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More evidence on cash transfers and child nutritional outcomes: a systematic review and meta-analysis

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ABSTRACT

Background Cash transfer (CT) programmes are an increasingly common approach to alleviate poverty and inequality and improving child health and nutrition, as well as supporting other goals such as education. Evidence indicates that CTs can be effective, but overall impacts are small in magnitude. This paper substantially updates the evidence base on the effectiveness of CTs and moderating factors.

Methods Building on a prior search done in 2018, we searched articles published between January 2018 and March 2021 using Agris, Econlit, Eldis, IBSS, IDEAS, IFPRI, Google Scholar, PubMed and World Bank databases. We included studies using quantitative impact evaluation methods of CTs with sample sizes over 300, targeted to households with children under 5 years conducted with clear counterfactuals in countries with gross domestic product below US$10 000 at baseline. We performed meta-analysis using random effects models to assess the impact of CT programme on selected child nutrition outcomes.

Findings Out of 1561 articles identified, 55 additional articles were eligible for inclusion for a total of 129 estimates. We find that CTs have significant although modest effects on height-for-age z-scores (HAZ) (0.024, 95% CI 0.004 to 0.044; p<0.02); stunting (–1.35%, 95% CI –2.35 to – 0.35; p<0;01); wasting (–1.31%, 95% CI –2.16% to 0.46%; p<0.01); animal-source foods (6.72%, 95% CI 5.24% to 8.20%; p<0.01); diet diversity (0.55, 95% CI 0.30 to 0.81; p<0.01) and diarrhoea incidence (– 1.74%, 95% CI –2.79% to –0.68%; p<0.05). There was no significant effect of CTs on weight-for-height (WHZ) or weight-for-age z-scores (WAZ). Well-targeted behaviour change communication was also effective in improving HAZ and decreasing the prevalence of diarrhoea.

Interpretation CT programmes improved linear growth among young children, reducing wasting and stunting, but effects are heterogeneous and somewhat small overall. More evidence indicates that effects on dietary diversity and the consumption of animal-source foods are increasingly pronounced.

WHAT IS ALREADY KNOWN?

⇒ Previous systematic reviews on the impact of social protection and particularly cash transfer (CT) programmes on nutrition outcomes find mixed results.

⇒ In their 2020 systematic review and meta-analysis, Manley et al reviewed 74 estimates of the impact of CTs, finding that the average effect of CT programmes on child height-for-age z-scores (HAZ) was positive and statistically significant.

WHAT ARE THE NEW FINDINGS?

⇒ This updated systematic review and meta-analysis adds 55 estimates to the previous set of 74 for a new total of 129 studies, finding significant effects of CTs on nutritional outcomes, including impacts on HAZ, stunting, wasting and diet and a decline in incidence of diarrhoea.

WHAT DO THE NEW FINDINGS IMPLY?

⇒ Findings reveal CT programme characteristics that influence programme effectiveness. In particular, a new finding is that that the content of behaviour change communication (BCC) matters for programme effectiveness; BCC providing instruction on Water, Sanitation and Hygiene is particularly helpful.

INTRODUCTION

The good news from the nutrition community is that stunting and deficits in height-for-age z-scores (HAZ) are less common than ever before. The prevalence of stunting among children under 5 years declined by almost a third from 2000 to 2017, with Asia seeing prevalence drop by over 40% from 38% to 23%, and Latin America limiting stunting to under 10% of the population, a decline of 46%. Overall stunting has declined at about 1% per year.[1] However, the problem persists: even before COVID-19, the Sustainable Development Goals relating to nutrition were seen as unlikely to be reached.[2]

Cash transfers (CTs) are an increasingly common means of social protection, with participants numbering as high as a billion in 186 countries, including a recent surge in programme development and implementation in 2020.[3] The 2013 Lancet series on maternal and child nutrition inspired an increase in programmes targeting these outcomes[4] and a resurgence in programme

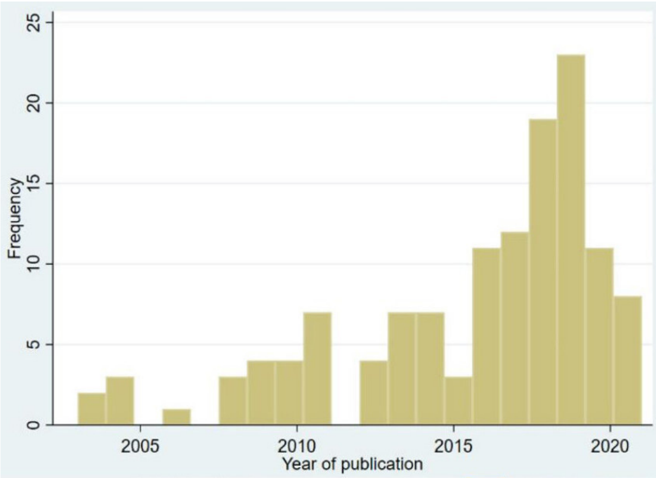

Figure 1 Year of publication for sources contained in this review.

evaluations is underway today (see figure 1), with eight published in the first 3 months of 2021, more than were published in any given year until 2016. The subsequent years saw a further profusion of trials and studies, reaching a peak (so far!) in 2019.

The evidence base for CTs continues to grow, with systematic reviews of the impacts of CT programmes on child nutrition finding effects that are positive but small.[5–9] In the current paper, we update the findings of the last such review for this very productive period, nearly doubling the set of papers included. We find that this added evidence gives us comparable results in most cases, with the most significant update being an increasing impact associated with wasting.

METHODS

Search strategy and study selection

Because this work is an extension of a previous effort,[5] the criteria are the same. While the previous paper used studies available as of 2018, the current effort expands the pool of evidence to include studies through March of 2021.

To reiterate, for this systematic review and meta-analysis, we searched for studies with (1) clear counterfactuals, including randomised control trials; (2) estimates of impact on one or more of our targeted outcomes with standard errors reported; (3) 300 or more observations on the outcome; in (4) countries with gross domestic product of under US$10 000 and (5) substantial literature not covered in existing meta-analyses. For this reason we do not cover low birth weight.[10] We also excluded programmes providing cash for work and eliminated programmes that provided recipients only one or two disbursements in total. Finally, we limited our sample to those studies examining children under the age of 60 months unless we were considering only (secondary) dietary household outcomes. In no case did we consider adult outcomes such as overweight or obesity.

After 'snowballing' references from researchers active in the area and perusing key background sources[6–9] we searched Google Scholar, Agris, Econlit, Eldis, IBSS, IDEAS, IFPRI, PubMed and World Bank using two terms: " cash transfer " and either " child health" or " child nutrition." Searches were limited to articles published from 2018 to March 2021 in peer-reviewed or grey literature. Searches were carried out in English, though the snowball ended up identifying three Spanish studies that were included in our final set.

Data collection and analysis

The title and abstract searches were each carried out by JM and an assistant in Spring of 2021. Search results were compiled separately and based on the articles compiled; data was created independently from included studies and reconciled through discussion.

Data extraction tables included the following information: year of study, whether the document was published in a peer reviewed journal, transfer amount, programme characteristics including conditionality (and type of conditionality) as well as provision of clinic access, nutritional supplements and behaviour change communication (BCC). Household characteristics include mean child age, age and education of household head, age and education of child's mother, household size, share of the sample in urban areas and household size. The primary outcome measures were anthropometric markers of nutritional status: height for age z-score (HAZ) and weight for height z-score (WHZ) as well as stunting and wasting. The secondary outcomes measures were markers of immediate and underlying determinants of malnutrition, specifically dietary diversity, the consumption of animal-source foods and the prevalence of diarrhoea. In some studies, animal-source foods refer to the probability of a household consuming animal source foods in a given time period, and in others it refers to the share of the household budget spent on such foods. (Results were combined since both reflect increased consumption, but separate results are also reported below.) Dietary diversity was based on a Household Dietary Diversity Score (HDDS) of defined food groups: while the majority of our studies operationalise this outcome using the HDDS based on 12 food groups, some studies used indices with fewer groups. (We break down results by whether or not HDDS is used.) Finally, we track the incidence of child diarrhoea defined as three or more watery stools occurring in the previous week or, in some cases, in the previous month.

We estimated the pooled effect sizes via the metan command in STATA V.15.1, using random effects (DerSimonian-Laird methodology) to take into account differences between studies.[11] A forest plot was created for each outcome including HAZ, WAZ, WHZ, wasting, stunting, animal-source foods, dietary diversity and diarrhoea. We used a series of simple meta-regressions to test a variety of programme, study, and household characteristics against each outcome. We carried out sensitivity

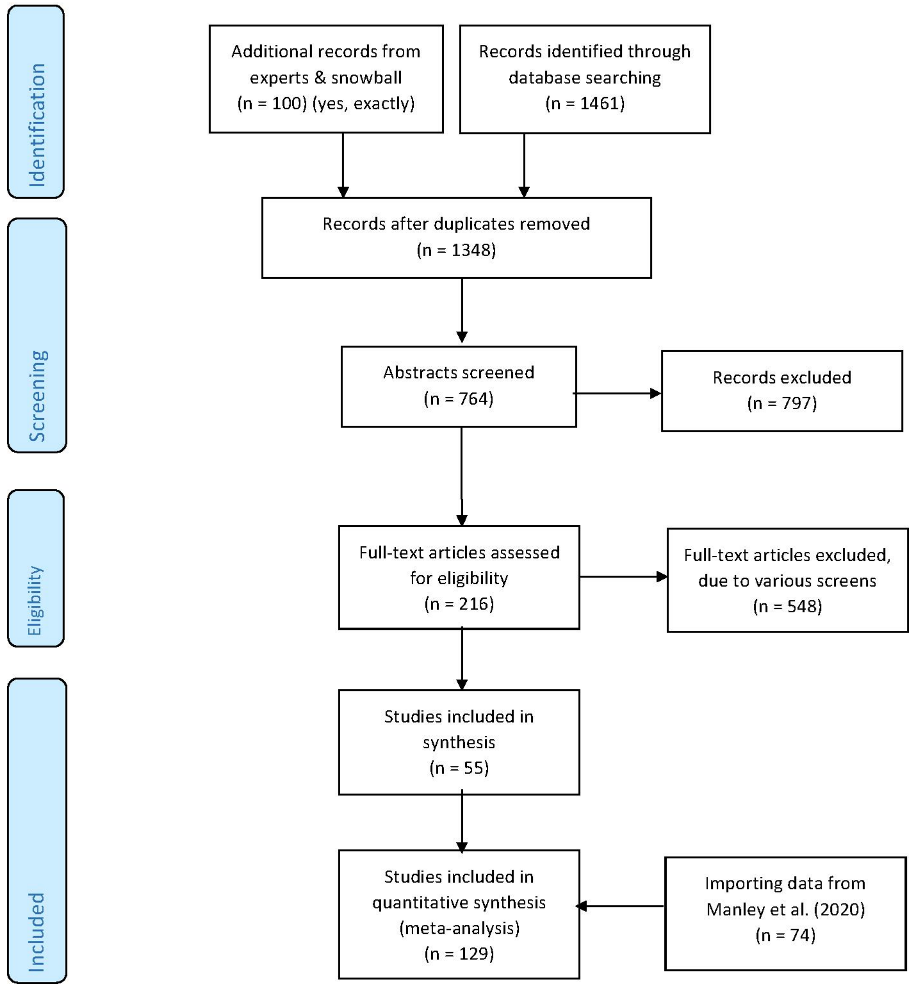

Figure 2 PRISMA flow diagram. PRISMA is Preferred Reporting Items for Systematic Reviews and Meta-Analyses; see http://www.prisma-statement.org/.

measures, including comparing the current results against the results of the 2020 review,[1] and breaking down results by child age and global region. Finally, we used a funnel plot to investigate publication bias.

Patient and public involvement

Patients and members of the public were not involved in the research. Experts from a variety of fields including nutrition and social protection were consulted as the direction of the project was decided, and representatives of many organisations continued to guide the work throughout the data collection, research and analysis process.

RESULTS

From the search strategy, we identified 1561 studies; of those, 764 titles and abstracts were from articles that were considered relevant and screened. The full text of 216 studies were examined for eligibility and after applying inclusion and exclusion criteria, 55 studies of 33 CT programmes were included (figure 2). To these we added the 74 estimates from the previous work to push the total to 129 observations. Online supplemental appendix 1 is the full set of papers included in the meta-analysis.

Table 1 shows the summary statistics of the studies included in the meta-analysis. Sample sizes vary widely, from 322 to 58 623, with a mean of 3547 and median of 2151. The median study took place in 2012, and the median study duration was 2 years, with 103 of 129 studies (80%) lasting 3 years or less. Half of the studies (66 of 129) appeared in peer reviewed journals. Programme participants received transfers worth USD$90 on average (deflated to 2015 US$) an increase of 28% of their income (for those reporting it as a percentage). Of 120 studies reporting, 61 transfers are monthly, 39 are bimonthly, 13 are quarterly, and a few others are on different schedules. Among studies included in this analysis, 43%, of programmes set conditions on recipients: among programmes setting conditions, 76% of CCTs required households to send school-age children to school and 91% required health services. (Enforcement of conditions was variable and was not tracked.) Approximately 43% of programmes provided health services and BCC interventions.

Table 1 Characteristics of studies included in the meta-analysis

	Obs	Mean	SD	Min	Max
Study					
Study sample size	129	3546.64	6207.27	322	58 623
Year of data collection	129	2011.13	5.50	1993	2020
Total years of study	129	2.40	1.74	0	10
Published study	129	0.51	0.50	0	1
Transfer size					
Real transfer amount, US$	127	89.71	104.68	5.3	908
Transfer, % of income	85	26.67	31.59	1	218
Log (real transfer)	119	3.99	0.97	1.7	6.8
Programme characteristics					
Conditional programme	129	0.43	0.50	0	1
Health services access	129	0.48	0.50	0	1
Behaviour change communication (BCC)	129	0.44	0.50	0	1
Participant characteristics					
Mother’s age	44	28.43	7.38	15	56
Child age	80	24.33	19.43	0	126
% of sample urban	90	0.16	0.29	0	1
Context					
Sub-Saharan Africa	129	0.42	0.50	0	1
Latin America	129	0.32	0.47	0	1
South Asia	129	0.14	0.35	0	1
East Asia	129	0.09	0.28	0	1
BCC types					
BCC on IYCF	57	0.77	0.42	0	1
BCC on household nutrition	57	0.72	0.45	0	1
BCC on healthcare	57	0.86	0.35	0	1
BCC on WASH/ hygiene	57	0.74	0.44	0	1
BCC with business/ag training	57	0.23	0.42	0	1

.IYCF, Infant and Youth Child Feeding; WASH, Water, Sanitation and Hygiene.

At the time of measurement, the average child was 24 months old and the majority (84%) lived in a rural area. Fifty-four of the 129 studies took place in sub-Saharan Africa, while 41 are from Latin America. (Five studies were from the Middle East/ North Africa region, not shown.) While almost half of the programmes included some form of BCC the type of instruction varied, with about a third providing instruction on childcare, about a third providing general nutrition information, and 40% addressing ‘health education’ directly, including in some cases reproductive health and knowledge about disease prevention.

The new sample improves the regional mix of included studies. While in an earlier study[5] about half of the included programmes were from Latin America and the Caribbean, in this review the number has dropped to 32%. More studies are coming from sub-Saharan Africa and South Asia: while the previous review included results from 26 studies from sub-Saharan Africa, the evidence base for this paper has more than doubled this subset to 54 studies. Likewise, while there were just 6 studies from South Asia in the last review, that number has tripled to a total of 18 studies, and East Asia’s representation has gone from 5 to 11.

Table 2 shows sample statistics for the primary and secondary outcomes of interest. The median programme has an impact of just 0.02 SD on the HAZ score while the mean is 0.05. Impacts on WAZ and WHZ are also positively skewed; WAZ has a median of 0.002 and a mean of 0.008, while WHZ has a median impact of 0.011 and a mean effect of 0.058. Both stunting and wasting show small reductions overall, with mean effects of 0.4% and 1.2%. All of the secondary outcomes have the expected signs, with consumption of animal source foods increasing by 14% on average as a treated household consumes food from 0.63 additional food groups. Finally, diarrhoea

Table 2 Unweighted sample statistics of dependent variables

Outcome	Obs	Mean effect size	SD	Min	Max
Height for age z-scores	77	0.05	0.23	– 0.34	1.2
Weight for age z-scores	32	0.01	0.18	– 0.64	0.46
Weight for height z-scores	40	0.06	0.37	– 0.68	1.8
Stunting (%)	41	– 1.16	4.25	– 10	11
Wasting (%)	25	– 2.97	8.29	– 40	6
Animal-source foods (% of days or budget)	46	14.19	21.12	– 22	100
Dietary diversity (food groups)	29	0.63	0.64	– 0.13	2.4
Diarrhoea incidence (%)	24	– 1.98	4.05	– 15	4

declines among programme participants by about 2% on average.

Meta-analysis results

Table 3 summarises the results of the meta-analyses. (For full forest plots, see online supplemental appendix 3) For HAZ, data were available from 77 studies. On average, the pooled effect size associated with CT programmes on HAZ scores was 0.024 (95% CI 0.00 to 0.05; p<0.02). For WAZ, data from 32 studies has a pooled effect size associated with CT programmes of 0.02 (95% CI –0.02 to 0.06; p<0.37). For WHZ, data from 40 studies have a pooled effect size of 0.03 (95% CI –0.01 to 0.07; p<0.19). Forty-one studies found effects on stunting, and on average, CT programmes decreased stunting relative to baseline by 1.4% (95% CI 0.3% to 2.4%; p<0.01). From 17 studies, CT programmes were found to decrease wasting by 1.3% (95%CI 0.5% to 2.2%; p<0.01).

Consumption of animal-source foods increased by an average of 6.7% (95% CI 5.2% to 8.2%; p<0.01). Separately, considering studies examining the share of household food budgets, we see a pooled effect size increase of 1.8% (95%CI 0.6% to 3.0%; p<0.01) while studies reporting changes in the probability of consumption found an increase of 11.5% (95% CI 8.8% to 14.2%; p<0.01).

Of 29 studies with data on the diversity of diets, children enrolled in CT programmes had increased diet diversity with the number of food groups consumed increasing by 0.39 (95% CI 0.34 to 0.44; p<0.01). Considering only the 17 papers using the HDDS 12 group measure, the pooled effect is 0.42 (95% CI 0.33 to 0.51; p<0.01).

Of the 25 studies which estimated programme effects on the incidence of diarrhoeal disease, an average decrease of 1.7% (95% CI 0.68% to 2.79%; p<0.01) was found among CT programme participants.

Table 4 shows that the sample sizes have increased substantially compared with earlier studies, and, thus, the p values reflect smaller confidence intervals around the outcomes. Effect sizes are largely unchanged, however, moving towards zero in most cases. The point estimates on wasting and animal source foods have increased slightly, and the biggest change in significance is increased confidence that effects on wasting are more than we can attribute to chance.

Subgroup results/sensitivity

Table 5 is the first of our sensitivity analyses. In each case we limit the analysis to studies from a particular region and report the results of the meta-analysis. South Asia shows the largest effects on several outcomes, and is the only region in which height for age shows a significant improvement. We see that measures of child weight are uniformly unaffected by CTs in any region. Effects on wasting are strongly significant in sub-Saharan Africa; while the point estimate on wasting effects is larger in South Asia, it is only significant at the 10% level.

Table 3 Effects of cash transfer programmes on child nutrition outcomes

Outcome	Effect size	P value	95% CI	N
Height for age z-scores	0.024	0.019	(0.004 to 0.044)	77
Weight for age z-scores	0.019	0.37	(– 0.022 to 0.059)	32
Weight for height z-scores	0.028	0.19	(– 0.013 to 0.069)	40
Stunting (%)	– 1.35	< 0.01	(–2.34 to 0.35)	41
Wasting (%)	– 1.31	< 0.01	(–2.16 to 0.46)	25
Animal-source foods (%)	6.72	< 0.01	(5.24 to 8.20)	46
Dietary diversity	0.55	< 0.01	(0.30 to 0.81)	29
Diarrhoea incidence (%)	– 1.74	< 0.01	(–2.79 to 0.68)	25

All results are from random-effects meta-analysis.

Table 4 2020 study results* 5 versus 2021 results

Outcome	2020* Effect Size	2020* P value	2020* N	2021 Effect Size	2021 P value	2021 N
HAZ	0.026	0.029	46	0.024	0.019	77
WAZ	0.023	0.41	19	0.019	0.37	32
Stunting (%)	– 2.11	< 0.01	27	– 1.35	< 0.01	41
Wasting (%)	– 1.22	0.06	17	– 1.31	< 0.01	25
Animal-source foods (%)	4.47	< 0.01	20	6.72	< 0.01	46
Dietary diversity	0.73	< 0.01	13	0.55	< 0.01	29
Diarrhoea incidence (%)	– 2.72	0.048	9	– 1.74	< 0.01	25

In the previous paper, WHZ was not included, and in the present analysis child illness was excluded, so neither appears here.
*5
HAZ, height-for-age z-scores; WAZ, weight-for-age z-scores.

Animal-source foods and diarrhoea incidence show the expected signs and are significant at the 5% level or better.

Next, we consider separately studies investigating programme effects on children under age 2 separate from those reporting on older children (table 6). The smaller sample sizes reduce statistical power, but the effect sizes of CTs on all outcomes except diarrhoea are higher (or comparable) and more statistically significant for children over 2 years old. None of HAZ, WAZ, WHZ and wasting are significant for children under age two. WAZ and WHZ are insignificant for both age groups.

We then review the results of the meta-regression analysis, for which we analysed separately the associations between each outcome and all covariates listed in table 1. While the full results appear in online supplemental appendix table 2, table 7 here includes only outcomes and programme or study characteristics for which we observed at least one significant result.

Transfer size is positively correlated with both dietary diversity and HAZ. We also see a slightly higher result in published studies examining these two outcomes, which may point to publication bias. Accordingly we report the results of a meta-funnel plot below. However, unlike a 2016 review[8] (but similar to a 2020 review)[5] the funnel plot shows no evidence of bias.

Continuing in table 7, the next three covariates (conditional programme, BCC and Latin America) all have a positive and significant impact on wasting, counter to the expected result. Most likely these odd results are due to the low numbers of observations in each group. As we saw in table 5, only three studies from Latin America report impacts on wasting, and all three are conditional programmes that provided BCC. This implies that programmes like Mexico's PROGRESA/Oportunidades/Prospera differed from programmes in other locales, perhaps partly because programme participants were not

Table 5 Sensitivity analyses: regional analysis

Outcome	Latin america Effect size	Latin america N	Sub-Saharan Africa Effect size	Sub-Saharan Africa N	South asia Effect size	South asia N	East Asia Effect size	East Asia N
HAZ	0.02	27	0.00	28	0.07†	14	0.03	5
WAZ	– 0.03	9	0.03	14	0.08	5	0.00	4
WHZ	0.03	5	0.01	15	0.04	14		
Stunting (%)	– 2.72‡	8	– 0.65	14	– 2.01†	11	– 0.84	8
Wasting (%)			– 1.88*	8	– 2.15‡	7	– 1.00	5
Animal-source foods (%)	3.07*	11	8.21*	19	12.10*	7	10.88†	6
Dietary diversity			0.65*	21				
Diarrhoea incidence (%)			– 2.37†	8	– 1.31†	9	– 2.22‡	4

Five studies from the Middle East/ North Africa were not enough to support analysis.
In this and all tables,
*indicates significance at the 1% level;
†is for 5%.
‡is significant at the 10% level only
HAZ, height-for-age z-scores; WAZ, weight-for-age z-scores; WHZ, weight for height z-score.

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Table 6 Sensitivity analyses: child age

	Under 24 months			24–60 months		
Outcome	Effect size	P value	N	Effect size	P value	N
HAZ	0.02	0.41	35	0.05	0.006	27
WAZ	– 0.04	0.09	13	0.06	0.09	10
WHZ	0.00	0.91	17	0.02	0.74	13
Stunting (%)	– 1.65	0.03	18	– 1.64	0.047	16
Wasting (%)	– 0.42	0.63	9	– 2.04	0.000	9
Diarrhoea Incidence (%)	– 1.79	0.042	11	– 1.60	0.20	5

Food consumption variables are assessed at the household level and so we cannot break them down using age groups. Note that some studies report that results reflect all children under 60 months without providing enough detail to disaggregate; these studies are excluded from this table.
HAZ, height-for-age z-scores; WAZ, weightt-for-age z-scores; WHZ, weight-for-height z-scores.

initially as undernourished as households in sub-Saharan Africa or South Asia.

The last four rows of table 7 show the impacts of different types of BCC on various outcomes. BCC that provided IYCF is weakly correlated with HAZ alone, while BCC that provided instruction on household nutrition is associated with improvements in HAZ, stunting and diarrhoea. BCC focused on healthcare has a high estimated impact on diarrhoea. Finally, the covariate showing significant associations with the most outcomes is Water, Sanitation and Hygiene (WASH)/hygiene-based BCC, which is associated with improvements in HAZ, stunting, animal-source foods and diarrhoea prevalence.

DISCUSSION

A 2020 systematic review and meta-analysis based on 74 studies dated as recently as 2018 found that an average programme increases HAZ by 0.03. In the present work, we update estimates to include an additional 55 studies from the years 2018 to 2021, allowing a larger meta-analysis of 129 estimates. The results are in line with previous efforts: the overall effects of CT programmes on HAZ and stunting continue to be statistically significant but small in size, with impacts on HAZ of 0.024 and on stunting of 2.1%. In line with a previous study,[12] HAZ impacts continue to appear larger among older children though the same study finds that stunting and deficits in (HAZ) happen more often prior to 24 months of age.

CT programmes mostly show no impact on child weight outcomes with the exception of wasting, an outcome for which this paper is among the first to find a significant decrease. Importantly, the sample is relatively small for these outcomes (WAZ and WHZ); increasing sample size will increase power, so perhaps lower p values are possible with more data. Finally, we also see added support for the importance of increasing transfer size, which is positively

Table 7 Meta-regression analysis: the effect of selected characteristics of CT programmes on selected outcomes

	HAZ	Stunting	Wasting	ASF	Diet	Diar
Total years studied	0	– 0.52	– 0.21	– 0.79	– 0.23†	– 0.37
Published study	0.05‡	– 1.51	0.56	2.80	0.35‡	– 0.33
Transfer, % of income	0.001†	0.03	– 0.01	0.11	0.02*	0.05
Conditional programme	0.01	0.46	1.48‡	– 3.10	– 0.18	0.89
Behaviour Change Communication	0.05	– 1.02	0.97‡	2.77	0.22	– 2.72†
Latin America	– 0.02	– 1.63	2.69*	– 6.43	0.15	– 1.78
BCC: IYCF	0.06‡	– 1.32	– 0.02	3.3	0.22	– 1.74
BCC: household nutrition	0.07†	– 2.11‡	– 0.43	4.85	– 0.08	– 2.42†
BCC: healthcare	0.02	– 0.54	– 0.09	– 2.41	0.05	– 3.03†
BCC: WASH/hygiene	0.06†	– 3.26*	– 0.87	6.84*	– 0.02	– 2.94†

Insignificant coefficients between ±0.005 are indicated by 0.
*Indicates regression coefficients significant at the 1% level.
†For 5%.
‡At the 10%.
ASF, animal source foods; BCC, behaviour change communication; CT, cash transfer; IYCF, Infant and Youth Child Feeding; WASH, Water, Sanitation and Hygiene.

linked to HAZ, dietary diversity and the consumption of animal sourced foods.

The latter two observations are a generally observed outcome of any increase in household resources as low-income households commonly spend a half or more of additional income on food expenditures with proportional increases of animal sourced foods generally greater than those for grains and tubers.[13]

However, improved anthropometry is not automatically associated with relatively modest income increases. This result may link to anther main result of interest: the association of certain types of BCC with a variety of outcomes from anthropometrics to morbidity. While previous efforts included only a blanket identification of BCC as a programme component, breaking it down by the type of communication indicates relatively strong associations. A concern is that some types of BCC are correlated with higher transfer amounts, though results are robust to limiting the sample to smaller transfer amounts. In particular WASH/hygiene BCC is effective in improving a variety of outcomes, a result that differs from another recent review.[14] Yet another review[15] comparing cash against cash plus nutrition-sensitive BCC finds that a meta-analysis of seven studies, including one study of cash for work, shows no significant association with stunting. That same work finds an intriguing impact of cash combined with food, something we had not tracked. Even with limited impact on stunting, reducing diarrhoeal incidence affects dehydration which is an important cause of mortality in low-income and middle-income countries.[2]

A number of limitations of the current work persist. First, this analysis remains at the meta-level; gathering a larger set of microdata along the lines of this study[16] would enable finer resolution on outcomes and the consideration of a much greater variety of covariates. Second, the data collected by this search is limited by the choice of terms: while 'child nutrition' and 'child health' are broad terms, other studies, for example, examining strictly household outcomes like diet quality might have been overlooked. Third, this analysis depends on the data collected, and most extant studies are of relatively short duration and only track outcomes shortly after programme cessation. Fourth, the realities on the ground are almost always different than expected, and implementation remains challenging particularly in remote contexts.[17]

As the world looks to recover from the global pandemic, it is good to know that some tested solutions are available, and that CTs are increasingly implemented around the world. The demonstrated effectiveness of BCC represents another tool in our response kit as we seek progress toward the sustainable development goals.

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Contributors JM conducted the review including the systematic search, selected studies for inclusion, and extracted the data with help from an assistant. HA, UG and JM substantially revised the paper and sharpened the analysis. JM did the analysis, generated figures, wrote the manuscript with input from all other authors, and is the guarantor of the work. All authors critically engaged with the manuscript and approved the final submitted version.

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Ethics approval This study does not involve human participants.

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Data availability statement Data are available on reasonable request. All data used are found in other papers; we compiled them for use in the meta-analysis. The contact author will provide them free on reasonable request.

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