh Food Voucher	Voucher transfer	PKR 1,500	15	6 months, Jul–Dec 2015	88	Mothers	WINS
Somalia[1]	Control			0	5 months, May–Oct 2016	0		
	Intervention	Unconditional cash transfer, NFI[2] kits, free piped drinking water		84	5 months, May–Oct 2016	420	Mothers	Free drinking water, non-food item kit

1 Values in $US are based on the exchange rate at the time of the intervention (https://www.oanda.com/fx-for-business/historical-rates)
2 NFI = non-food item

TABLE 3 Study designs

Study Country	Design	Number of clusters	Sample size
Niger	Two arm cluster randomised controlled trial	Modified Cash Transfer 10 Standard Cash Transfer 10 **Total 20**	1,932 HHs 1,831 children
Pakistan	Four arm cluster randomised controlled trial	Control 28 Standard Cash Transfer 31 Double Cash Transfer 24 Fresh Food Voucher 31 **Total 114**	2,469 HHs 3,462 children
Somalia	Two arm cluster controlled trial	Control 10 Cash Transfer 10 **Total 20**	228 HHs and 332 children received detailed questionnaire. 2,138[1] children had mid-upper arm circumference (MUAC) measured monthly

1 The number followed up varied slightly each month

2.1   NIGER

THE NIGER INTERVENTION

The control intervention in Niger was a seasonal unconditional cash transfer (UCT) delivered by Concern Worldwide as a part of their humanitarian program-ming. Each selected household received 32,500 West African Franc (CFA) a month (equivalent to $US 58), which was given as physical cash to female represen-tatives who attended a cash distribution point every month, from June to September. Cash distribution points were sited in villages so that beneficiaries did not have to travel more than 5km. The total cash transfer was 130,000 CFA. The cash amount was calculated by the government to allow purchase of a food basket similar to the World Food Programme (WFP) house-hold ration that met 75% of the daily energy needs of a household of seven people, according to market conditions at the start of the intervention. Cash was given to women on the assumption that they would be able to influence its use to the benefit of children. The cash transfer was manual because the mobile phone network and available vendors did not support money transfers.

Supplementary food, from WFP, was given to preg-nant and lactating women (PLW) and children 6-23 months old in the cash receiving household regardless of their nutritional status, as long as they attended on the distribution day. At the distribution, women had to attend a Behaviour Change Communication (BCC) session focused on hygiene, health and nutrition, and women and children were screened for acute malnu-trition using mid-upper arm circumference (MUAC), and referred to supplementary or therapeutic feeding programmes according to local criteria. Concern Worldwide undertook community sensitisation on the objectives of the cash programme, including sugges-tions to use the cash to buy food for children.

The modified intervention gave the same total amount of cash to households, but started earlier and was given over a longer period. A cash transfer of 21,500 CFA was given from April to September (22,500 CFA was given in June). As with the standard intervention, supplementary feeding was only given between June and September.

NIGER STUDY DESIGN

The Niger study design was a community-based, two-arm cRCT to assess the impact of CBI interventions on the risk of child undernutrition among households targeted for intervention and in the general population in which the interventions were implemented. The detailed study protocol was published in 2015[10]. Study participants were selected from three agricultural zones sharing similar livelihoods and geography. Eligible households were identified as poor and very poor (according to wealth ranking criteria) and had a child or children aged 6-48 months. The unit of randomisation was the cash distribution point; i.e. one or more villages grouped to receive cash in a given location.

The randomisation was undertaken in a public meeting to which the village leaders were invited. Meeting participants were invited to blindly select envelopes one by one which were sequentially allocated to the modified and standard cash arms, until all had been allocated. Ten clusters were assigned to each interven-tion arm. Cash receiving households were exhaustively sampled from the selected villages for inclusion in the study cohort. In addition, a sample of households not eligible for cash transfers was randomly sampled for inclusion in the cohort, from the same villages. The study participants were children aged 6-59 months and women aged 15-49 years, exhaustively sampled from the selected households.

NIGER DATA COLLECTION

Quantitative data collection took place at two time points, in March-April, before the intervention, and in September-October, after the intervention. Question-naires were administered to the head of household, women of childbearing age (15-49 years), and mothers or carers of eligible children. Questionnaire tools were developed using standard indicators, and refined based on the results of formative research and piloting. Data was collected using Digital Data Gathering devices.

For cost-effectiveness analysis, institutional costs were assessed using accounting data and information collected from key informant interviews and programme documentation. Societal and household costs were assessed using qualitative data collected

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10 Sibson VL, Grijalva-Eternod CS, Bourahla L, Haghparast-Bidgoli H, Morrison J, Puett C, et al. The REFANI-N study protocol: a cluster-randomised controlled trial of the effectiveness and cost-effectiveness of early initiation and longer duration of emergency/seasonal unconditional cash transfers for the prevention of acute malnutrition among children, 6-59 months, in Tahoua, Niger. BMC Public Health. (2015) 15:1289

2.2   PAKISTAN

THE PAKISTAN INTERVENTION

from focus group discussions and quantitative data collected from the cohort. Data collection for the cost-effectiveness analysis was conducted by a separate study team including an international researcher and a translator, and a note-taker during community-level discussions.

Qualitative data was collected as well, aimed at describing the context and explore mechanisms by which the interventions worked or failed to work. This qualitative study involved a longitudinal study of a purposively selected sample of cash receiving and non-cash receiving households, and additional, topic-focused qualitative studies. Data was collected using Interviews, focus group discussions (FGDs) and observation notes[11].

Three transfer programmes were implemented in Pakistan - 2 unconditional cash transfers (UCT) and a fresh food voucher transfer (FFV). The UCT consisted of a 'standard cash' (SC) transfer of 1500 Pakistan Rupees (PKR), approximately $14 USD (based on a national cash transfer programme known as the BISP), and a 'double' cash (DC) transfer of 3000 PKR ($28 USD). The fresh food voucher (FFV) had a cash value of 1500 PKR ($14 USD - equivalent to the SC), which could be exchanged for specified fresh foods (fruits, vegetables and meat) in nominated shops. The transfers were disbursed at the same time every month for six consecutive months by mobile armoured vehicles that either travelled to a central location for a number of participating villages or through the central banks in Dadu City that served a number of villages. The FFVs were disbursed to participating households at the village level. All three interventions were delivered with 'soft' messaging that children should benefit from the transfers. A control group was enrolled which did not receive cash or vouchers.

All fours study arms were exposed to an ongoing large-scale programme called Women and Children/Infant's Improved Nutrition in Sindh (WINS). The WINS programme provided outpatient treatment for children aged 6-59 months with severe acute malnutrition (SAM), micronutrient supplementation (children and PLW), and behaviour change communications (BCC). Key messages focussed on the causes of undernutrition, the benefits of exclusive breastfeeding, improved complementary feeding practices, food and water hygiene, handwashing and sanitation. These messages were targeted to mothers and carers and delivered monthly to all study participants in group sessions by the research mobilisers. The research mobilisers also facilitated data collection activities, such as community mobilisation, but were not involved in the data collection itself.

Two of the intervention arms (SC and FFV) were funded by the European Union (EU). The DC arm was funded by the EU Humanitarian Aid and Civil Protection (ECHO). The interventions took place from July to December 2015. The implementation and the use of the transfers were monitored through monthly questionnaires or three focus group discussions and key informant interviews.

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11 This qualitative report can be found on REFANI's web page at https://www.actionagainsthunger.org/refani

PAKISTAN STUDY DESIGN

The Pakistan study was a longitudinal cRCT, with four parallel arms conducted among 114 villages, which were selected from the Action Against Hunger WINS programme database. The trial design, setting, and characteristics of the study population have been described in a published protocol paper[12].

Households were selected from villages in three agricultural areas sharing similar livelihoods, geography, and access to the WINS programme. Action Against Hunger provided the initial household lists, and these were further verified and updated by the study research team. Eligible households were defined as poor or very poor - using eligibility criteria based on the ownership of cultivated land and the number of small ruminants - and had one or more children aged 6–48 months. The study was a closed cohort and followed all children in eligible households, regardless of their baseline anthropometric status.

As Global Positioning System mapping is not permitted in Pakistan, the research team carried out a mapping exercise by hand to assess the size of each village and the potential number of eligible households. Because it was not possible to carry out a public randomisation, randomisation was done by the principal investigator using a random number table to generate the randomisation sequence and then drawing village names from a box. Block randomisation was done, allowing equal distribution of the villages to each arm for small (<40 households), medium (40–85 households), and large (>85 households) villages.

The study also involved a mixed-methods process evaluation to further understand how intervention implementation may have affected intervention impacts in this setting, and to quantify the causes of any impacts seen.

PAKISTAN DATA COLLECTION

Quantitative data were collected at baseline and then after each cash and voucher disbursement (six months in total), with a final round of data collection one year after baseline. Hb data were collected only at baseline and at six months due to the costs involved. Data for the main impact analysis and findings reported here involved three periods: baseline (June to July 2015), six months after baseline (December 2015), and one year after baseline (June/July 2016). All questionnaires were translated and administered in the local language, Sindhi. Piloting and back-translation were carried out to ensure that the intended meaning of the questions was retained. Quantitative data were collected using android mobile phones with Open Data Kit software. To ensure the quality of the data collected, daily field supervision, meetings with the study coordinator, a mid-term refresher training session, and regular data checks were carried out.

Qualitative data were collected using focus group discussions, key informant interviews, and longitudinal in-depth interviews. Data were collected by a qualified qualitative researcher who conducted two rounds of in-depth interviews with 32 study mothers and 34 FGDs that included study mothers and fathers and other female and male non-participants. Qualitative data were collected using digital dictaphones, and the mp3 files of the recorded interviews were transcribed and translated into English in MS Word, and then analysed using a thematic approach.

As with the Niger cost-effectiveness analysis, institutional costs were assessed using a combination of accounting data, key informant interviews and programme documentation. Societal and household costs were assessed using qualitative data collected from FGD and quantitative data collected from the main cohort study.

12 Fenn B, Sangrasi GM, Puett C, Trenouth L, Pietzsch S. The REFANI Pakistan study-a cluster randomised controlled trial of the effectiveness and cost-effectiveness of cash-based transfer programmes on child nutrition status: study protocol. BMC Public Health. (2015)15:1044

2.3   SOMALIA

THE SOMALIA INTERVENTION

The intervention implemented in Somalia, by Concern Worldwide, comprised a monthly unconditional CBI of US$ 84.00/month for 5 months, a once-only distribution of a NFI kit, and the provision of free piped water through tap stands. The monthly cash amount was based on the cost of the Minimum Expenditure Basket (MEB) developed by the Somalia Food Security and Nutrition Analysis Unit (FSNAU). The MEB represents a minimum set of basic food items such as sorghum, vegetable oil and sugar, comprising 2,100 kilocalories/person/day basic energy requirement for a household of 6–7 members, and non-food items such as such as water, kerosene, firewood, soap and cereal grinding costs. The NFI kit comprised a plastic sheet, two mosquito nets, one blanket, one sleeping mat, one kitchen set, one bar of soap, two collapsible jerry cans, and one set of sanitary pads.

Upon registration, a female household representative received a mobile phone SIM card with a unique number through which they received the transfer via a mobile money transfer company. The intervention targeted women as the household cash recipient on the assumption that their spending was more likely to benefit their children.

Concern Worldwide also continued to support and equip the local Maternal and Child Health and Nutrition (MCHN) centres and Outpatient Therapeutic Programmes (OTP), where malnourished children and PLW from the study area were referred for treatment. Improved pit latrines were provided by Concern Worldwide and other NGOs in most of the camps included in the study.

SOMALIA STUDY DESIGN

The Somalia study design was a two-arm, non-randomised, cluster controlled trial. Concern Worldwide implemented a routine needs assessment exercise to identify vulnerable beneficiaries and on that basis selected the camps that received the intervention. All households in the selected camps were registered for the intervention. A non-randomised design was chosen as the best available approach in this setting because the intervention was allocated using vulnerability criteria.

The cluster unit in the trial was an IDP camp and the intervention arm included 10 IDP camps selected to receive the intervention. The reason that only 10 camps were selected to receive the intervention was the limit in the donor funding that was available to provide services in the area. The control arm included another 10 IDP camps located adjacent to the intervention camps that did not receive the intervention. Routine programme data suggested small differences in vulnerability between camps. Households in both arms benefited from other services provided by Concern Worldwide, such as care from OTP and MCHN centres. The published protocol provides further details of the study methods[13].

SOMALIA DATA COLLECTION

Quantitative data was collected using questionnaires translated into the local Somali language, and addressed to the primary carer of the child included in the study. A two-week training was held for enumerators and supervisors prior to survey implementation. Survey data was collected using mobile devices and community surveillance data was collected on paper forms.

Baseline and endline surveys took place in March and September 2016, respectively. The community surveillance system started data collection in March 2016 and continued during the course of the intervention. Four teams, each with two enumerators and led by two supervisors, undertook data collection for the surveys. Qualitative data collection was undertaken by one team with a supervisor. For the surveillance system, a total of sixteen community health workers (CHW) collected the monthly data, grouped into six teams of two members, and three additional standby CHW. Each team had one supervisor. A field coordinator and a study coordinator supervised all field-teams. All the study team, except the study coordinator, were recruited locally and were based in the Mogadishu area. Qualitative data was collected by a trained team in the local Somali language.

13 Jelle M, Grijalva-Eternod CS, Haghparast-Bidgoli H, King S, Cox CL, Skordis-Worrall J, Morrison J, Colbourn T, Fottrell E, Seal AJ. The REFANI-S study protocol: a non-randomised cluster controlled trial to assess the role of an unconditional cash transfer, a non-food item kit, and free piped water in reducing the risk of acute malnutrition among children aged 6-59 months living in camps for internally displaced persons in the Afgooye corridor, Somalia. BMC Public Health. (2017)17:632

SECTION 3
TRIAL RESULTS

This section summarises and contrasts the study results for Niger, Pakistan, and Somalia. **TABLE 4**, below, provides an overview of the main impact on the primary outcomes of interest i.e. the prevalence of global acute malnutrition (GAM) (Niger and Pakistan) or the incidence of GAM by MUAC (Somalia).

TABLE 4 Main trial results

Study Country & Arm		Baseline GAM prevalence (95% CI) & mean WHZ ± SD	6-month unadjusted GAM prevalence (95% CI) & mean WHZ ± SD	6-month intervention effect OR or HR (95% CI); difference in mean WHZ (95% CI)[1]	P	12-month intervention effect OR or HR, (95% CI); difference in mean WHZ (95% CI)	P
Niger	Standard Cash	14.1 % (10.3, 18.8)	15.1 % (12.8, 17.8)				
		-0.98 ± 1.00	-1.04 ± 0.94				
	Modified Cash	12.9 % (9.5, 17.4)	14.2 % (11.3, 17.7)	OR 1.10 (0.77, 1.56)	0.60	NM[3]	
		-0.87 ± 0.99	-0.99 ± 0.95	-0.00 (-0.09 0.09)	0.98	NM	
Pakistan	Control	21.9% (19.2, 24.9)	9.1% (7.2-11.3)				
		-1.15 ± 1.30	-0.63 ± 1.14				
	Standard Cash	22.0% (19.3, 24.8)	9.9% (8.0, 12.1)	OR 1.09 (0.64, 1.87)	0.75	OR 1.10 (0.71, 1.71)	0.66
		-1.11 ± 1.34	-0.58 ± 1.12	0.04 (-0.07, 0.14)	0.50	-0.07 -0.19, 0.04)	0.21
	Double Cash	24.0% (21.1, 27.1)	7.8% (6.1, 9.9)	OR 0.52 (0.29, 0.92)	**0.02**	OR 0.80 (0.51, 1.24)	0.32
		-1.24 ± 1.28	-0.63 ± 1.02	0.11 (0.00, 0.21)	**<0.05**	0.00 (-0.12, 0.12)	0.96
	Fresh Food Voucher	19.3% (16.7, 22.1)	8.0% (6.2, 10.0)	OR 1.16 (0.67, 2.01)	0.60	OR 1.17 (0.75, 1.82)	0.50
		-1.08 ± 1.14	-0.43 ± 1.09	0.16 (0.05, 0.26)	**0.004**	0.02 (-0.10, 0.14)	0.79
Somalia	Control	13.7% (8.8; 20.7)	7.4% (4.8, 11.4)				
		-0.82 ± 1.13	-0.35 ± 1.03				
	Intervention	14.9% (10.5; 20.8)	9.7% (5.7, 16.3)	HR 0.94[2] (0.51, 1.74)	0.84	NM	
		-0.83 ± 1.13	-0.58 ± 1.10			NM	

1 Adjusted for child age, sex, and baseline measure
2 The hazard ratio (HR) for acute malnutrition was calculated using MUAC data collected monthly on all children in the study camps by a population surveillance system.
  The reported HR is adjusted for age and sex.
3 NM = not measured

3.1 PRIMARY TRIAL RESULTS

In the Niger trial, the baseline prevalence of GAM was between 10 and 15% in the two study arms. After six months of intervention the prevalence in both study arms remained statistically unchanged. We also observed no difference in the prevalence of GAM or the mean WHZ between the standard cash and modified cash arms. The results suggest that modification of the UCT had no impact on the prevalence of GAM or mean WHZ.

In Pakistan, the prevalence of GAM at baseline was higher than 15% in all arms, i.e. above emergency threshold levels. In all arms, the prevalence of GAM fell markedly after 6 months, with a 58% reduction in prevalence in the control arm. However, when adjusted for baseline variables and clustering we saw a significantly reduced odds (OR 0.52; p=0.02) off wasting in the double cash arm only. No reduction in wasting was seen in the other intervention arms. However, a significant improvement in mean WHZ was seen in both the DC and FFV arms after 6 months (p<0.05). We saw no intervention effect on acute malnutrition in any of the study arms at 12 months, i.e. 6 months after the intervention stopped, indicating that the beneficial effect that were seen on the prevalence of wasting and mean WHZ did not persist in the medium term[14].

The trial in Somalia utilised monthly measurements of MUAC to allow determination of the incidence of GAM by MUAC as the main outcome indicator. The results indicate no difference between the study arms in the incidence of GAM by MUAC during the intervention period. To allow for adjustment for covariates and clustering the hazard ratio was calculated using a Cox's proportional hazards model. This analysis also found no difference between the study arms. In addition to this main analysis, the weight and height of a subsample of participants were measured at baseline and endline only, so as to allow a fuller description of the nutritional context. These results indicate that the baseline prevalence of GAM in the 2 study arms lay between 10 and 15%, and in both arms the prevalence decreased markedly between baseline and 6 months although there was no statistical difference between the arms.

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14 The main results from the Pakistan trial have been published in PLOS Med: Fenn B, Colbourn T, Dolan C, Pietzsch S, Sangrasi M, Shoham J. Impact evaluation of different cash-based intervention modalities on child and maternal nutritional status in Sindh Province, Pakistan, at 6 mo and at 1 y: A cluster randomised controlled trial. PLoS Medicine. (2017) 14, 24. The results from the other two trials will be published in the near future.

3.2 SECONDARY TRIAL RESULTS

Secondary results are presented separately below for households, women, and children. Wherever possible comparable indicators from the three studies are presented. Each study focussed on a range of secondary outcome variables in line with the Theory of Change (see ANNEX), which was developed to underpin the research protocols.

SECONDARY RESULTS: HOUSEHOLD

The study in Niger revealed no significant endline changes in any household indicators as a result of the modified cash transfer. As the intervention impact was measured immediately after the last cash distribution, during which the households getting the modified intervention had received a smaller transfer, a lower expenditure among these households was expected. There was, however, no significant difference. Similarly, there was no difference at this time point in household diet diversity score, food consumption score, and the coping strategies index (CSI).

However, we also used retrospective recall to measure monthly household food provisioning. This revealed a significant difference in household food security during the first two months of the intervention. During these two months (April and June), cash was only being distributed to the households receiving the modified intervention and this resulted in a significant improvement in household food security (p<0.001).

In the Pakistan study, there was a trend for total household expenditure to increase in both cash receiving arms, although it was only significantly increased in the Standard Cash arm. Expenditure on food however, significantly increased in both of these arms. As expected, household diet diversity also improved, with a larger improvement in the households receiving DC, which also reported a lower household hunger score (p=0.001).

Although the full CSI was not measured in this study, households receiving cash did report being able to cope better in response to a single question (p=0.004). The Fresh Food Voucher arm saw no significant improvements in household indicators and were more likely than the control group to take out a loan (p=0.008). It appears that giving cash, especially a higher amount, resulted in households being economically better-off whereas there was no evidence that households receiving the Fresh Food Voucher were, possibly because of their restricted nature.

Households receiving the cash transfer in Somalia showed an increased total expenditure but no significant increase in expenditure on food. Nonetheless, household food dietary diversity improved and there was an increase in the food consumption score. In addition, the CSI improved indicating a reduction in negative coping strategies following the receipt of the cash transfer.

TABLE 5 Secondary trial results: Households

Study Country & Arm		Household									
		Household Total Expenditure ($US/30 days)		Household Food Expenditure ($US/30 days)		Household Dietary Diversity Score		Coping Strategies Index		Household Food Consumption Score[1]	
		Baseline mean ± SD	Intervention effect after 6 months (95% CI)	Baseline mean ± SD	Intervention effect after 6 months (95% CI)	Baseline mean ± SD	Intervention effect after 6 months (95% CI)	Baseline mean ± SD	Intervention effect after 6 months (95% CI)	Baseline mean ± SD	Intervention effect after 6 months (95% CI)
Niger	Standard Cash	42.04 ± 26.14		32.12 (28.42, 35.66)		4.0 ± 2.0		8.3 ± 9.4		40.9 ± 18.0	
	Modified Cash	42.93 ± 28.38	-2.31 (-8.11, 3.48) P>0.05	34.05 (31.97, 35.97)	-2.38 (-8.45, 3.69) P>0.05	4.2 ± 1.9	0.47 (-1.57, 2.50) P=0.636	8.6 ± 9.5	0.18 (-2.65, 3.00) P=0.90	43.7 ± 16.9	2.88 (-1.45, 7.21) P=0.181
Pakistan	Control	77.3 ± 36.1		53.0 (18.3, 70.8)		9.5 ±1.7		NM[2]		NM	
	Standard Cash	70.8 ± 33.6	10.0 (5.4, 14.5) **P<0.001**	38.9 (17.2, 61.3)	9.5 (6.0, 12.9) **P<0.001**	9.2 ±2.0	0.80 (0.57, 1.04) **P<0.001**	NM	NM	NM	NM
	Double Cash	79.0 ± 32.9	4.5 (-0.1, 9.1) P=0.06	48.2 (16.5, 68.2)	8.2 (4.7, 11.7) **P<0.001**	9.5 ±1.5	1.41 (1.18, 1.65) **P<0.001**	NM	NM	NM	NM
	Fresh Food Voucher	73.8 ± 37.3	3.1 (-1.4, 7.7) P=0.18	50.6 (18.2, 69.2)	2.9 (-0.6, 6.3) P=0.10	9.2 ±1.8	0.13 (-0.10, 0.37) P=0.27	NM	NM	NM	NM
Somalia	Control	75.7 ± 37.3		49.0 ± 25.2		6.56 ± 1.5		28.8 ± 8.61		52.1 ± 18.2	
	Inter-vention	92.1 ± 49.1	29.6 (3.5; 55.7) **P=0.028**	68.8 ± 35.1	10.8 (-7.5; 29.0) P=0.20	7.16 ± 1.5	0.99 (0.09; 1.90) **P=0.033**	25.1 ± 9.57	-11.6 (-17.2; -5.96) **P<0.001**	58.7 ± 20.4	14.8 (4.83; 24.8) **P=0.006**

1 TheHousehold Food Insecurity Access Scale (HFIAS) was also measured in Niger and this showed a significant improvement in household food security in households receiving the modified CTP during the initial 2 months of the transfer when the standard cash arm was not receiving cash (P<0.001 & P=0.0019).
2 NM – not measured

SECONDARY RESULTS: WOMEN

In the Pakistan study, although the interventions were targeted at mothers for use on their children, the interventions had a positive impact on women's dietary diversity in all arms and women's body mass index (BMI) also increased in the FFV arm. While there is evidence to show that vouchers are generally better than cash at improving dietary diversity this was not the case in Pakistan. The Double Cash arm showed a greater improvement in dietary diversity, followed by the Standard Cash and then the Fresh Food Voucher arms. This finding on women's diet diversity is consistent with the Hb concentration results. While Hb concentration fell in all arms, presumably due to seasonal infections, the reduction was lower in the women receiving double cash. This may be related to their ability to afford items such as bed nets that can reduce the risk of infections.

In the Pakistan study, although the interventions were targeted at mothers for use on their children, the interventions had a positive impact on women's dietary diversity in all arms and women's body mass index (BMI) also increased in the FFV arm. While there is evidence to show that vouchers are generally better than cash at improving dietary diversity this was not the case in Pakistan. The Double Cash arm showed a greater improvement in dietary diversity, followed by the Standard Cash and then the Fresh Food Voucher arms. While dietary diversity improved this was not translated into an improvement in Hb concentration as would have been expected. While Hb concentration increased in all arms over the six months of the study, the increase was significantly lower in the women receiving either a Fresh Food Voucher or Standard Cash, compared to the control. It was also observed that the BMI of women receiving the Fresh Food Voucher increased. A similar effect on Hb was seen in children and these results, taken together, are potentially indicative of the voucher being too restrictive

For Standard Cash it is difficult to say exactly why the increase in Hb concentration in women was lower than the control, although it potentially points toward preferential spending of the smaller amount of money on food for the children. No impact on MUAC was seen for any intervention.

Similarly to Pakistan, the study in Somalia found that a cash transfer was associated with an increased diet diversity score in women. It is also notable that baseline diet diversity was much lower in Somalia than in Pakistan; by about 3 food groups. No impact of the cash transfer was seen on women's BMI in Somalia but a very small, statistically significant, increase in women's MUAC was observed.

TABLE 6 Secondary trial results: Women

| | | Women | | | | | | | |
| | | Individual Dietary Diversity Score mean ± SD | | BMI (kg/m²) mean ± SD or (95% CI) | | MUAC (cm) mean ± SD | | Haemoglobin (g/dL) mean ± SD | |
Study Country & Arm		Baseline	Intervention effect after 6 months (95% CI)	Baseline	Intervention effect after 6 months (95% CI)	Baseline	Intervention effect after 6 months (95% CI)	Baseline	Intervention effect after 6 months (95% CI)
Niger	Standard Cash	NM		NM		NM		NM	
	Modified Cash	NM	NM	NM	NM	NM	NM	NM	NM
Pakistan	Control	6.9 ± 1.3		20.0 (18.1-22.7)		24.3 ± 3.2		10.0 ± 1.9	
	Standard Cash	6.6 ± 1.3	1.01 (0.79, 1.23) **P<0.001**	20.4 (18.3-23.5)	-0.10 (-0.36, 0.16) P=0.45	24.4 ± 3.4	0.09 (-0.13, 0.30) P=0.41	10.3 ± 1.8	-0.42 (-0.63, -0.20) **P<0.001**
	Double Cash	6.4 ± 1.4	1.70 (1.48, 1.92) **P<0.001**	20.9 (18.5-24.3)	-0.10 (-0.36, 0.17) P=0.47	24.9 ± 3.5	-0.18 (-0.40, 0.04) P=0.11	10.6 ± 1.8	-0.09 (-0.30, 0.13) P=0.37
	Fresh Food Voucher	6.7 ± 1.2	0.76 (0.54, 0.98) **P<0.001**	20.8 (18.5-24.0)	0.29 (0.03, 0.54) **P=0.03**	25.2 ± 3.2	-0.16 (-0.38, 0.05) P=0.14	10.4 ± 1.8	-0.50 (-0.71, -0.29) **P<0.001**
Somalia	Control	3.19 ± 1.33		22.9 ± 4.68		27.5 ± 4.27		NM	
	Intervention	3.58 ± 1.51	1.37 (0.53, 2.21) **P=0.003**	24.1 ± 5.74	0.40 (-0.27, 1.06) P=0.2	27.6 ± 5.11	1.14 (0.12; 2.16) **P=0.030**	NM	NM

NM – not measured

SECONDARY RESULTS: CHILDREN

The baseline prevalence of SAM was between 2% and 3% in the study arms in Niger and Somalia, but higher in Pakistan, where it was between 5 and 9% in the different study arms. There was no intervention effect on severe acute malnutrition in any arm of the three studies.

In contrast, the baseline prevalence of stunting was more similar in the 3 studies, ranging from 35 to 56%, with a corresponding mean height-for-age (HAZ) between -1.4 to -2.3. In Pakistan, stunting and severe stunting was reduced by all 3 interventions (with moderate effect sizes >5%) and a corresponding improvement in mean HAZ. Furthermore, these improvements were maintained at 12 months after baseline, indicating a sustained benefit after the intervention was stopped. As height-for-age is known to be highly correlated with poverty the impact of an unconditional cash distribution on this indicator was not surprising. However, it is notable that this effect was also seen with the distribution of a fresh food voucher. In both Niger and Somalia no impact on stunting or mean HAZ was observed. Mean MUAC ranged from 13.5 to 14.5cm in the different arms of the 3 studies and changed little in response to any of the interventions.

Children's individual dietary diversity scores varied greatly at baseline with similarly low levels in Niger and Somalia, of 2 to 3 food groups, with a much better diversity seen in Pakistan. While no difference was seen between the arms in Niger, all the other cash or voucher interventions resulted in an improvement in child diet diversity. The increase in diversity was lowest with the fresh food voucher in Pakistan, while the cash intervention arms in Pakistan and Somalia resulted in a rise of 0.6 to 0.7 food groups. While there was no significant difference between the Standard and double cash arms in Pakistan the improvement in the double cash arm was slightly higher.

Baseline morbidity levels were high in all study sites. In Pakistan, morbidity was particularly high with about 80% of children having had an illness within the last two weeks. In comparison, about 70% of children in Somalia had had an illness within the last 4 weeks and in Niger this figure was about 30%. There was no significant reduction in overall morbidity in Pakistan but there were reductions in acute respiratory infections in the double cash arm and in malaria/fever in both cash receiving arms. Bed net use increased significantly in the Standard Cash (OR 5.0, p<0.001) and Double Cash (OR 1.5, p=0.02) arms but did not increase significantly in the Fresh Food Voucher (OR 0.84, p=0.31) arm. It may be that increased purchasing power led to a reduction in malaria infection due to increased buying and use of bed nets (though no improvement in Hb status was observed when compared to the control group).

In Pakistan, the intervention impact on children's Hb concentration reflects that seen in their mothers, in that children receiving fresh food vouchers saw a decrease in Hb concentration compared to the control group. In both arms that received cash there was no difference in Hb compared to the control group. It is notable that in both cash receiving groups a significant reduction in reported malaria/fever infection was also seen but this was not seen in the fresh food voucher arm. The fact that children receiving fresh food vouchers did worse than the control group may also be partly explained by the restricted design used for the voucher distribution and the lack of particular foods such as iron-rich meat and vitamin A rich fruit and vegetables.

TABLE 7A Secondary trial results: Children (6-59 mo. in Niger and Somalia, and 6-48 mo. in Pakistan at baseline)[1]

Country	Group	Severe Acute Malnutrition Baseline prevalence	Severe Acute Malnutrition 6-month intervention effect (95% CI)	Stunting (HAZ <-2) Baseline prevalence	Stunting (HAZ <-2) 6-month intervention effect	Stunting (HAZ <-2) 12-month intervention effect	Severe Stunting (HAZ <-3) Baseline prevalence	Severe Stunting (HAZ <-3) 6-month intervention effect	Severe Stunting (HAZ <-3) 12-month intervention effect	Mean HAZ Baseline mean ± SD	Mean HAZ 6-month intervention effect	Mean HAZ 12-month intervention effect	MUAC Mean (cm) Baseline mean ± SD	MUAC Mean (cm) 6-month intervention effect
Niger	Standard Cash	3.0% (1.78, 5.17)		36.6% (33.0, 40.3)			NM			-1.49 ± 1.44			14.2 ± 1.3	
	Modified Cash	1.8% (0.84, 3.77)	NM	34.8% (30.6, 39.3)	OR 1.33 (0.97, 1.84) P=0.078	NM	NM	NM	NM	-1.44 ± 1.26	-0.04 (-0.09, 0.01) P=0.153	NM	14.4 ± 1.2	-0.90 (-2.38, 0.58) P=0.236
Pakistan	Control	7.4% (5.7, 9.4)		51.7% (48.2-55.1)			28.5% (25.4-31.7)			-1.97 ±1.75			13.5 ± 1.2	
	Standard Cash	7.7% (6.1, 9.7)	OR 0.98 (0.38, 2.54) P=0.95	50.9% (47.6-54.2)	OR 0.36 (0.22, 0.59) **P<0.001**	OR 0.54 (0.36, 0.81) **P=0.003**	26.1% (23.2-29.1)	OR 0.47 (0.28, 0.77) **P=0.003**	OR 0.59 (0.38, 0.92) **P=0.02**	-1.98 ± 1.65	0.24 (0.17, 0.32) **P<0.001**	0.21 (0.10, 0.31) **P<0.001**	13.5 ± 1.3	0.06 (-0.02, 0.15) P=0.15
	Double Cash	9.0% (7.1, 11.1)	OR 0.37 (0.13, 1.04) P=0.06	46.5% (43.0-49.9)	OR 0.39 (0.24, 0.64) **P<0.001**	OR 0.53 (0.35, 0.82) **P=0.004**	24.8% (21.9-27.9)	OR 0.40 (0.24, 0.68) **P=0.001**	OR 0.54 (0.34, 0.85) **P=0.01**	-1.79 ± 1.78	0.24 (0.17, 0.32) **P<0.001**	0.21 (0.10, 0.31) **P<0.001**	13.6 ± 1.3	0.06 (-0.15, 0.03) P=0.21
	Fresh Food Voucher	5.4% (4.0, 7.1)	OR 1.27 (0.45, 3.55) P=0.66	54.9% (51.5-58.3)	OR 0.41 (0.25, 0.67) **P<0.001**	OR 0.48 (0.31, 0.73) **P=0.001**	31.1% (28.0-34.3)	OR 0.38 (0.23, 0.63) **P<0.001**	OR 0.51 (0.33, 0.79) **P=0.003**	-2.12 ±1.69	0.27 (0.19, 0.32) **P<0.001**	0.29 (0.19, 0.40) **P<0.001**	13.8 ± 1.2	-0.05 (-0.14, 0.04) P=0.27
Somalia	Control	3.43% (1.23, 9.17)		45.4% (36.4, 54.2)		NM	22.0% (15.2, 30.8)		NM	2.04 ± 1.28		NM	14.3 ±1.48	
	Inter-vention[1]	3.25% (1.78, 5.86)	0.91% (-3.10; 4.92) P=0.6	55.5% (44.6, 65.9)	-0.16% (-7.61, 7.29) P=0.9	NM	32.3% (23.4, 42.6)	-5.57% (-15.0, 3.84) P=0.2	NM	-2.29 ± 1.44	0.10 (-0.07, 0.26) P=0.2	NM	14.1 ± 1.44	-0.07 (-0.38, 0.24) P=0.6

1 Intervention effects are shown as the change in the mean or proportion (difference in difference) or as an odds ratio.

TABLE 7B Secondary trial results: Children (6-59 mo. in Niger and Somalia, and 6-48 mo. in Pakistan at baseline)[1]

		Individual Dietary Diversity Score		Recent morbidity[2]		Diarrhoea		ARI		Malaria/fever		Haemoglobin (g/dL) ± SD	
		Baseline	6-month intervention effect (95% CI)[2]	Baseline prevalence	6-month intervention effect (95% CI)	Baseline prevalence	6-month intervention effect (95% CI)	Baseline prevalence	6-month intervention effect (95% CI)	Baseline prevalence	6-month intervention effect (95% CI)	Baseline prevalence	6-month intervention effect (95% CI)
Niger	Standard Cash	2.3 ± 1.3		27.5 % (18.0, 39.8)		NM		NM		NM		NM	
	Modified Cash	2.5 ± 1.3	-0.03 (-0.59, 0.52) P=0.904	31.5% (26.8, 36.5)	-4.3 (-19.5, 11.0) P=0.565	NM	NM	NM	NM	NM	NM	NM	NM
Pakistan	Control	7.5 ± 2.0		82.5% (79.8, 85.0)		35.0% (31.8, 38.2)		32.2% (29.0, 35.4)		61.2% (57.9, 64.5)		8.8 ± 1.6	
	Standard Cash	7.0 ± 1.9	0.59 (0.39, 0.79) P<0.001	75.9% (73.0, 78.7)	OR 0.79 (0.57, 1.08) P=0.14	25.2% (22.4, 28.2)	OR 1.05 (0.67, 1.63) P=0.84	34.3% (31.2, 37.4)	OR 0.73 (0.51, 1.03) P=0.07	60.2% (56.9, 63.3)	OR 0.64 (0.46, 0.90) P=0.01	8.9 ± 1.7	-0.12 (-0.31, 0.08) P=0.24
	Double Cash	7.1 ± 2.0	0.73 (0.53, 0.93) P<0.001	80.7% (77.8, 83.3)	OR 0.97 (0.71, 1.33) P=0.87	27.3% (24.3-30.5)	OR 0.87 (0.55, 1.36) P=0.54	39.6% (36.2-43.0)	OR 0.57 (0.40, 0.80) P=0.002	61.7% (58.3-65.0)	OR 0.63 (0.45, 0.89) P=0.01	9.0 ± 1.6	0.07 (-0.12, 0.27) P=0.48
	Fresh Food Voucher	7.2 ± 1.9	0.43 (0.23, 0.63) P=0.001	78.9% (76.0, 81.5)	OR 1.04 (0.77, 1.41) P=0.80	27.3% (24.3-30.3)	OR 0.99 (0.64, 1.54) P=0.97	30.6% (27.5-33.8)	OR 0.87 (0.61, 1.24) P=0.43	56.4% (53.0-59.7)	OR 0.87 (0.62, 1.22) P=0.41	9.2 ± 1.6	-0.26 (-0.45, -0.08) P=0.005
Somalia	Control	2.37 ± 0.97		68.5% (63.0, 73.6)		30.9% (25.4, 37.0)		30.9% (22.9, 40.3)		17.4% (11.9, 24.8)		NM	
	Inter-vention	2.95 ±1.03	0.57 (0.04, 1.10) P=0.036	74.2% (62.2; 83.4)	-4.41% (-28.8, 19.9) P=0.7	30.3% (22.0, 40.1)	-1.48 (-15.4, 12.4) P=0.8	3.23% (0.83, 11.7)	32.8% (17.5, 48.1) P<0.001	34.8% (23.7, 47.9)	-13.9 (-30.9, 2.97) P=0.1	NM	NM

1 Intervention effects are shown as the change in the mean or proportion (difference in difference) or as an odds ratios.
2 A 2-week recall period was used in Pakistan and a 4-week recall period was used in Niger and Somalia.

3.3 COST, COST-EFFICIENCY AND COST-EFFECTIVENESS ANALYSIS RESULTS

Cost, cost-efficiency, and cost-effectiveness were assessed for the Niger and Pakistan studies, the main results of which are summarised in **TABLE 8**.

TABLE 8 Main cost, cost-efficiency, and cost-effectiveness results from Niger and Pakistan

	Niger		Pakistan		
	Standard Cash	Modified Cash	Standard Cash	Double Cash	Fresh Food Voucher
Number of beneficiary households[1]	1124	951	632	600	632
Costs					
Value of transfer/household	$233	$233	$88	$175	$88
Implementation cost/household	$127	$183	$105	$109	$132
Total programme cost/household	$361	$416	$193	$284	$220
Total programme cost	$405,767	$395,402	$121,811	$170,201	$138,754
Cost of programme participation/household	$10.06	$13.50	$16.87	$16.87	$4.92
Cost to household as % of transfer	4.32%	5.79%	19.26%	9.63%	5.62%
Net value of transfer/household	222.94	219.5	70.69	158.26	82.67
Cost-efficiency					
Total cost transfer ratio (per $US), gross transfer	1.55	1.78	2.20	1.62	2.51
Total cost transfer ratio (per $US), net transfer	1.62	1.90	2.82	1.82	2.73
Cost-effectiveness[2]					
Cost/case of wasting averted				$4,865	
Cost/case of stunting averted			$882	$1,290	$883
Cost/DALY averted, wasting & stunting[3]				$1,252	
Cost/DALY averted, stunting[3]			$845		$1,096
Cost/DALY averted, wasting & stunting[4]				$641	
Cost/DALY averted, stunting[4]			$434		$563

1 Number at the start of the distribution programmes
2 Incremental cost-effectiveness ratios of the intervention compared to the control group
3 Discounted and age-weighted
4 Not discounted and age-weighted

The number of beneficiaries receiving the different interventions, the value of the transfers, and the costs of implementing the transfers, all varied substantially between the different programmes that were studied. This resulted in the total cost of each of the implemented programmes ranging from $120,000 for the single cash programme in Pakistan to $406,000 for the standard cash programme in Niger.

Participating in programmes will also usually have a cost to beneficiary households. Costs may include, for example, the direct cost of travelling to the distribution site and the opportunity cost of lost agricultural activity while they are collecting the transfer. The costs of programme participation in these studies were estimated to range from $5 to $17 per household, varying on the different intervention designs and locations. As expected, the cost of programme participation in Niger was higher for the modified cash programme than the standard cash, as beneficiaries had to attend more distributions. More interesting, however, is the significant difference in beneficiary costs between the two cash programmes and the voucher programme in Pakistan. The reason for this difference is that all vouchers were distributed directly to beneficiaries in their own village, whereas many of the cash programme beneficiaries had to travel either to another village or to the capital city to collect their transfer. The combination of a low transfer value and high beneficiary cost meant that the SC beneficiaries retained the lowest proportion of their transfer.

Calculation of the total cost transfer ratio (TCTR) provides an estimation of the cost to deliver $1 of benefit to a household, and is a way to estimate cost-efficiency. The TCTR in the programmes in this study ranged from 1.55 to 2.51 for the gross values of the transfer. The results from these studies are similar to other analyses which estimate the average TCTR for projects with less than 10,000 beneficiaries at 2.72 for cash transfer programmes and 3.23 for voucher programmes (Maunder 2015).

However, a better representation of the actual cost to deliver $1 of benefit to a household is a net transfer TCTR which deducts the cost to beneficiary households of participating in the programme from the gross transfer value. These range 1.62 for the standard intervention in Niger to 2.82 for the SC in Pakistan. The TCTR for the gross value of the transfer obscures the much larger cost to Pakistan beneficiaries in the SC intervention compared to the FFV intervention, and it makes the SC intervention appear more cost-efficient. When household costs are deducted from the transfer value, the FFV intervention is shown to be more cost-efficient. This example demonstrates the effect of high beneficiary participation costs on cost-efficiency, as measured by TCTR, and reinforces the necessity of carefully considering the cost implications to beneficiaries of programme design.

Since there was no difference in impact between the two study arms in Niger, the cost-effectiveness of different CBI for averting cases of malnutrition was estimated for the Pakistan study only. Here, the cost to avert a case of wasting with a UCT ($4,865 in DC) was much higher than that to avert a case of stunting ($1,290 in DC, $882 in SC, $883 in FFV). The cost per disability-adjusted life year (DALY) averted ($641 in DC, $434 in SC, $563 in FFV for non-discounted and age-weighted results), while "highly cost-effective" according to international standards, is high for the Pakistan context and higher than estimates of DALYs averted for some nutrition-specific treatment interventions.

The high fungibility of cash means that the transfers are likely to be used for a wide variety of basic needs and that the impact on any one particular outcome of interest is expected to be diffused. Therefore, a direct nutrition treatment programme is likely to be more cost-effective than a preventative multi-purpose cash transfer programme when analysed using one outcome measure such as cases of undernutrition recovered/prevented. As the estimated cost per case averted does not represent the full range of benefits the cash transfer is likely to confer, caution is needed in interpreting the results of such analysis and in comparing the costs with those from other types of intervention.

SECTION 4
CONCLUSIONS AND
RECOMMENDATIONS

This closing section contains conclusions about the combined findings of the three studies, recommendations for policy and practice, and highlights areas where further research is required.

4.1 CONCLUSIONS

1. CASH AND VOUCHER TRANSFERS DID NOT CONSISTENTLY REDUCE ACUTE MALNUTRITION

The combined findings indicate that cash and voucher transfers are only effective at reducing acute malnutrition in some contexts. A significant decrease in the prevalence of GAM was only seen in the double cash intervention arm in Pakistan, and here the effect size was small. A significant increase in mean WHZ was also observed in the FFV arm in Pakistan but there was no decrease in GAM. In Somalia, there was no reduction in the incidence of acute malnutrition (MUAC<12.5 cm or oedema).

In the CBI comparison study in Niger, there was no difference in GAM between the standard and modified cash arms at end line. There was also no decrease GAM between baseline and end line in either of the cash receiving arms, despite increases in expenditure and improvements in food security in both. This finding, combined with an analysis of secondary data, strongly suggests the role of malaria and other infections in the causation of acute malnutrition in this context.

The finding that cash and voucher transfers were only effective against acute child malnutrition in some humanitarian situations is consistent with the existing literature from development contexts. This finding is unsurprising given the well-established multiple causes of malnutrition and the fact that only some of these risk factors are likely to improve following short-term cash or voucher transfers to individuals.

2. THE IMPACT OF CASH TRANSFERS ON ACUTE CHILD MALNUTRITION WAS TRANSIENT

The transfer of the higher amount of cash in the Pakistan setting was effective in reducing the odds of GAM when measured at 6 months post-baseline. However, by 12 months of follow up there was no significant difference between the intervention and control arms, indicating that the reduction in the risk of GAM was transient and not sustained much beyond the intervention period. Further work is required to determine whether the reduction in GAM could be maintained and strengthened through longer term cash transfer programmes within the context of social protection or other systems.

3. CASH AND VOUCHER TRANSFERS REDUCED STUNTING IN PAKISTAN

The Pakistan study found compelling evidence that cash and voucher transfers can increase mean HAZ and reduce stunting, with moderate effect sizes. This effect was seen in all 3 study arms and the improvement was seen both at 6 months and 12 months of follow-up, indicating a sustained benefit on child growth. Stunting and mean HAZ are well-established indicators of poverty and the impact seen here is consistent with the published literature on cash and voucher transfers. This finding is an important contribution to the debate on how we can prevent and reduce stunting in chronically fragile contexts. Severe stunting carries a very high risk of mortality (equal to that observed for moderate wasting) and the significant reduction seen in the Pakistan study adds to the growing case for humanitarian policies and programming to consider stunting. We did not measure stunting as an outcome for the CTP comparison study in Niger and the sample size in Somalia was not large enough to reliably detect any difference.

4. CASH TRANSFERS INCREASED HOUSEHOLD EXPENDITURE

In the two studies that included a control group that received no cash (Pakistan and Somalia), we observed increases in total household expenditure and/or household food expenditure as a result of the transfers. This finding is consistent with published evidence and unsurprising given the high rates of poverty in the study settings.

5. CASH TRANSFERS IMPROVED HOUSEHOLD FOOD SECURITY

In all three studies cash transfers led to improvements in household food security according to a number of different indicators. In the transfer comparison study in Niger the improvement was only seen during the first two months of distribution, but in the other studies the improvements were evident at endline. This finding is again consistent with the majority of published data on cash transfers. However, in the Pakistan arm that received a fresh food voucher arm, we saw no improvement in food security following the transfer.

6. CASH AND VOUCHER TRANSFERS IMPROVED DIETARY DIVERSITY

In households in Pakistan and Somalia there was a significant improvement in individual DDS in both women and children in all arms receiving either cash or fresh food voucher transfers.

7. THE SIZE OF THE CASH TRANSFER IS ONE FACTOR THAT INFLUENCED EFFECTIVENESS

The Pakistan study showed that nutrition impacts can be affected by the size of the cash transfer. While the standard cash intervention in Pakistan did not reduce the prevalence of GAM the double cash intervention was effective. However, it is also worth noting that the size of the cash transfer in Pakistan was the smallest, in $US terms, when comparing the value of the transfers used in the 3 studies. The cost of living varied greatly across the 3 sites so a direct comparison of the size of the transfers is not particularly informative.

Qualitative work across all three studies also indicated that sharing of the transferred cash within and between households was an important factor, and quantitative data indicated that decision making over expenditure also influenced the amount of cash that was available to be utilized for food and other purchases that could influence the risk of malnutrition (see Theory of Change in ANNEX). In addition, the ability or willingness of households to change many of the risk factors for malnutrition, for example the availability of improved water sources or better quality health care, is not likely to be influenced by the variations in the size of cash transfers that were tested.

8. NUTRITIONAL IMPACTS OF CBI ARE MODULATED BY SEASONALITY AND THE EPIDEMIOLOGY OF INFECTIOUS DISEASE

The prevalence of GAM and other indicators of interest in all these studies was likely influenced by seasonality. Therefore, the change, or lack of change, in indicators between baseline and endline measurements needs to be interpreted with this in mind. Large decreases in the prevalence of GAM in all study arms were observed over the course of the study in Pakistan and, to a lesser extent, in Somalia. In contrast, no change in the prevalence of GAM was seen in Niger between baseline and end line. It is likely that the seasonal spike in malaria infection overwhelmed the benefits of improved food security and diet diversity that were seen in both study arms. Seasonality remains an important factor in many humanitarian contexts such as the three studied, and cash or voucher transfers implemented and/or evaluated in the same locations but during a different season may yield different results to those described here.

9. FRESH FOOD VOUCHERS DID NOT INCREASE DIET DIVERSITY

Distribution of fresh food vouchers in Pakistan did not increase dietary diversity as we had expected. The use of vouchers is likely to be optimal where food availability is good and access (through income) is limited. Vouchers with restricted use also offer the opportunity to enhance consumption of food items that will have a beneficial impact on nutrient intake, and a voucher programme can be designed based on knowledge of nutrient gaps in a particular context. However, the design and running of a voucher programme is inherently more complex than an unconditional cash transfer. This is reflected in the relatively high cost transfer ratio for this intervention.

4.2 RECOMMENDATIONS

1. THE IMPACT OF CASH AND VOUCHER TRANSFERS SHOULD BE ASSESSED WITHIN THE WIDER HUMANITARIAN CONTEXT

UCT will usually be implemented with the aim of achieving a range of different humanitarian outcomes, which may or may not explicitly include nutrition. While not directly addressed within the research conducted for REFANI, the primary aim of humanitarian response is to reduce excess mortality and cash transfers may or may not influence this overriding objective via a number of pathways. Therefore, in assessing the benefit and cost-benefit of CBI programmes it is important to take into account their multiple purposes, which may encompass a number of sectors and potential outcomes. Analysing the costs for CBI recipients is another element to include when considering impact. This raises methodological challenges for designing and implementing efficacy and effectiveness studies, and associated cost-effectiveness analysis. Cost-efficiency and cost-effectiveness comparisons with other studies should be done with caution as methods and approaches are still evolving.

2. CERTAIN DESIGN FEATURES OF CASH AND VOUCHER TRANSFER PROGRAMMES – INCLUDING THEIR INTEGRATION WITH OTHER INTERVENTIONS, TRANSFER SIZE, AND PURCHASING RESTRICTIONS, – MUST BE CONSIDERED TO OPTIMISE NUTRITION-RELATED EFFECTS

A. INTEGRATION

Cash and voucher transfers alone may often not prove sufficient to reduce acute child malnutrition in humanitarian contexts, and therefore, may often require integration with other context-specific interventions to achieve nutrition-related goals. The exact mix of interventions will depend on the nature of the emergency, the resources and infrastructure available to the affected population, and the availability of goods and services through the market. Important drivers of health and nutrition outcomes, including access to public health services such as vaccination, availability of water and sanitation infrastructure, and access to curative nutrition and health services, are unlikely to be strongly influenced by cash transfers to individual beneficiaries in most contexts, and will continue to require direct, sector-specific interventions.

B. SIZE

The size of the cash transfer is an important design feature and the amount needs to be both consistent with national benchmarks/programmes yet adequate to allow households to utilise cash for improved dietary intake and to enhance their resilience to illness.

C. RESTRICTIONS

When designing restricted voucher transfer programmes it is important to ensure the adequate availability of macro and micro nutrient containing foods in the food vendor outlets. Attention is particularly warranted in areas where high level of anaemia or other forms of micronutrient malnutrition exist prior to the intervention.

3. RESEARCH IN HUMANITARIAN CONTEXTS IS CHALLENGING BUT KEY FOR PROMOTING EVIDENCE-BASED INTERVENTIONS

Research in humanitarian contexts is vital to help facilitate and promote evidence-based practice. The challenges of conducting research varies from context to context and requires a variety of approaches that may include elements of remote research support and management, as well as on the ground engagement from the lead research team. It may be that operational and ethical reasons prevent the inclusion of control groups and certain types of measurements in some contexts but allow them in others. A pragmatic, opportunistic, and flexible approach to research in humanitarian contexts is therefore needed from all stakeholders. The involvement of independent research organisations is important to ensure any possible conflicts of interest are mitigated and to lend credibility to the findings. In all cases, the involvement of a dedicated team of field data collectors is indispensable.

4. STAKEHOLDERS SHOULD WORK TOGETHER TO ENABLE COMPARABLE STUDIES AND OPTIMISE GENERALIZABILITY

Due to the range of different contexts in which humanitarian programmes are implemented the challenge of maximising the generalizability of research findings from a single study or series of studies is a key issue. Efforts to ensure consistency between different

studies are very important, but, for various reasons, it is unlikely that harmonisation of all measures and outcomes will be achievable. One of the challenges to harmonisation is that funding for interventions and for associated research are usually separate and, in the case of REFANI, even came for different donors, making the planning and execution of research plans more difficult. Conducting research on the back of ongoing and often separately funded interventions can constrain the choice of research methodology and raises questions about optimal institutional arrangements for research – especially in challenging humanitarian contexts.

5. FURTHER STUDIES SHOULD BE UNDERTAKEN TO BUILD EVIDENCE ON CBI

The REFANI studies generated substantial amounts of data and new evidence on cash and voucher transfer programmes in humanitarian contexts. The work also revealed the need for further research on a range of topics including:

A. ENHANCING THE EFFECTIVENESS OF CBI FOR NUTRITION AND HEALTH OUTCOMES

What combination of CBI and sector specific direct interventions is most effective at achieving health and nutrition objectives in humanitarian contexts and to what extent can behaviour change communication and/or conditionality help improve outcomes?

B. RESPONSE ANALYSIS AND DECISION SUPPORT

How can decisions be best taken on the allocation of resources between cash transfer programmes and other interventions, e.g. vaccination or WASH programmes, in different humanitarian response situations? Can an evidence-based decision support tool be developed to ensure the optimal design of Cash+ interventions?

C. OPTIMISING COST-EFFECTIVENESS/COST-BENEFIT ANALYSIS FOR CBI

Current approaches to cost-effectiveness analysis have methodological limitations for assessing the full impact of cash and voucher transfers. CEA can analyse only one outcome or composite outcome at a time. Interventions which impact multiple aspects of wellbeing for which there is no composite indicator will appear to be less cost-effective than an intervention which has a narrow and direct impact on the outcome of interest. Research is therefore needed on the development of enhanced methods for the economic analysis of CBI programmes.

D. USE OF FRESH FOOD VOUCHERS

The study in Pakistan unexpectedly found that provision of a fresh food voucher was associated with a significantly lower Hb concentration compared to the control group. Further research is needed on what accounted for this surprising result and what implications this might have for the future design of food voucher programmes.

E. POST-INTERVENTION IMPACT ON STUNTING

The findings from the Pakistan study at 12 months are potentially important. Further research could help determine whether this impact is easily replicated in other contexts as well as help understanding of the process by which CBI impact stunting both during and post-intervention.

ANNEX THE REFANI THEORY OF CHANGE