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Nutritional Impact of the Child Grant

An Evidence from Karnali Zone, Nepal

Tomoo Okubo

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Social Policy and Economic Analysis Section
UN House, Pulchowk, PO Box 1187
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Tomoo Okubo
Associate Policy Analyst
United Nations Children's Fund
Nepal Country Office
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Executive Summary

This study investigates the effect of the Child Grant (CG), a cash transfer programme for children under 5 years of age, on child nutrition in the Karnali zone, Nepal. While the programme has reached over 550,000 children in Nepal and over 90,000 children in Karnali districts, there has been little evidence of the impact of CG, especially on nutritional outcomes. Based on a survey of 3,750 households with at least one child aged under 5 years in Karnali Zone, this research analyses quantitatively the changes in the three indicators of undernutrition (i.e. underweight, wasting and stunting) associated with the CG. Since the actual amount of transfer varied widely among the recipient households due to weak implementation, the study uses the amount of the CG received per child in the 12 months preceding the survey as the main independent variable of interest. It was revealed that higher amount of CG is associated with reduction in underweight and severe wasting. For instance, the prevalence of underweight decreased from 42.5 per cent for non-recipients to 34.5 per cent for children who received the full amount of CG, a decrease by 8 percentage points (18.8 percent). The model projects that, if the amount of CG increases to NRs 500(USD $5) per month from the current NRs 200 (USD $2), the prevalence of underweight will decline to 23.8 per cent. This finding is supported by the analysis of the immediate causes of undernutrition, which revealed that the recipient households of CG were more likely to obtain desired amount and frequency of meals. Based on the findings, this study suggests scaling-up the CG, as well as increasing the benefit amount to improve child nutrition in Nepal.

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1. Introduction

While Nepal has achieved significant progress in poverty reduction since 2004, the nutritional status of children remains as a major concern (World Bank 2014). According to the Nepal Demographic and Health Survey in 2011 (NDHS), 29 per cent of children under 5 years of age are underweight, 11 per cent are wasted and 41 per cent are stunted. The situation is even more worrying in the Karnali zone, one of the poorest and most remote area in the Mid-Western Development Region of Nepal. 39 per cent of the under-five children are underweight, 12 per cent are wasted and 58 per cent are stunted (GoN, UNICEF and VaRG forthcoming)

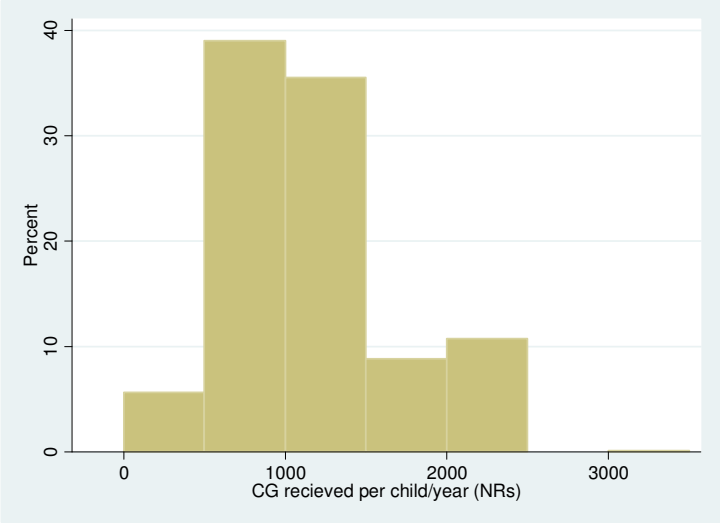
The Government of Nepal (GoN) first introduced the Child Grant (CG) in fiscal year 2009/2010, in the context of an expansive set of social protection policies. As stated in the national budget speech of the fiscal year 2009/2010, the objective of this program was specifically to improve the nutrition of children (MoF 2009). Eligible children, up to two per family, are entitled to a benefit of NRs 200 per month per child (almost equivalent to USD $2). While the government initially indicated its intention of scaling up the program nationally to reach all children under the age of 5, the coverage was limited to five Karnali districts (Jumla, Humla, Kalikot, Dolpa and Mugu) and to children from poor *dalit* families, a marginalized caste group formally known as 'untouchables', across the country due to limited resources. Since the introduction of the program, none of the design elements have been revised and the benefit amount has not been raised.

Two surveys have been conducted to assess the implementation of the program and its impact on a range of outcome indicator. A cross-sectional survey on nutrition and social protection was conducted by the GoN, UNICEF and Valley Research Group (VaRG) to assess the implementation status of the CG in the Karnali zone. The study found relatively high coverage rate for a remote area. 78 percent of eligible families had received the CG in the previous year and 83 percent reported having ever received the CG. Some positive changes associated with the CG were also documented, including the increase in birth registration rate - 90 per cent in Karnali against the national average of 42 per cent (GoN, UNICEF and VaRG, 2014). On the other hand, constraints and challenges were revealed, such as the low level of benefit, low coverage among under-two children, and delay in cash delivery. Another study was conducted by ODI and NEPAN to analyse the effect of the CG on social inclusion (Adhikari et.al., 2014). Using propensity score matching method, the study compares several outcomes across the treatment group (beneficiary of the CG, children aged 0-4 years) and the control group (non-recipient of the CG, children aged 5-10 years). Overall, the study did not find any statistically significant on expenditure and food security score, leading to suggest an increase in the benefit amount.

This research fills the gap in scientific evidence that sheds light on the possible impacts of CG in the following three ways. First, the study evaluates the nutritional impact on under-five children based on anthropometric measures. This is in line with the primary policy objective of CG, which is to improve the nutritional status of under-five children. To further study the theory of change, linkages between CG amount received and the immediate causes of undernutrition (i.e. inadequate dietary intake and disease) were analysed, building on UNICEF nutrition framework.

Second, this study breaks down the treatment group (the actual recipients of CG) by the amount of CG received in the twelve months preceding the survey. This is an important consideration, given the fact that the amount of CG received varied across households (Figure 1). While the formal rule states the annual transfer to be NRs 2400 per child, more than half of the recipients in the sample received less than or equal to NRs 1,000 and the average amount received among the beneficiaries was NRs 1,045 per child (with standard deviation NRs 579). While the underlying causes of payments that are lower than stated in official rules are not yet fully understood, the previous studies point out the implementation issues on the supply side, such as delay in delivery, irregularities in the application process and infrequent payments (Adhikari et. al., 2014; GoN, UNICEF and VaRG, 2014).

Figure 1 Amount of Child Grant Received Per Child



Source: Author's Calculation based on GoN, UNICEF and VaRG (2014)

Considering the wide range in the benefit amount, we use the amount of CG received as the key independent variable.

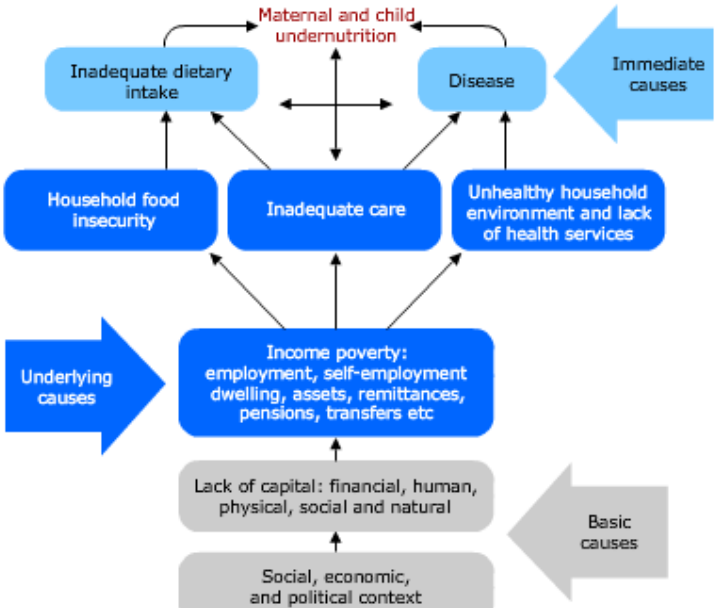
Third, the study adopts multivariate Probit model in order to control for the observable characteristics and to conduct prediction of outcomes with the increase in CG amount. This enables us to control for the impact of demographic and socioeconomic characters of the households and to eliminate any biases associated with systematic difference in the characteristics between the recipients and non-recipients of the CG. For example, coverage rate of the CG is significantly lower among the children under 1 year of age since the birth registration process was delayed (GoN, UNICEF, VaRG 2014). For this reason, age of the child was controlled. More detailed description of the control variables are presented in the following section.

2. Methodology

2.1 Conceptual Framework

This study builds on the nutritional framework that recognises the underlying causes of undernutrition including the environmental, economic, and political contextual factors, in particular poverty (Figure 2). The framework has been used as a basis for academic research as well as for policy planning for over 25 years in the nutrition community (Black et al., 2008, UNICEF 2014). The theory of change, as well as the selection of control variables follow this nutrition framework. In theory, the CG contributes to address the underlying causes of undernutrition that stems from income poverty, and improves the nutritional status of children by reducing the incidence of inadequate dietary intake and disease.

Figure 2 UNICEF Nutritional Framework



Source: UNICEF (2014)

2.2 Dataset

The study uses a unique dataset collected by GoN, UNICEF and VaRG in 2013 to investigate the nutritional status and infant and young child feeding (IYCF) practices in the Karnali zone. 750 households with children under the age of 5 per district were interviewed in five districts which gives a total sample size of 3,750. The households were selected based on a two-stage cluster design. First, 30 clusters (wards) were chosen from each district based on probability proportional to size (PPS) principles. Second, within each selected cluster, 25 eligible households were identified using systematic random sampling procedures. Households were considered eligible if there was at least one child aged less than 60 months regardless of their regardless of their enrolment status in the CG programme. Where there was more than one age-eligible child in a household, a single child was randomly selected for enumeration. In cases where sampled clusters were too small and did not have 25 eligible households, an adjoining ward was merged and the two were treated as a single cluster. The survey covered cross-sectional information including the general characteristics of the household, water, hygiene and sanitation, food security, IYCF practices, prevention and control of diseases, social protection and household expenditure, and anthropometric measurements.

2.3 Outcome Variables and Model Selection

The first set of outcome indicators were constructed to assess the association between the CG and three indicators of undernutrition (i.e. underweight, wasting and stunting) defined by the 2006 WHO growth standards (WHO 2006). Underweight is defined as weight-for-age below -2 z-scores the median, while severe underweight is defined by a very low weight-for-age (below -3z scores of the median). Wasting and stunting are defined as a weight-for-height and height-for-age below -2 z-scores, respectively. Likewise, severe wasting and stunting are defined below -3 z-scores of the same indicators. Additionally, indicators related to the immediate causes of undernutrition (i.e. inadequate dietary intake and disease) were analysed to understand the mechanism in which CG might have affected the nutritional status of children. The first set of indicators capture the changes in dietary intake by asking if the family had to reduce the amount or frequency of the meal due to food shortage in the four weeks preceding the survey. Households also reported if the child was sick in the two weeks preceding the survey.

As binary outcome variables were constructed from anthropometric indicators following the WHO 2006 standard (e.g. underweight or not), Probit model was used as the main tool for analysis. Logit model were used for robustness check. Stata 12 was used as the statistical package for analysis.

2.4 Independent Variables

The main variable of interest is the amount of CG received per child in the 12 months preceding the survey. This approach allows us to consider the wide range in actual transfer amounts. Additionally, household characteristics that might be correlated with both the outcome and CG transfer amount were controlled to isolate the effect of the CG. These variables were selected following the nutritional framework, and from relevant previous literature (Crum et al., 2013, UNICEF 2014).

Different sets of control variables were selected in order to verify the robustness of the model and the theory of change. Seven different combinations used for the analysis can be found from Table 2 to Table 8 in the Appendix. First specification does not control for any character to observe simple relationship between nutritional status and CG amount received. In the second specification, age and age squared are controlled as younger children were more likely to be non-recipients due to delay in birth registration process (GoN, UNICEF and VaRG 2014). The third specification controls for basic and underlying causes that could have affected beneficiary status and nutritional outcomes. These include district of residence, socioeconomic status (SES) index[1], number of children aged 0-4 and household size, mother's highest education level and ethnicity. Fourth and fifth specification adds variables relevant to two underlying causes, unhealthy household environment and inadequate care. The fourth specification controls for the environment (main source of drinking water and access to toilet facility) and the fifth controls for behaviour (habit of hand washing with soap). In the sixth specification, other in-kind support[2] (flour and rice) and total value of other cash transfer programmes per capita (old age pension, disability grant, widow allowance, scholarships and tiffin) are controlled to isolate the benefit from the CG. The last specification uses the Logit model instead of Probit model to check robustness across different assumption of the statistical models. Descriptive statistics of each variable is provided in Table 1 of the Appendix.

[1] The SES index was constructed based on several housing characteristics (roof and wall material, number of rooms per member, and land ownership) and ownership of selected household items (electricity, radio, television, and mobile phone). Households were ranked into categories of five wealth quintiles based on the value of the wealth index.

[2] It should be noted that the amount of in-kind transfer was unknown due to the limitation of questionnaire.

2.5 Limitations

Since the beneficiaries of the CG were not randomly assigned, it was not possible to control for unobservable factors that could have influenced both the amount of CG received and the outcome. In the absence of randomisation, this study addresses the selection bias by using the econometric techniques and control variables described above[3].

Additionally, the dataset did not contain information about the participation in the infant and young child feeding practice training provided in Karnali zone with the support of UNICEF. This training was provided at two different levels; one targeted to the village development committee (VDC) secretariats, social mobilizers, female community health volunteers and the other for the community members. The training covered practical knowledge and skills about infant and young child feeding practices, health and hygiene. Thus, when the results are interpreted, the existence of complementary educational program should be also taken into account.

[3] It is not straight-forward to estimate the effect of selection bias. For example, if any unobservable factors correlate positively both with the amount of CG received and nutritional outcomes (e.g. attitude towards child health), the results could be an overestimate. On the other hand, there could also be a negative reverse causation, where worse nutritional status of children drives mothers to claim for the CG. In this case, the results could be an underestimate.

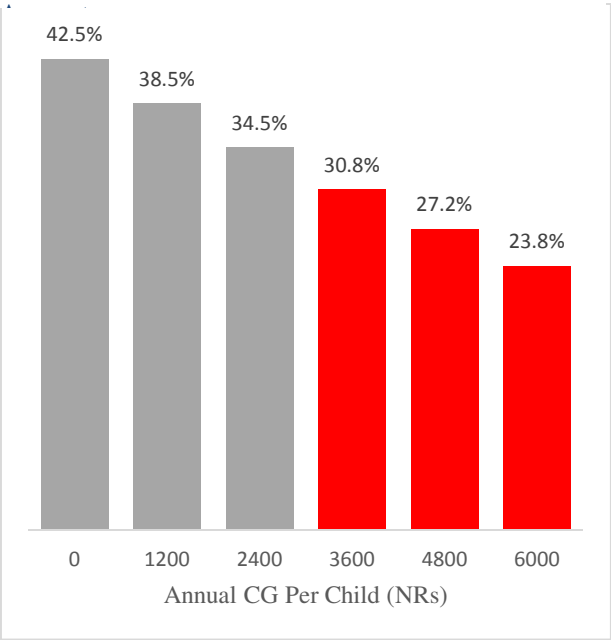
3. Results

3.1 Underweight

An increase in the amount of CG received was associated with a decline in underweight rates at 5 percent significance level when household's characteristics were controlled. The result is robust across different econometric specifications (Table 2).

Figure 3 shows how the underweight rate decreases as the CG amount rises. While the prevalence of underweight was 42.5 per cent for those who did not receive the CG, the rate falls by 8 percentage points (18.8 percent) to 34.5 per cent when a family received the full amount of CG (NRs 2400).Our regression model also allows us to predict the decrease in underweight rate, when the amount CG is further raised. An increase from NRs 200 per month to NRs 300 is predicted to cut the underweight prevalence to 30.8 per cent. Further, an increase to NRs 500 per month is predicted to further lower the underweight prevalence to 23.8 per cent. As presented in figure 3, the prevalence of underweight shows linear decrease up to NRs 2400 (NRs 200 monthly), but the rate of reduction becomes smaller as the amount of transfer increases.

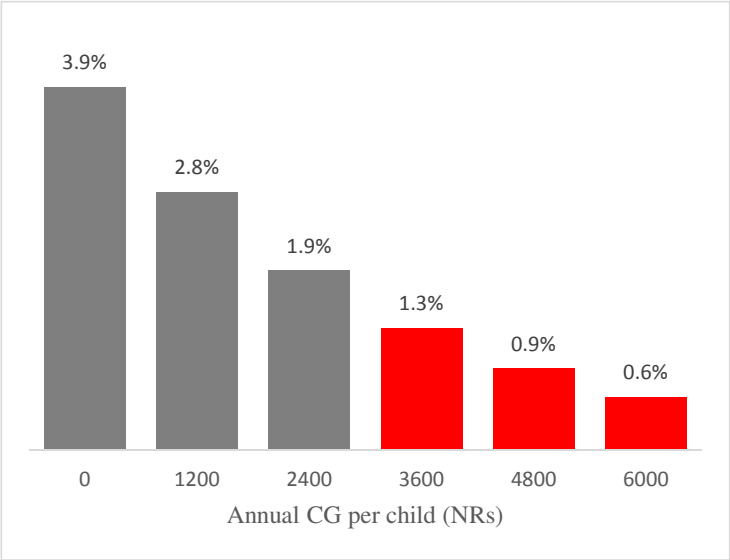
Figure 3 Simulated Prevalence of Underweight by CG



3.2 Wasting

An increase in the CG was associated with the reduction in the prevalence of severe wasting at 10 per cent significance level when Probit model was applied and household covariates were controlled for (Table 3). 3.9 per cent of the non-recipients were severely wasted, while the rate decreases to 1.9 per cent for the children who received the full amount of CG. This is equivalent to 51.3 percent decrease in the prevalence of severe wasting. Likewise, it is predicted that the prevalence of severe wasting will decrease to 1.3 per cent under NRs 300 per month scheme and to 0.6 per cent under NRs 500 scheme. The correlation between moderate level of wasting and the CG was not statistically significant (Table 5).

Figure 4Simulated Prevalence of Severe Wasting by CG Amount



3.3 Stunting

The relationship between the CG and stunting was weak and was not statistically significant at 10 percent significance level, for both moderate and severe prevalence of stunting (Table 6 and 7). The potential reasons are discussed in the following section.

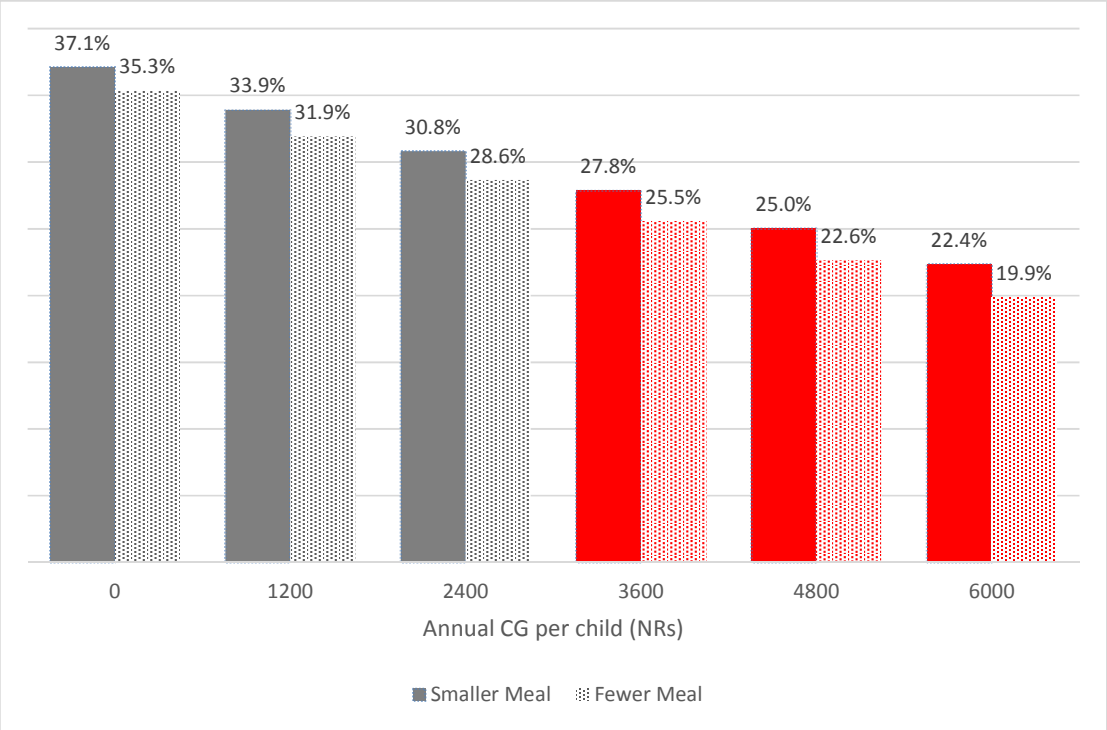
3.4 Analysis of Immediate Causes

Among the indicators that capture the changes in the immediate causes of undernutrition, measures on inadequate dietary intake were correlated with the amount of CG (Figure 5, Table 8). Firstly, households were less likely to reduce the size of meals in the four weeks preceding the survey when they received larger amount of CG. 37.1 per cent of the non-recipient households had smaller meals than desired due to food shortage, but the share decreases to 30.8 per cent when they receive the full amount of CG and to 22.4 per cent if the CG was increased to NRs 500 per month.

The second relevant indicator is on the frequency of meals (i.e. if a household had to reduce the number of meals because of food shortage) also in the four weeks preceding the survey. Among households without CG benefits, 35.3 per cent of them had fewer meals per day than desired, while the share is 6.7 per cent lower (28.6 per cent) for households with full amount of CG, and is 15.4 per cent (19.9 per cent) lower if households received NRs 500 per month.

On the other hand, the prevalence of disease was not correlated with CG. This could be because of the short period captured in the questionnaire (whether the child was sick in the two weeks before the survey), or because the low transfer amount was not sufficient to improve underlying factors of disease, such as unhealthy household environment and lack of health services. These results indicate that CG had impact on underweight and severe wasting of children through improved dietary intake. This finding is consistent with the two previous studies that analyzed the expenditure pattern of CG and found spending on food to be most common (Adhikari, et al., 2014, GoN, UNICEF and VaRG 2014).

Figure 5 Simulated Food Security Indicators by CG Amount



4. Conclusion and Discussion

This study was the first to analyse quantitatively the relationship between the amount of the CG received and the nutritional outcome in the Karnali zone. Three aspects of nutritional status (wasting, underweight and stunting) were assessed at various levels using multivariate model, controlling for demographic and socioeconomic characteristics. Evidence from this study suggests that an increase in the CG benefit leads to decline in the prevalence of underweight and severe wasting. When children received the full amount of CG, the underweight rate decreased by 18.8 percent, and the probability of severe wasting decreased by 51.3 percent. The results were robust across different specifications. Additionally, prediction were performed to simulate the impact of increasing the benefit amount, which projected further impact on the nutritional status of children. This finding was supported from additional analysis of immediate causes of undernutrition, where an increase in CG was suggested to be used to maintain the dietary intake of the household during food shortages. These findings enhance our understanding of the role of CG in reducing undernutrition and supports the increase of benefit amount and coverage rate to improve child nutrition in Nepal.

On the other hand, it is recommended that further research be undertaken in the following two areas. First, while the study finds strong evidence of the CG on nutritional status of children, it should be noted that there still remains nutritional aspects that were not improved through CG. CG was correlated with underweight and severe wasting, but the change in severe underweight, wasting and stunting were not statistically significant. This could be due to the low level of benefit, short time-period between the treatment and assessment, or other technical limitations discussed in this study. Further investigation is required to identify ways to improve other aspects of child growth through policy interventions.

Second, while this study focused mainly on CG, the relationship between several other variables and child nutrition provides interesting insights for future analysis. Multiple factors, including the age of child, mother's highest education level, access to toilet and habit of hand washing had statistically significant correlation with multiple outcomes, showing consistent results with the nutrition framework. Further investigation is required for other factors in the framework that were not significant in this study or had reversal relationship than expected. These factors include the main source of drinking water and other in-kind assistance program, as there were limitation to analysis due to the design of the questionnaire[4].

[4] For example, it was not possible to know if the water source was protected or not from the questionnaire. Or, the amount of in-kind transfer were not covered in the questions.

5. Appendix

Table 1 Descriptive statistics

Variable	Description	Avg.	Std. Err
Small Meal	Household member had to eat a smaller meal than needed because of food shortage in the 4weeks preceding the survey	36%	0.48
Fewer Meal	Household member had to eat a fewer meals a day than needed because of food shortage in the 4weeks preceding the survey	34%	0.47
Restricted Meal	Adult household member restricted consumption for smaller children in the 4weeks preceding the survey	30%	0.46
Disease	The child had been sick in the two weeks preceding the survey	34%	0.47
CG per child	Amount of CG received per child in the year preceding the survey	8.08	6.72
Age	Age of child	1.90	1.31
Age Squared	Age squared of child	5.30	5.29
District	**District of Residence**		
	Mugu (Reference Category)	20%	
	Jumla	20%	
	Humla	20%	
	Kalikot	20%	
	Dolpa	20%	
SES	Socio-economic Status of the Household (Five Quintiles, Lowest as the reference category)		
# of children	Number of children under the age of 5 in the household	1.60	0.66
HHsize	Total household size		
	Household size (2-3, reference category)	7.95	
	Household size (4-5)	32.67	
	Household size (6-7)	33.31	
	Household size (8+)	26.08	
Education	Mother's highest education level		
	No education (reference category)	79%	
	Primary Education	8%	
	Secondary Education	9%	
	Advanced Education	3%	
Caste	Caste		
	Upper Caste group (reference category)	66%	
	Janjati	10%	
	Dalit	23%	
Improved Water	Main source of drinking water (piped water or public tap)	92%	0.27
Access to Toilet	Have toilet facility at home	78%	0.41
Hand Washing	Used soap to wash hand yesterday	64%	0.48
Flour Support	Household received fortified flour in the year preceding the survey	39%	0.49
Rice Support	Household received rice in the year preceding the survey	13%	0.34
Other Transfer	Total amount of transfer received in the preceding year (old age pension, disability grant, widow allowance, scholarships and tiffin) per HH member (100 Rs)	1.57	3.20

Table 2 Regression results on underweight

			Probit				Logit
CG per child	-0.00423	-0.00952***	-0.00929**	-0.00906**	-0.00878**	-0.00900**	-0.0146**
	(0.00342)	(0.00355)	(0.00425)	(0.00425)	(0.00425)	(0.00427)	(0.00695)
Age		0.396***	0.384***	0.385***	0.382***	0.371***	0.603***
		(0.0598)	(0.0608)	(0.0608)	(0.0609)	(0.0611)	(0.0998)
Age Squared		-0.0837***	-0.0805***	-0.0808***	-0.0804***	-0.0773***	-0.126***
		(0.0147)	(0.0149)	(0.0149)	(0.0149)	(0.0150)	(0.0245)
Jumla			0.0521	0.0594	0.0931	0.0900	0.145
			(0.0716)	(0.0718)	(0.0735)	(0.0745)	(0.120)
Humla			-0.0133	-0.0330	-0.0352	-0.0415	-0.0715
			(0.0684)	(0.0693)	(0.0694)	(0.0703)	(0.114)
Kalikot			0.0618	0.0805	0.0960	0.0950	0.150
			(0.0700)	(0.0709)	(0.0713)	(0.0719)	(0.116)
Dolpa			-0.143*	-0.151**	-0.131*	-0.132*	-0.221*
			(0.0765)	(0.0768)	(0.0774)	(0.0776)	(0.126)
SES (2nd lowest)			-0.0278	-0.0262	-0.0146	-0.0157	-0.0255
			(0.0742)	(0.0742)	(0.0744)	(0.0745)	(0.120)
SES(middle)			-0.164**	-0.160**	-0.144*	-0.151**	-0.242*
			(0.0756)	(0.0757)	(0.0765)	(0.0770)	(0.125)
SES(Fourth)			-0.0265	-0.0226	-0.00592	-0.00814	-0.0106
			(0.0768)	(0.0769)	(0.0776)	(0.0781)	(0.126)
SES (Highest)			-0.244***	-0.235***	-0.211**	-0.208**	-0.337**
			(0.0822)	(0.0823)	(0.0835)	(0.0840)	(0.137)
# of Children			0.0385	0.0378	0.0342	0.0321	0.0515
			(0.0384)	(0.0384)	(0.0386)	(0.0389)	(0.0631)
HHSize(4-5)			0.0211	0.0278	0.0259	0.0200	0.0359
			(0.0960)	(0.0961)	(0.0961)	(0.0969)	(0.158)
HHSize(6-7)			-0.0471	-0.0394	-0.0409	-0.0515	-0.0825
			(0.0976)	(0.0976)	(0.0977)	(0.0988)	(0.161)
Hhsize(8-)			-0.0550	-0.0409	-0.0468	-0.0575	-0.0908
			(0.103)	(0.103)	(0.103)	(0.104)	(0.170)
(Mother) Primary Education			0.0605	0.0649	0.0703	0.0742	0.121
			(0.0868)	(0.0869)	(0.0867)	(0.0868)	(0.140)
Secondary			-0.132	-0.132	-0.118	-0.114	-0.187
			(0.0859)	(0.0861)	(0.0864)	(0.0865)	(0.142)
Advanced			-0.348**	-0.348**	-0.331**	-0.330**	-0.561**
			(0.160)	(0.160)	(0.160)	(0.161)	(0.276)
Janjati			-0.173**	-0.196**	-0.200**	-0.205**	-0.329**
			(0.0824)	(0.0840)	(0.0842)	(0.0843)	(0.139)
Dalit			0.0980*	0.0900	0.0841	0.0879	0.144
			(0.0584)	(0.0587)	(0.0588)	(0.0590)	(0.0955)
Improved Water				0.0634	0.0652	0.0661	0.109
				(0.0889)	(0.0889)	(0.0891)	(0.145)
Access to Toilet				-0.124**	-0.108*	-0.102*	-0.163
				(0.0606)	(0.0613)	(0.0613)	(0.0996)
Hand Washing					-0.110**	-0.120**	-0.196**
					(0.0547)	(0.0550)	(0.0889)
Flour support						0.0951*	0.154*
						(0.0497)	(0.0807)
Rice support						0.0719	0.116
						(0.0703)	(0.114)
Other Transfer						0.00621	0.0105
						(0.00753)	(0.0122)
Constant	-0.228***	-0.491***	-0.454***	-0.425***	-0.385**	-0.421***	-0.681***
	(0.0360)	(0.0538)	(0.125)	(0.154)	(0.156)	(0.157)	(0.255)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3 Regression results on Severe wasting

Model			Probit				Logit
CG per child	-0.0259***	-0.0129*	-0.0139*	-0.0139*	-0.0135*	-0.0137*	-0.0302
	(0.00752)	(0.00696)	(0.00818)	(0.00809)	(0.00809)	(0.00808)	(0.0187)
Age		-0.139	-0.158	-0.159	-0.165	-0.178	-0.223
		(0.132)	(0.133)	(0.133)	(0.133)	(0.132)	(0.337)
Age Squared		-0.0444	-0.0434	-0.0430	-0.0426	-0.0394	-0.157
		(0.0455)	(0.0452)	(0.0450)	(0.0449)	(0.0447)	(0.129)
Jumla			-0.122	-0.126	-0.0783	-0.0801	-0.147
			(0.141)	(0.142)	(0.143)	(0.144)	(0.314)
Humla			-0.0390	-0.0510	-0.0569	-0.0614	-0.104
			(0.134)	(0.137)	(0.137)	(0.141)	(0.320)
Kalikot			-0.0223	-0.0181	0.00362	0.00671	0.0387
			(0.133)	(0.135)	(0.136)	(0.137)	(0.301)
Dolpa			-0.361**	-0.366**	-0.339*	-0.341*	-0.848*
			(0.180)	(0.180)	(0.181)	(0.181)	(0.434)
SES (2nd lowest)			0.164	0.165	0.172	0.170	0.357
			(0.140)	(0.140)	(0.142)	(0.141)	(0.318)
SES(middle)			0.115	0.123	0.144	0.140	0.289
			(0.155)	(0.155)	(0.156)	(0.157)	(0.359)
SES(Fourth)			0.236	0.243*	0.260*	0.257*	0.544
			(0.147)	(0.147)	(0.150)	(0.151)	(0.343)
SES (Highest)			0.000516	0.00831	0.0335	0.0357	0.0840
			(0.178)	(0.177)	(0.182)	(0.181)	(0.426)
# of Children			0.00335	0.00735	0.00139	-0.00460	0.00691
			(0.0654)	(0.0657)	(0.0659)	(0.0663)	(0.142)
HHSize(4-5)			0.184	0.181	0.181	0.182	0.387
			(0.188)	(0.190)	(0.191)	(0.190)	(0.449)
HHSize(6-7)			0.0271	0.0231	0.0230	0.0227	0.0880
			(0.191)	(0.193)	(0.194)	(0.195)	(0.457)
Hhsize(8-)			0.0646	0.0640	0.0555	0.0550	0.155
			(0.205)	(0.208)	(0.209)	(0.212)	(0.492)
(Mother) Primary Education			-0.105	-0.0974	-0.0930	-0.0859	-0.207
			(0.184)	(0.185)	(0.185)	(0.184)	(0.431)
Secondary			-0.168	-0.169	-0.146	-0.142	-0.306
			(0.157)	(0.158)	(0.158)	(0.158)	(0.359)
Advanced			-0.722*	-0.732*	-0.707*	-0.707*	-1.706*
			(0.383)	(0.383)	(0.384)	(0.382)	(1.031)
Janjati			-0.427*	-0.437*	-0.434*	-0.425*	-0.920
			(0.235)	(0.235)	(0.235)	(0.236)	(0.618)
Dalit			0.251**	0.246**	0.239**	0.240**	0.514**
			(0.109)	(0.111)	(0.111)	(0.111)	(0.250)
Improved Water				0.229	0.239	0.230	0.485
				(0.229)	(0.227)	(0.228)	(0.564)
Access to Toilet				-0.0345	-0.0139	-0.0105	-0.0371
				(0.124)	(0.124)	(0.124)	(0.281)
Hand Washing					-0.145	-0.151	-0.293
					(0.107)	(0.107)	(0.237)
Flour support						0.0911	0.159
						(0.101)	(0.229)
Rice support						0.0552	0.128
						(0.134)	(0.305)
Other Transfer						-0.00236	-0.00942
						(0.0169)	(0.0370)
Constant	-1.656***	-1.409***	-1.544***	-1.735***	-1.687***	-1.700***	-3.159***
	(0.0673)	(0.0856)	(0.239)	(0.343)	(0.346)	(0.352)	(0.864)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4 Regression results on Severe underweight

Model			Probit				Logit
CG per child	-0.00705	-0.00931**	-0.00821	-0.00784	-0.00774	-0.00755	-0.0132
	(0.00435)	(0.00448)	(0.00535)	(0.00534)	(0.00534)	(0.00535)	(0.0101)
Age		0.426***	0.400***	0.399***	0.397***	0.389***	0.742***
		(0.0781)	(0.0789)	(0.0790)	(0.0791)	(0.0794)	(0.154)
Age Squared		-0.113***	-0.109***	-0.108***	-0.108***	-0.106***	-0.204***
		(0.0201)	(0.0202)	(0.0202)	(0.0202)	(0.0203)	(0.0402)
Jumla			0.000505	0.0101	0.0286	0.0252	0.0356
			(0.0892)	(0.0895)	(0.0908)	(0.0921)	(0.171)
Humla			-0.0833	-0.102	-0.103	-0.102	-0.197
			(0.0851)	(0.0865)	(0.0865)	(0.0882)	(0.165)
Kalikot			-0.0657	-0.0403	-0.0311	-0.0266	-0.0641
			(0.0865)	(0.0880)	(0.0886)	(0.0894)	(0.165)
Dolpa			-0.189*	-0.199**	-0.188*	-0.189*	-0.360*
			(0.0970)	(0.0978)	(0.0982)	(0.0988)	(0.188)
SES (2nd lowest)			-0.0352	-0.0351	-0.0302	-0.0327	-0.0463
			(0.0882)	(0.0883)	(0.0890)	(0.0891)	(0.163)
SES(middle)			-0.222**	-0.219**	-0.211**	-0.215**	-0.383**
			(0.0942)	(0.0943)	(0.0953)	(0.0962)	(0.182)
SES(Fourth)			-0.0959	-0.0918	-0.0839	-0.0869	-0.166
			(0.0949)	(0.0951)	(0.0962)	(0.0970)	(0.181)
SES (Highest)			-0.292***	-0.282***	-0.270**	-0.269**	-0.508**
			(0.107)	(0.107)	(0.109)	(0.109)	(0.212)
# of Children			0.0406	0.0386	0.0366	0.0296	0.0528
			(0.0471)	(0.0472)	(0.0474)	(0.0474)	(0.0873)
HHSize(4-5)			0.0682	0.0731	0.0736	0.0852	0.162
			(0.126)	(0.127)	(0.127)	(0.128)	(0.245)
HHSize(6-7)			0.0256	0.0328	0.0331	0.0462	0.100
			(0.128)	(0.129)	(0.129)	(0.130)	(0.249)
Hhsize(8-)			0.0835	0.0965	0.0945	0.112	0.233
			(0.133)	(0.134)	(0.134)	(0.136)	(0.259)
(Mother) Primary Education			-0.0594	-0.0551	-0.0529	-0.0496	-0.103
			(0.114)	(0.114)	(0.114)	(0.114)	(0.217)
Secondary			-0.206*	-0.206*	-0.198*	-0.196*	-0.348
			(0.116)	(0.117)	(0.117)	(0.117)	(0.232)
Advanced			-0.390	-0.385	-0.375	-0.376	-0.805
			(0.254)	(0.254)	(0.254)	(0.254)	(0.543)
Janjati			0.00734	-0.0132	-0.0151	-0.0174	-0.0473
			(0.104)	(0.106)	(0.106)	(0.106)	(0.204)
Dalit			0.193***	0.184***	0.181**	0.179**	0.329**
			(0.0704)	(0.0708)	(0.0711)	(0.0711)	(0.130)
Improved Water				0.000684	0.000966	-0.00614	-0.0160
				(0.109)	(0.110)	(0.110)	(0.203)
Access to Toilet				-0.138*	-0.130*	-0.127*	-0.238
				(0.0757)	(0.0769)	(0.0772)	(0.146)
Hand Washing					-0.0548	-0.0568	-0.0910
					(0.0697)	(0.0702)	(0.132)
Flour support						0.0699	0.129
						(0.0627)	(0.118)
Rice support						0.0284	0.0561
						(0.0865)	(0.162)
Other Transfer						-0.00813	-0.0156
						(0.0100)	(0.0192)
Constant	-1.086***	-1.291***	-1.256***	-1.158***	-1.139***	-1.148***	-1.970***
	(0.0442)	(0.0692)	(0.157)	(0.192)	(0.193)	(0.194)	(0.365)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5 Regression results on wasting

Model	Probit						Logit
CG per child	-0.0178***	-0.00652	-0.00944	-0.00946*	-0.00940	-0.00912	-0.0194*
	(0.00487)	(0.00483)	(0.00578)	(0.00575)	(0.00576)	(0.00575)	(0.0110)
Age		-0.264***	-0.262***	-0.261***	-0.262***	-0.266***	-0.435***
		(0.0794)	(0.0788)	(0.0787)	(0.0788)	(0.0792)	(0.153)
Age Squared		0.0104	0.00924	0.00920	0.00930	0.0101	-0.00115
		(0.0222)	(0.0218)	(0.0218)	(0.0218)	(0.0219)	(0.0455)
Jumla			0.0129	0.0108	0.0198	0.0119	0.0247
			(0.0936)	(0.0939)	(0.0953)	(0.0963)	(0.180)
Humla			-0.0635	-0.0673	-0.0687	-0.0613	-0.130
			(0.0923)	(0.0937)	(0.0937)	(0.0953)	(0.185)
Kalikot			0.170*	0.168*	0.172*	0.169*	0.308*
			(0.0896)	(0.0909)	(0.0913)	(0.0921)	(0.172)
Dolpa			-0.152	-0.155	-0.149	-0.150	-0.301
			(0.107)	(0.107)	(0.107)	(0.107)	(0.210)
SES (2nd lowest)			0.0369	0.0372	0.0396	0.0387	0.105
			(0.0958)	(0.0959)	(0.0964)	(0.0967)	(0.183)
SES(middle)			-0.0167	-0.0160	-0.0122	-0.00985	-0.000530
			(0.101)	(0.101)	(0.102)	(0.102)	(0.197)
SES(Fourth)			0.0964	0.0966	0.101	0.104	0.201
			(0.102)	(0.102)	(0.103)	(0.105)	(0.200)
SES (Highest)			-0.0410	-0.0414	-0.0358	-0.0310	-0.0327
			(0.112)	(0.112)	(0.114)	(0.115)	(0.223)
# of Children			0.0234	0.0245	0.0235	0.0189	0.0618
			(0.0501)	(0.0501)	(0.0502)	(0.0505)	(0.0943)
HHSize(4-5)			0.123	0.123	0.123	0.136	0.261
			(0.137)	(0.137)	(0.137)	(0.138)	(0.263)
HHSize(6-7)			0.0597	0.0597	0.0599	0.0755	0.151
			(0.138)	(0.138)	(0.138)	(0.140)	(0.267)
Hhsize(8-)			0.00804	0.00927	0.00830	0.0245	0.0363
			(0.145)	(0.145)	(0.145)	(0.147)	(0.280)
(Mother) Primary Education			-0.109	-0.107	-0.106	-0.105	-0.192
			(0.116)	(0.116)	(0.116)	(0.116)	(0.223)
Secondary			-0.103	-0.104	-0.100	-0.0966	-0.167
			(0.110)	(0.110)	(0.111)	(0.111)	(0.207)
Advanced			-0.311	-0.314	-0.310	-0.308	-0.645
			(0.225)	(0.225)	(0.225)	(0.225)	(0.447)
Janjati			-0.520***	-0.521***	-0.521***	-0.518***	-1.114***
			(0.145)	(0.146)	(0.146)	(0.146)	(0.324)
Dalit			0.0535	0.0526	0.0512	0.0503	0.0999
			(0.0768)	(0.0771)	(0.0772)	(0.0778)	(0.147)
Improved Water				0.0673	0.0677	0.0685	0.166
				(0.124)	(0.124)	(0.124)	(0.239)
Access to Toilet				-0.00423	-0.000121	0.000364	-0.0142
				(0.0834)	(0.0841)	(0.0843)	(0.163)
Hand Washing					-0.0292	-0.0307	-0.0528
					(0.0742)	(0.0748)	(0.141)
Flour support						0.00975	0.0114
						(0.0676)	(0.130)
Rice support						0.0285	0.0405
						(0.0907)	(0.170)
Other Transfer						-0.00917	-0.0167
						(0.0104)	(0.0197)
Constant	-1.050***	-0.757***	-0.865***	-0.924***	-0.913***	-0.915***	-1.610***
	(0.0474)	(0.0622)	(0.162)	(0.207)	(0.208)	(0.209)	(0.401)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6 Regression results on stunting

Model			Probit				Logit
CG per child	0.0152***	0.00295	-7.02e-05	-5.82e-05	-4.25e-05	-0.000471	-0.000429
	(0.00350)	(0.00363)	(0.00428)	(0.00428)	(0.00428)	(0.00430)	(0.00706)
Age		0.824***	0.832***	0.833***	0.833***	0.821***	1.329***
		(0.0602)	(0.0611)	(0.0611)	(0.0611)	(0.0614)	(0.101)
Age Squared		-0.165***	-0.166***	-0.166***	-0.166***	-0.163***	-0.264***
		(0.0147)	(0.0148)	(0.0148)	(0.0148)	(0.0149)	(0.0242)
Jumla			0.0227	0.0221	0.0239	0.0336	0.0524
			(0.0730)	(0.0733)	(0.0751)	(0.0762)	(0.125)
Humla			-0.171**	-0.181**	-0.181**	-0.198***	-0.321***
			(0.0698)	(0.0706)	(0.0705)	(0.0714)	(0.117)
Kalikot			-0.0106	-0.00870	-0.00785	0.00210	-0.000516
			(0.0718)	(0.0728)	(0.0732)	(0.0737)	(0.121)
Dolpa			0.0840	0.0765	0.0776	0.0702	0.118
			(0.0783)	(0.0785)	(0.0791)	(0.0792)	(0.131)
SES (2nd lowest)			-0.149*	-0.147*	-0.146*	-0.149*	-0.245*
			(0.0763)	(0.0763)	(0.0766)	(0.0766)	(0.126)
SES(middle)			-0.0591	-0.0572	-0.0563	-0.0697	-0.112
			(0.0777)	(0.0778)	(0.0784)	(0.0787)	(0.130)
SES(Fourth)			-0.0331	-0.0314	-0.0304	-0.0429	-0.0721
			(0.0792)	(0.0793)	(0.0801)	(0.0806)	(0.133)
SES (Highest)			-0.123	-0.121	-0.120	-0.130	-0.210
			(0.0828)	(0.0829)	(0.0841)	(0.0847)	(0.139)
# of Children			0.0470	0.0482	0.0480	0.0432	0.0695
			(0.0393)	(0.0392)	(0.0393)	(0.0396)	(0.0651)
HHSize(4-5)			-0.141	-0.137	-0.137	-0.135	-0.219
			(0.0973)	(0.0974)	(0.0974)	(0.0984)	(0.162)
HHSize(6-7)			-0.0718	-0.0684	-0.0685	-0.0702	-0.117
			(0.0987)	(0.0986)	(0.0986)	(0.1000)	(0.164)
Hhsize(8-)			-0.150	-0.144	-0.144	-0.141	-0.230
			(0.103)	(0.104)	(0.104)	(0.105)	(0.171)
(Mother) Primary Education			0.0747	0.0787	0.0790	0.0857	0.138
			(0.0846)	(0.0848)	(0.0848)	(0.0849)	(0.138)
Secondary			-0.108	-0.108	-0.107	-0.105	-0.175
			(0.0848)	(0.0848)	(0.0851)	(0.0851)	(0.139)
Advanced			-0.326**	-0.330**	-0.329**	-0.332**	-0.547**
			(0.150)	(0.151)	(0.151)	(0.151)	(0.248)
Janjati			0.0912	0.0827	0.0825	0.0801	0.126
			(0.0859)	(0.0869)	(0.0869)	(0.0868)	(0.143)
Dalit			0.0958	0.0931	0.0928	0.0910	0.148
			(0.0599)	(0.0601)	(0.0602)	(0.0605)	(0.0998)
Improved Water				0.126	0.126	0.117	0.196
				(0.0919)	(0.0919)	(0.0920)	(0.151)
Access to Toilet				-0.0426	-0.0417	-0.0353	-0.0575
				(0.0621)	(0.0629)	(0.0628)	(0.104)
Hand Washing					-0.00643	-0.00798	-0.0161
					(0.0564)	(0.0568)	(0.0935)
Flour support						0.124**	0.204**
						(0.0505)	(0.0829)
Rice support						-0.00429	-0.00396
						(0.0725)	(0.120)
Other Transfer						0.00146	0.00213
						(0.00760)	(0.0124)
Constant	0.0878**	-0.483***	-0.361***	-0.448***	-0.445***	-0.465***	-0.753***
	(0.0361)	(0.0541)	(0.127)	(0.158)	(0.159)	(0.160)	(0.263)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7 Regression results on severe stunting

Model	Probit						Logit
CG per child	0.00625*	-0.00455	-0.00590	-0.00579	-0.00584	-0.00574	-0.00950
	(0.00341)	(0.00364)	(0.00433)	(0.00432)	(0.00433)	(0.00434)	(0.00726)
Age		0.809***	0.792***	0.794***	0.794***	0.786***	1.317***
		(0.0642)	(0.0654)	(0.0656)	(0.0656)	(0.0658)	(0.113)
Age Squared		-0.161***	-0.156***	-0.157***	-0.157***	-0.154***	-0.258***
		(0.0155)	(0.0157)	(0.0157)	(0.0157)	(0.0158)	(0.0268)
Jumla			-0.0603	-0.0564	-0.0641	-0.0693	-0.0978
			(0.0752)	(0.0753)	(0.0771)	(0.0782)	(0.130)
Humla			-0.302***	-0.318***	-0.317***	-0.316***	-0.517***
			(0.0727)	(0.0735)	(0.0735)	(0.0745)	(0.124)
Kalikot			-0.133*	-0.122*	-0.126*	-0.126*	-0.197
			(0.0734)	(0.0743)	(0.0746)	(0.0753)	(0.125)
Dolpa			-0.0207	-0.0292	-0.0338	-0.0355	-0.0591
			(0.0796)	(0.0799)	(0.0805)	(0.0807)	(0.134)
SES (2nd lowest)			-0.147*	-0.145*	-0.148*	-0.149*	-0.249*
			(0.0774)	(0.0774)	(0.0778)	(0.0778)	(0.129)
SES(middle)			-0.177**	-0.173**	-0.177**	-0.180**	-0.295**
			(0.0790)	(0.0791)	(0.0797)	(0.0800)	(0.132)
SES(Fourth)			-0.135*	-0.131*	-0.135*	-0.136*	-0.224*
			(0.0791)	(0.0793)	(0.0801)	(0.0804)	(0.133)
SES (Highest)			-0.279***	-0.274***	-0.279***	-0.275***	-0.453***
			(0.0853)	(0.0855)	(0.0868)	(0.0870)	(0.146)
# of Children			0.120***	0.120***	0.121***	0.117***	0.200***
			(0.0398)	(0.0398)	(0.0398)	(0.0401)	(0.0667)
HHSize(4-5)			-0.0211	-0.0153	-0.0148	-0.00938	-0.0250
			(0.0998)	(0.0998)	(0.0998)	(0.100)	(0.168)
HHSize(6-7)			-0.0709	-0.0647	-0.0644	-0.0593	-0.109
			(0.102)	(0.102)	(0.102)	(0.103)	(0.171)
Hhsize(8-)			-0.162	-0.150	-0.148	-0.141	-0.244
			(0.108)	(0.108)	(0.108)	(0.109)	(0.182)
(Mother) Primary Education			-0.00910	-0.00396	-0.00519	-0.00309	-0.0104
			(0.0908)	(0.0909)	(0.0910)	(0.0909)	(0.151)
Secondary			-0.231**	-0.230**	-0.234**	-0.230**	-0.388**
			(0.0929)	(0.0929)	(0.0930)	(0.0930)	(0.161)
Advanced			-0.314*	-0.316*	-0.320*	-0.322*	-0.578*
			(0.178)	(0.178)	(0.178)	(0.177)	(0.312)
Janjati			0.235***	0.217**	0.218***	0.215**	0.356**
			(0.0828)	(0.0842)	(0.0842)	(0.0842)	(0.139)
Dalit			0.0896	0.0844	0.0859	0.0867	0.148
			(0.0604)	(0.0607)	(0.0609)	(0.0610)	(0.101)
Improved Water				0.0989	0.0988	0.0973	0.167
				(0.0938)	(0.0938)	(0.0939)	(0.156)
Access to Toilet				-0.0900	-0.0937	-0.0892	-0.151
				(0.0618)	(0.0626)	(0.0626)	(0.104)
Hand Washing					0.0247	0.0203	0.0352
					(0.0569)	(0.0572)	(0.0949)
Flour support						0.0691	0.120
						(0.0512)	(0.0848)
Rice support						0.0480	0.0745
						(0.0737)	(0.123)
Other Transfer						-0.00270	-0.00342
						(0.00779)	(0.0130)
Constant	-0.546***	-1.162***	-1.022***	-1.050***	-1.060***	-1.082***	-1.819***
	(0.0364)	(0.0595)	(0.133)	(0.165)	(0.166)	(0.167)	(0.281)
Observations	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8 Regression on other outcomes

	Smaller Meal	Fewer Meal	Disease
Model		Probit	
CG per child	-0.00871*	-0.00932*	0.000777
	(0.00479)	(0.00476)	(0.00423)
Age	0.0572	0.0339	-0.0192
	(0.0662)	(0.0648)	(0.0615)
Age Squared	-0.00374	-0.000801	-0.00992
	(0.0162)	(0.0159)	(0.0151)
Jumla	0.196**	-0.113	0.151**
	(0.0821)	(0.0816)	(0.0767)
Humla	0.759***	0.301***	0.336***
	(0.0737)	(0.0724)	(0.0726)
Kalikot	0.300***	0.198***	0.00178
	(0.0777)	(0.0754)	(0.0748)
Dolpa	0.350***	0.266***	0.477***
	(0.0833)	(0.0815)	(0.0791)
SES (2nd lowest)	-0.260***	-0.142*	-0.0265
	(0.0768)	(0.0754)	(0.0770)
SES(middle)	-0.499***	-0.385***	-0.0613
	(0.0797)	(0.0787)	(0.0792)
SES(Fourth)	-0.591***	-0.383***	-0.0325
	(0.0833)	(0.0815)	(0.0804)
SES (Highest)	-1.026***	-0.858***	0.00921
	(0.0948)	(0.0943)	(0.0845)
# of Child under5	0.149***	0.136***	0.0471
	(0.0415)	(0.0410)	(0.0397)
HHSize(4-5)	0.0943	-0.0950	-0.0240
	(0.108)	(0.106)	(0.0979)
HHSize(6-7)	-0.0252	-0.235**	-0.00516
	(0.110)	(0.107)	(0.0996)
Hhsize(8-)	0.0558	-0.108	0.0460
	(0.114)	(0.112)	(0.106)
(Mother) Primary Education	-0.272***	-0.296***	-0.0611
	(0.0930)	(0.0937)	(0.0879)
Secondary	-0.255***	-0.368***	-0.00322
	(0.0951)	(0.0951)	(0.0849)
Advanced	-0.726***	-1.079***	-0.196
	(0.234)	(0.266)	(0.152)
Janjati	-0.678***	-0.662***	-0.329***
	(0.110)	(0.111)	(0.0891)
Dalit	0.397***	0.330***	0.127**
	(0.0605)	(0.0595)	(0.0599)
Received Flour support	-0.0608	-0.0794	0.00511
	(0.0550)	(0.0542)	(0.0508)
Received Rice support	-0.784***	-0.758***	-0.0411
	(0.0871)	(0.0876)	(0.0713)
Total Cash support per HHmember	-9.77e-05	-4.64e-05	-8.72e-05
	(7.80e-05)	(7.72e-05)	(7.67e-05)
Improved Water[5]			0.0803
			(0.0913)
Toilet			0.0339
			(0.0627)
Wash Hands			0.0983*
			(0.0566)
Constant	-0.400***	-0.128	-0.729***
	(0.135)	(0.133)	(0.159)
Observations	3,750	3,750	3,750

[5] Water and Hygiene related indicators were not controlled for the analysis of dietary intake as there were no expected direct or indirect relationship as presented in the nutritional framework.

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