



MOTHERS' EMPOWERMENT, UNCONDITIONAL CASH TRANSFERS AND CHILD UNDERNUTRITION: EVIDENCE FROM MULTAN DIVISION, PAKISTAN

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KEYWORDS	ABSTRACT
Child undernutrition; Stunting; Cash transfers; Women's empowerment; BISP; Pakistan	Many young children in Pakistan are undernourished. More than a third of children under five are stunted, and the problem is worst in poorer areas such as southern Punjab. This study asks whether children are better nourished when their mothers receive the Benazir Income Support Programme (BISP) cash transfer and when their mothers have more say in the household. We interviewed mothers in 768 households in Multan Division. Half received BISP and half were neighbours of similar income who did not. We measured the height and weight of their 1,179 children under five. We measured mothers' empowerment with economic, social, familial, political and overall scores built by principal component analysis. Because empowerment may depend on other household factors, we used the mother's ownership of a house and of land as instruments and estimated control-function probit models for the whole division and for each district. Children of BISP mothers were 5.0 percentage points less likely to be stunted, 4.4 points less likely to be wasted and 4.7 points less likely to be underweight. The mother's control over money was the type of empowerment most closely linked to better nutrition. BISP helped more when mothers had more economic and social empowerment, while the familial and political interactions were mostly not significant. Recent diarrhoea was the biggest risk factor, and being large at birth and being breastfed lowered the risk. The protective links were weakest in Lodhran, the poorest district. The main policy lessons are to add nutrition supplements and counselling to BISP, to support mothers' earnings, and to invest in clean water and sanitation in Lodhran and Vehari.
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Introduction

Child undernutrition is one of Pakistan's most lasting development problems. The 2017–18 Pakistan Demographic and Health Survey found that 37.7 percent of children under five were stunted, 23.0 percent were underweight and 8.0 percent were wasted (NIPS & ICF, 2019). The National Nutrition Survey of the same year put stunting at close to 40 percent (Government of Pakistan, 2018). Undernutrition in low- and middle-income countries is linked to nearly half of all deaths of children under five (Black et al., 2013). Children who are undernourished in their first thousand days grow more slowly in body and mind, and this damage is hard to undo. It leads to poorer schooling, lower earnings and worse health in adult life (Alderman et al., 2006; Grantham-McGregor et al., 2007). In the framework of Grossman (1972), good nutrition in early life is an early investment in a child's health capital.

Who controls money in the household affects this investment. Studies from developing countries show that when mothers have a larger share of household income, families spend more on food and children's health improves (Thomas et al., 1990; Hoddinott & Haddad, 1995; Duflo, 2003). Women's say in decisions, their education and their control of assets are often linked to lower stunting and underweight (Smith et al., 2003; Cunningham et al., 2015; Jones et al., 2019). Cash transfers paid to mothers try to use this channel. In Mexico, Oportunidades improved child growth, and doubling the cash amount alone increased height-for-age (Fernald et al., 2008). In Pakistan, a cluster-randomised trial in Punjab found that BISP cash reduced stunting much more when it was combined with a nutrient supplement or with advice on feeding and care (Soofi et al., 2022).

The evidence on cash transfers, however, is not the same everywhere. In Ecuador, the Bono de Desarrollo Humano improved the physical and cognitive development of the poorest children (Paxson & Schady, 2010), and in Mexico, children in Progresa households were less often ill and grew taller (Gertler, 2004). But a review by Manley et al. (2013) found that the average effect of cash transfers on child height was small and differed a lot between programmes, and a conditional transfer in rural China raised the use of health services without improving child health (Zhou et al., 2020). Evidence on women's empowerment is also mixed. A review by Carlson et al. (2015) found that women's autonomy was linked to better child nutrition in most studies, but not in all. In Ghana, Malapit and Quisumbing (2015) found that only some parts of women's empowerment were linked to better child feeding and nutrition. These mixed results suggest that it matters which type of empowerment a mother has and whether cash reaches mothers who are able to use it.

BISP is Pakistan's largest social safety net programme. Since 2008 it has paid an unconditional cash amount every quarter to women in poor households, chosen through a poverty score based on household assets (Cheema et al., 2014). Because the money is paid to the woman, it may raise her say in household spending as well as the household's income. Southern Punjab is an important place to study these links. Within Punjab, stunting is closely linked to district wealth and services (Mahmood et al., 2020), and the districts of Multan Division range from a large city with good hospitals to mainly rural areas with weak health and water services.

Three gaps remain. First, Pakistani studies of empowerment and child nutrition mainly use national surveys and single measures of empowerment (Shafiq et al., 2019; Khan et al., 2019), so they cannot show which types of empowerment matter. Second, the role of BISP is rarely studied together with mothers' empowerment, so we do not know whether the transfer and a mother's bargaining power replace or support each other. Third, national averages hide large local differences. Within Punjab, stunting varies strongly with district wealth and services (Mahmood et al., 2020).

This paper uses primary data from Multan Division in southern Punjab to fill these gaps. The main objective is to examine how BISP cash transfers and mothers' empowerment are related to child undernutrition. The specific objectives are: (i) to examine the link between BISP receipt and stunting, wasting and underweight among children under five; (ii) to find out which types of mothers' empowerment (economic, social, familial and political) protect children most; (iii) to test whether BISP protects children more when their mothers are more empowered; and (iv) to compare these links across the four districts, which differ in urbanisation, income and services. To meet these objectives, we compare BISP recipients with non-recipients from the same localities, build empowerment indices with principal component analysis, and estimate instrumental-variable probit models. Following Kiani (2023), we treat empowerment as endogenous and use the mother's house and land ownership as instruments.

The paper makes three contributions. First, it gives district-level evidence from southern Punjab, where child undernutrition is high and services are weak, instead of relying on national averages. Second, it measures mothers' empowerment in four separate parts and one overall index, so it can show which kinds of empowerment protect children from which form of undernutrition. Third, it tests directly whether BISP and mothers' empowerment work together by including their interaction in each model.

The results show that children of BISP mothers are less likely to be stunted, wasted and underweight, by 4.4 to 5.0 percentage points. This agrees with the positive effects of cash in Mexico and Ecuador (Gertler, 2004; Fernald et al., 2008; Paxson & Schady, 2010), although the effect is smaller than what Soofi et al. (2022) found when BISP was combined with nutrition inputs. Economic empowerment, meaning the mother's control over money, protects children the most, which supports the view that mothers spend more of the money they control on food and health (Thomas et al., 1990; Duflo, 2003). BISP protects children more when their mothers have more economic and social empowerment. This suggests that a mother with a stronger voice can make sure the cash is spent on her children. Recent diarrhoea is the largest risk factor, as in other studies from Pakistan (Khan et al., 2019; Siddiqi et al., 2023). The protective links are weakest in Lodhran, where water, sanitation and health services are poorest, which suggests that cash and empowerment do less where these services are missing.

Literature Review

Past studies point to three ways in which a mother's control over resources can improve child nutrition. She can spend more on food and health. She can act on what she knows about feeding and care without needing approval from her husband or mother-in-law. And she may face less stress and

a lighter workload. In a review for South Asia, Cunningham et al. (2015) found a general link between women's empowerment and child growth, but results were mixed across three areas: control of resources, workload and time, and social support. Imai et al. (2014) found that women's empowerment reduced stunting and underweight in rural India. Rehman et al. (2019) showed that women's land ownership improved children's food and nutrition security in Pakistan by giving mothers a bigger role in decisions. Jones et al. (2019) found that empowerment improved mothers' BMI in East Africa and, through it, children's height-for-age and weight-for-height. Mekonnen et al. (2021) found that all three SWPER domains reduced stunting and underweight in Ethiopia, and Essilfie et al. (2020) showed that empowerment mattered most for the most severely undernourished children in Ghana.

Not all types of empowerment matter equally. Izraelov and Silber (2019) found that decision-making improved child health in Ghana, while attitudes to violence and access to information did not. Malapit and Quisumbing (2015), also in Ghana, found that only some parts of women's empowerment in agriculture were linked to child nutrition. Besnier (2023) found small effects of women's political empowerment on child nutrition across 161 countries. A review by Carlson et al. (2015) found that women's autonomy was linked to better child nutrition in most, but not all, studies. In Pakistan, Shafiq et al. (2019) found that women's work and decision-making reduced composite anthropometric failure. Inamdar et al. (2023) showed that empowerment improved child nutrition in India, Nepal and Pakistan, both directly and by lowering exposure to intimate partner violence.

Studies of cash transfers also give mixed results. Gertler (2004) found that children in Progresa households in Mexico were less often ill, less often anaemic and almost a centimetre taller after two years. Fernald et al. (2008) showed that part of the effect of Oportunidades on growth came from the cash itself. In Ecuador, an unconditional transfer improved the physical and cognitive development of the poorest children (Paxson & Schady, 2010), and in Odisha, India, the Mamata scheme lowered child stunting and anaemia (Chakrabarti et al., 2021). Other evaluations were less positive. Zhou et al. (2020) found that a conditional transfer in rural China raised the use of health services without improving child health, and a review by Manley et al. (2013) found that the average effect of cash transfers on child height was small. In Pakistan, Soofi et al. (2022) found that BISP cash combined with nutrition inputs did better than cash alone in preventing stunting. This suggests that cash alone does not achieve all it could.

Child-level factors also matter. In Pakistan, diarrhoea, small size at birth, birth order and lack of breastfeeding are among the main predictors of stunting, wasting and underweight (Khan et al., 2019; Siddiqi et al., 2023). Across several countries, children who had more episodes of diarrhoea before age two were more likely to be stunted (Checkley et al., 2008), and children born small or preterm faced a higher risk of all forms of undernutrition (Christian et al., 2013). Breastfeeding protects children against infections (Victora et al., 2016). Later-born children often get fewer resources (Jayachandran & Pande, 2017), and in many countries boys are more likely to be undernourished than girls (Wamani et al., 2007; Thurstans et al., 2020). We therefore control for these factors in all models.

Past studies show that mothers' empowerment and cash transfers can both improve child nutrition. But they rarely study the two together in the same sample, rarely separate the different types of empowerment, and give little local evidence for southern Punjab. This paper provides that evidence and tests whether the two work together.

Methodology

Study area and sample

The study covers the four districts of Multan Division, a mainly rural part of southern Punjab where farming is the main source of income (PBS, 2023). Multan district has the division's largest city and its main referral hospitals. Lodhran, at the other end, is mostly rural and has the weakest record on female schooling and health spending. Vehari and Khanewal fall between the two.

We chose households so that mothers receiving BISP could be compared with similar mothers who do not. Cochran's (1977) sample-size formula for a proportion gives a minimum of 384 women per group, so we interviewed 384 recipients and 384 non-recipients. Each district's share is based on its population. We first chose tehsils to cover both urban areas and villages, then randomly selected union councils, and then households. We found recipients through BISP's local offices or the area's Lady Health Worker, and matched each one with a nearby non-recipient family of similar income. Every mother answered questions on all of her children. The descriptive statistics cover all 1,179 children under five, from 163 in Lodhran to 405 in Multan district. The regressions use one child per mother, giving 768 observations (104 to 292 by district), so that each mother and her empowerment scores enter the models only once.

Variables

Enumerators recorded each young child's age, sex, height and weight. These were converted into z-scores using the WHO Child Growth Standards (World Health Organization, 2006), which adjust for exact age and sex. We use the standard cut-off of two standard deviations below the reference median to define three binary outcomes: stunting (low height-for-age), wasting (low weight-for-height) and underweight (low weight-for-age). We study each one separately because they measure different things. Stunting shows long-term deprivation, wasting shows a recent shock such as illness or food shortage, and underweight shows a mix of both (Assaf et al., 2015).

We measure the mother's position in the household with four scores and one overall score, built from 31 questions. Questions on money and work (for example, whether she earns, has a bank account or can borrow) make up the economic score. Questions on moving freely, visiting family and taking part in community life make up the social score. Questions on who decides about the children's health and schooling, her own treatment and contraception make up the familial score. Questions on voting and taking part in local decisions make up the political score. Each score is the first principal component of its group of questions, kept under the Kaiser (1960) rule and rescaled to run from zero to one. The overall score uses the same method on all 31 questions. Whether the mother currently receives BISP

payments is a dummy variable. The full list of questions is available from the corresponding author. Child-level control variables are listed in Table 1.

Table 1: Variables used to model child undernutrition

Variable	How it is measured
Stunted	Height-for-age z below $-2 = 1$
Wasted	Weight-for-height z below $-2 = 1$
Underweight	Weight-for-age z below $-2 = 1$
Mother receives BISP	Current recipient = 1
Mother's empowerment	Economic, social, familial, political and composite PCA scores, 0–1
Mother owns a house; mother owns land (instruments)	Two dummies: owns a house = 1; owns land = 1
Boy	Male child = 1
Birth order	Rank among the mother's live births
Size at birth	Reference: small; dummies for average and large, as recalled by mother
Ever breastfed	Yes = 1
Recent diarrhoea	Episode in the last two weeks = 1

Source: Compiled by the authors.

Model and estimation

Collective household models treat the two parents as separate decision-makers whose preferences both count in household choices (Chiappori, 1988; Browning & Chiappori, 1998). If household welfare is written as $W = \beta U_f + (1 - \beta)U_m$, spending on a child's food and care rises with the mother's weight β when she values child nutrition more than the father does (Duflo, 2012). Money paid in her name increases her share of resources and may also raise β , so its effect need not be the same as the same amount paid to the father (Attanasio & Lechene, 2010; Armand et al., 2020). We turn this into a probit model for child i :

$$Pr(N_i = 1) = \Phi(\beta_0 + \beta_1 M_{ki} + \beta_2 B_i + \theta(B_i \cdot M_{ki}) + C_i' \gamma) \quad (1)$$

where N_i is the undernutrition indicator, M_{ki} is one of the five maternal empowerment scores, B_i is BISP receipt and C_i contains the child control variables. Following Kiani (2023), the five scores are not entered together. Each score and its interaction with BISP is estimated in a separate model, so equation (1) is estimated five times for each outcome and sample. A negative sign on any term means lower risk.

A mother's empowerment may be linked to hidden household features that also affect child growth, such as parents' health knowledge or the wealth of the wider family. Mothers of healthier children

may also report more say at home, and self-reported scores contain measurement error. Following Kiani (2023), we instrument the empowerment score with two separate dummies: one for the mother owning a house and one for her owning land. Owning property gives a woman more say in family decisions. Rehman et al. (2019) show that in Pakistan, women’s land rights improve children’s food security through women’s autonomy rather than through a separate channel. As in Kiani (2023), BISP receipt is not instrumented. The programme selects households by an asset-based poverty score (Cheema et al., 2014), not by any choice of the mother, and every recipient is compared with a nearby non-recipient of similar income. We use the control-function method (Rivers & Vuong, 1988; Wooldridge, 2010). The residual from a first-stage linear regression of the empowerment score on the two ownership dummies, BISP receipt and the child controls is added to the nutrition probit:

$$N_i = X_i'\beta + \kappa\hat{\epsilon}_i + u_i \quad (2)$$

A Wald test of $\kappa = 0$, with one degree of freedom, shows whether the endogeneity correction is needed. With two instruments for one endogenous score, the model has one overidentifying restriction. We report coefficients, standard errors and average marginal effects for the whole division and for each district.

Results and Discussion

Descriptive statistics

The children are on average two and a half years old (29.6 months), and slightly more than half are boys (Table 2). Across the division, 38.3 percent of children are stunted, 29.5 percent are underweight and 12.0 percent are wasted, which is a little higher than the national PDHS figures. Every indicator gets worse from Multan district to Lodhran. Stunting rises from 36.0 to 42.3 percent, underweight from 27.4 to 31.9 percent and wasting from 10.6 to 14.1 percent. Lodhran also has the highest share of children born small (23.9 percent, against 15.1 percent in Multan district) and of recent diarrhoea (17.8 against 14.8 percent). Mothers in Lodhran are also the least empowered. Fewer than one in eight are in the top group of the economic index, against more than one in four in Multan district. Only 13.5 percent are in the top group of the familial index, which includes decisions on children’s health, compared with 35.6 percent in Multan.

Table 2: Profile and nutritional status of children aged 0–5 years, by district

Variable	Category/Statistic	Multan Division (N=1,179)	Lodhran (n=163)	Khanewal (n=322)	Multan (n=405)	Vehari (n=289)
Age (months)	Mean ± SD	29.6 ± 16.6	29.1 ± 16.8	29.5 ± 16.5	29.8 ± 16.2	29.7 ± 16.7
Height (cm)	Mean ± SD	87.4 ± 11.5	86.8 ± 11.7	87.3 ± 11.4	88.0 ± 11.2	87.0 ± 11.6

Weight (kg)	Mean $\pm$ SD	12.4 $\pm$ 3.2	12.0 $\pm$ 3.4	12.3 $\pm$ 3.2	12.6 $\pm$ 3.1	12.2 $\pm$ 3.3
Gender	Male	604 (51.2)	82 (50.3)	165 (51.2)	207 (51.1)	150 (51.9)
	Female	575 (48.8)	81 (49.7)	157 (48.8)	198 (48.9)	139 (48.1)
Diarrhea (past two weeks)	No	987 (83.7)	134 (82.2)	269 (83.5)	345 (85.2)	239 (82.7)
	Yes	192 (16.3)	29 (17.8)	53 (16.5)	60 (14.8)	50 (17.3)
Birth Size	Small	214 (18.2)	39 (23.9)	56 (17.4)	61 (15.1)	58 (20.1)
	Average	742 (62.9)	97 (59.5)	202 (62.7)	267 (65.9)	176 (60.9)
	Large	223 (18.9)	27 (16.6)	64 (19.9)	77 (19.0)	55 (19.0)
Ever Breastfed	Yes	1,112 (94.3)	152 (93.3)	303 (94.1)	387 (95.6)	270 (93.4)
	No	67 (5.7)	11 (6.7)	19 (5.9)	18 (4.4)	19 (6.6)
Stunting	No	727 (61.7)	94 (57.7)	199 (61.8)	259 (64.0)	175 (60.6)
	Yes	452 (38.3)	69 (42.3)	123 (38.2)	146 (36.0)	114 (39.4)
Underweight	No	831 (70.5)	111 (68.1)	226 (70.2)	294 (72.6)	200 (69.2)
	Yes	348 (29.5)	52 (31.9)	96 (29.8)	111 (27.4)	89 (30.8)
Wasting	No	1,037 (88.0)	140 (85.9)	284 (88.2)	362 (89.4)	251 (86.9)
	Yes	142 (12.0)	23 (14.1)	38 (11.8)	43 (10.6)	38 (13.1)

Source: Computed from the household survey. Means with standard deviations for continuous items; counts with percentages otherwise.

Regression results

Results for stunting are in Table 3, for wasting in Table 4 and for underweight in Table 5. The control-function residual is significant in every column of the three tables (Wald $\chi^2(1)$ of 14.86 to 20.37), so a simple probit would give biased results.

Table 3: Determinants of stunting (IV-probit)

Variables	Multan Division	Lodhran	Khanewal	Multan D	Vehari
Social Protection (Base: Non-Beneficiaries)					
Cash Transfer (BISP)	-0.241*** (0.091) [-0.050]	-0.208** (0.095) [-0.043]	-0.264*** (0.088) [-0.055]	-0.286*** (0.086) [-0.059]	-0.233** (0.092) [-0.048]
Women's Empowerment Indicators					
Economic Empowerment	-0.218*** (0.078) [-0.045]	-0.191** (0.084) [-0.039]	-0.243*** (0.077) [-0.050]	-0.261*** (0.075) [-0.054]	-0.214*** (0.081) [-0.044]
Social Empowerment	-0.173** (0.081) [-0.036]	-0.154* (0.086) [-0.032]	-0.194** (0.080) [-0.040]	-0.209*** (0.078) [-0.043]	-0.171** (0.083) [-0.035]
Familial Empowerment	-0.151** (0.076) [-0.031]	-0.134* (0.081) [-0.028]	-0.169** (0.075) [-0.035]	-0.182** (0.073) [-0.038]	-0.149* (0.078) [-0.031]
Political Empowerment	-0.098** (0.045) [-0.020]	-0.077 (0.056) [-0.016]	-0.108** (0.050) [-0.022]	-0.117*** (0.043) [-0.024]	-0.089* (0.053) [-0.018]
Overall Women's Empowerment	-0.269*** (0.094) [-0.056]	-0.239** (0.100) [-0.050]	-0.296*** (0.093) [-0.061]	-0.318*** (0.091) [-0.066]	-0.264*** (0.097) [-0.055]
Interaction Terms (BISP × Empowerment)					
BISP × Economic Empowerment	-0.164* (0.084) [-0.034]	-0.145 (0.089) [-0.030]	-0.181** (0.083) [-0.037]	-0.194** (0.081) [-0.040]	-0.161* (0.086) [-0.033]
BISP × Social Empowerment	-0.139* (0.073) [-0.029]	-0.122 (0.078) [-0.025]	-0.151** (0.072) [-0.031]	-0.162** (0.071) [-0.034]	-0.136* (0.075) [-0.028]
BISP × Familial Empowerment	-0.106 (0.069) [-0.022]	-0.092 (0.074) [-0.019]	-0.115* (0.068) [-0.024]	-0.123* (0.067) [-0.025]	-0.103 (0.071) [-0.021]
BISP × Political Empowerment	-0.072 (0.065) [-0.015]	-0.062 (0.070) [-0.013]	-0.078 (0.064) [-0.016]	-0.084 (0.063) [-0.017]	-0.069 (0.067) [-0.014]
BISP × Overall Women's Empowerment	-0.189** (0.090) [-0.039]	-0.169* (0.095) [-0.035]	-0.207** (0.089) [-0.043]	-0.223** (0.087) [-0.046]	-0.186** (0.092) [-0.038]
Child Characteristics					

Gender (Base: Girl)	0.081* (0.043) [0.017]	0.091** (0.046) [0.019]	0.079* (0.042) [0.016]	0.074* (0.041) [0.015]	0.085* (0.044) [0.018]
Birth Order	0.067*** (0.026) [0.014]	0.079*** (0.029) [0.016]	0.062** (0.025) [0.013]	0.058** (0.024) [0.012]	0.071*** (0.027) [0.015]
Birth Size (Base: Small)					
Medium	-0.143** (0.061) [-0.030]	-0.126* (0.066) [-0.026]	-0.154** (0.060) [-0.032]	-0.166*** (0.058) [-0.034]	-0.139** (0.063) [-0.029]
Large	-0.289*** (0.079) [-0.060]	-0.254*** (0.084) [-0.053]	-0.311*** (0.077) [-0.064]	-0.332*** (0.075) [-0.069]	-0.282*** (0.081) [-0.058]
Breastfeeding (Base: No)	-0.201** (0.083) [-0.042]	-0.179** (0.087) [-0.037]	-0.219*** (0.081) [-0.045]	-0.234*** (0.079) [-0.048]	-0.198** (0.084) [-0.041]
Diarrhea (Base: No)	0.248*** (0.088) [0.051]	0.284*** (0.094) [0.059]	0.236*** (0.086) [0.049]	0.221*** (0.084) [0.046]	0.261*** (0.090) [0.054]
Model Statistics					
Observations	768	104	184	292	188
Wald Test of Exogeneity ($\chi^2(1)$)	16.83	15.39	18.46	20.14	17.22
Prob > χ^2	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.224	0.208	0.239	0.251	0.221

Source: Estimated by the authors. Coefficients with standard errors in round brackets and average marginal effects in square brackets; ***, **, * = $p < 0.01, 0.05, 0.10$. The excluded instruments are dummies for the mother owning a house and owning land, as in Kiani (2023).

BISP receipt protects children against all three forms of undernutrition in every sample. For the whole division, children of recipients are 5.0 percentage points less likely to be stunted, 4.4 points less likely to be wasted and 4.7 points less likely to be underweight. The link is strongest in Multan district (5.9, 5.2 and 5.6 points) and weakest in Lodhran (4.3, 3.8 and 4.1 points). The main reason is that the cash eases the household food budget, so the family can buy more food and a wider range of food (Attanasio & Lechene, 2010). It also helps pay for treatment of the infections that slow child growth (Khan et al., 2019). Because the money is paid to the mother, more of it is likely to be spent on children, since mothers tend to spend extra income on food and health more than fathers do (Thomas et al., 1990; Duflo, 2003; Armand et al., 2020). The link is larger for stunting than for wasting. A regular and predictable transfer is better suited to preventing long-term growth problems than to responding to sudden shocks such as an illness.

These results agree with Gertler (2004) and Fernald et al. (2008), who found that Progresa and Oportunidades improved child growth in Mexico, and with Paxson and Schady (2010), who found that an unconditional transfer improved the physical development of the poorest children in Ecuador. They are also in line with Chakrabarti et al. (2021) for the Mamata scheme in India. However, they differ from Zhou et al. (2020), who found no effect on child health in rural China, and the size of our effects is modest, as in the review by Manley et al. (2013). Soofi et al. (2022) show that BISP cash reduced stunting more when it was combined with a nutrient supplement or with advice on feeding and care, so our estimates probably show only part of what a programme with a nutrition focus could achieve. The smaller effect in Lodhran may be because cash cannot make up for unsafe water and poor health services, which are worst in that district.

Table 4: Determinants of wasting (IV-probit)

Variables	Multan Division	Lodhran	Khanewal	Multan	Vehari
Social Protection (Base: Non-Beneficiaries)					
Cash Transfer (BISP)	-0.214** (0.089) [-0.044]	-0.186** (0.094) [-0.038]	-0.236*** (0.087) [-0.049]	-0.253*** (0.085) [-0.052]	-0.208** (0.091) [-0.043]
Women's Empowerment Indicators					
Economic Empowerment	-0.196*** (0.076) [-0.040]	-0.172** (0.082) [-0.035]	-0.218*** (0.075) [-0.045]	-0.233*** (0.073) [-0.048]	-0.192** (0.079) [-0.039]
Social Empowerment	-0.158** (0.079) [-0.032]	-0.141* (0.084) [-0.029]	-0.178** (0.078) [-0.036]	-0.191** (0.076) [-0.039]	-0.156* (0.081) [-0.032]
Familial Empowerment	-0.139* (0.074) [-0.029]	-0.122 (0.079) [-0.025]	-0.154** (0.073) [-0.032]	-0.166** (0.071) [-0.034]	-0.136* (0.076) [-0.028]
Political Empowerment	-0.091** (0.044) [-0.019]	-0.072 (0.055) [-0.015]	-0.101** (0.049) [-0.021]	-0.109*** (0.042) [-0.022]	-0.083 (0.052) [-0.017]
Overall Women's Empowerment	-0.244*** (0.092) [-0.050]	-0.218** (0.098) [-0.045]	-0.269*** (0.091) [-0.055]	-0.289*** (0.089) [-0.059]	-0.241** (0.095) [-0.050]
Interaction Terms (BISP × Empowerment)					
BISP × Economic Empowerment	-0.149* (0.082) [-0.031]	-0.132 (0.087) [-0.027]	-0.164** (0.081) [-0.034]	-0.176** (0.079) [-0.036]	-0.146* (0.084) [-0.030]
BISP × Social Empowerment	-0.126* (0.071) [-0.026]	-0.112 (0.076) [-0.023]	-0.138** (0.070) [-0.028]	-0.148** (0.069) [-0.030]	-0.124* (0.073) [-0.025]

BISP	×	-0.098	-0.086	-0.106	-0.114*	-0.095
Familial		(0.067)	(0.072)	(0.066)	(0.065)	(0.069)
Empowerment		[-0.020]	[-0.018]	[-0.022]	[-0.023]	[-0.020]
BISP	×	-0.066	-0.058	-0.072	-0.078	-0.064
Political		(0.063)	(0.068)	(0.062)	(0.061)	(0.065)
Empowerment		[-0.014]	[-0.012]	[-0.015]	[-0.016]	[-0.013]
BISP	×	-0.174**	-0.155*	-0.191**	-0.206**	-0.171*
Overall		(0.088)	(0.093)	(0.087)	(0.085)	(0.090)
Women's		[-0.036]	[-0.032]	[-0.039]	[-0.042]	[-0.035]
Empowerment						
Child Characteristics						
Gender (Base: Girl)		0.074*	0.084*	0.071*	0.068*	0.078*
		(0.042)	(0.045)	(0.041)	(0.040)	(0.043)
		[0.015]	[0.017]	[0.015]	[0.014]	[0.016]
Birth Order		0.058**	0.069**	0.055**	0.051**	0.062**
		(0.025)	(0.028)	(0.024)	(0.023)	(0.026)
		[0.012]	[0.014]	[0.011]	[0.011]	[0.013]
Birth Size (Base: Small)						
Medium		-0.129**	-0.114*	-0.140**	-0.151**	-0.126**
		(0.059)	(0.064)	(0.058)	(0.056)	(0.061)
		[-0.027]	[-0.023]	[-0.029]	[-0.031]	[-0.026]
Large		-0.262***	-0.231***	-0.283***	-0.301***	-0.257***
		(0.077)	(0.082)	(0.075)	(0.073)	(0.079)
		[-0.054]	[-0.048]	[-0.058]	[-0.062]	[-0.053]
Breastfeeding (Base: No)		-0.184**	-0.163*	-0.201**	-0.214***	-0.181**
		(0.081)	(0.085)	(0.079)	(0.077)	(0.082)
		[-0.038]	[-0.034]	[-0.041]	[-0.044]	[-0.037]
Diarrhea (Base: No)		0.281***	0.319***	0.264***	0.248***	0.296***
		(0.086)	(0.092)	(0.084)	(0.082)	(0.088)
		[0.058]	[0.066]	[0.055]	[0.051]	[0.061]
Model Statistics						
Observations		768	104	184	292	188
Wald Test of Exogeneity ($\chi^2(1)$)		15.94	14.86	17.91	19.82	16.48
Prob > χ^2		0.000	0.000	0.000	0.000	0.000
Pseudo R ²		0.196	0.186	0.212	0.223	0.198

Source: Estimated by the authors; see notes to Table 3.

Economic empowerment is the most protective type for every outcome, with full-sample AMEs of -4.5 (stunting), -4.0 (wasting) and -4.3 points (underweight). A mother who controls income can buy food and pay for health care without asking anyone for approval. Mothers also tend to spend money

they control on children's food and health more than fathers do (Thomas et al., 1990; Hoddinott & Haddad, 1995). The result matches Shafiq et al. (2019) for Pakistan and Imai et al. (2014) for India. It also agrees with Rehman et al. (2019), who found that women's land ownership improved child food security in Pakistan, and with Smith et al. (2003), who found that women's status was strongly linked to child nutrition across developing countries. It is stronger than the mixed results for control of resources in the South Asian review of Cunningham et al. (2015), which may be because we instrument empowerment and so reduce measurement error.

Social empowerment is protective in every sample but smaller (-3.2 to -3.6 points). Mothers who can move freely and meet other people learn more about good feeding practices, get help from others during illness or food shortage, and can take a sick child to a clinic without first asking permission. Vir (2016) and Cunningham et al. (2015) stress these channels for South Asia. The result agrees with Mekonnen et al. (2021), who found that the social independence domain of SWPER, along with the other two domains, reduced stunting and underweight in Ethiopia. It differs from Izraelov and Silber (2019), who found that access to information did not improve child health in Ghana. The difference may be because our social score covers freedom of movement and social contact as well as access to information.

Familial empowerment has the smallest effects (-2.9 to -3.1 points) and is not significant in Lodhran for wasting and underweight. When a mother has more say in family decisions, her mother-in-law or husband is less able to override her choices on feeding and care. This agrees with Izraelov and Silber (2019), who found that decision-making improved child health in Ghana, and with Shafiq et al. (2019) for Pakistan. The weaker effect in Lodhran may be because decisions about a child's health matter less where clinics are far away and poorly equipped. In such places, even a mother who decides to seek care may not be able to get it.

Political empowerment is protective in the full sample, Khanewal and Multan district for all three outcomes, and in Vehari for stunting and underweight at the 10 percent level. Its effects are small (about -2.0 points in the full sample), and it is never significant in Lodhran. Voting and civic participation are far from daily feeding decisions. Their main benefit is that a mother who knows her rights is more likely to use public health and nutrition services, but this only helps where those services exist (Pratley, 2016). This is in line with Besnier (2023), who found only small effects of women's political empowerment on child nutrition across 161 countries.

The overall index is protective in all models (-5.0 to -5.6 points). It combines all four types of empowerment, so it picks up mothers who have money, freedom of movement, a say in family decisions and political voice at the same time. These advantages support each other, which explains why the overall index has the largest effects. The result is consistent with Inamdar et al. (2023), who also used an overall measure for India, Nepal and Pakistan, and with Jones et al. (2019) for East Africa. It is also in line with the review by Carlson et al. (2015), which found that women's autonomy was linked to better child nutrition in most studies.

Table 5: Determinants of underweight (IV-probit)

Variables	Multan Division	Lodhran	Khanewal	Multan	Vehari
Social Protection (Base: Non-Beneficiaries)					
Cash Transfer (BISP)	-0.228** (0.090) [-0.047]	-0.199** (0.095) [-0.041]	-0.251*** (0.088) [-0.052]	-0.271*** (0.086) [-0.056]	-0.222** (0.092) [-0.046]
Women's Empowerment Indicators					
Economic Empowerment	-0.207*** (0.077) [-0.043]	-0.182** (0.083) [-0.038]	-0.231*** (0.076) [-0.048]	-0.248*** (0.074) [-0.051]	-0.203** (0.080) [-0.042]
Social Empowerment	-0.166** (0.080) [-0.034]	-0.148* (0.085) [-0.031]	-0.186** (0.079) [-0.038]	-0.201*** (0.077) [-0.041]	-0.164** (0.082) [-0.034]
Familial Empowerment	-0.146* (0.075) [-0.030]	-0.129 (0.080) [-0.027]	-0.162** (0.074) [-0.033]	-0.176** (0.072) [-0.036]	-0.143* (0.077) [-0.030]
Political Empowerment	-0.095** (0.044) [-0.020]	-0.075 (0.055) [-0.016]	-0.104** (0.049) [-0.021]	-0.113*** (0.042) [-0.023]	-0.086* (0.052) [-0.018]
Overall Women's Empowerment	-0.256*** (0.093) [-0.053]	-0.229** (0.099) [-0.047]	-0.282*** (0.092) [-0.058]	-0.304*** (0.090) [-0.063]	-0.253*** (0.096) [-0.052]
Interaction Terms (BISP × Empowerment)					
BISP × Economic Empowerment	-0.156* (0.083) [-0.032]	-0.139 (0.088) [-0.029]	-0.173** (0.082) [-0.036]	-0.186** (0.080) [-0.038]	-0.154* (0.085) [-0.032]
BISP × Social Empowerment	-0.132* (0.072) [-0.027]	-0.116 (0.077) [-0.024]	-0.144** (0.071) [-0.030]	-0.155** (0.070) [-0.032]	-0.129* (0.074) [-0.027]
BISP × Familial Empowerment	-0.101 (0.068) [-0.021]	-0.089 (0.073) [-0.018]	-0.110 (0.067) [-0.023]	-0.118* (0.066) [-0.024]	-0.099 (0.070) [-0.020]
BISP × Political Empowerment	-0.068 (0.064) [-0.014]	-0.059 (0.069) [-0.012]	-0.074 (0.063) [-0.015]	-0.080 (0.062) [-0.016]	-0.066 (0.066) [-0.014]
BISP × Overall Women's Empowerment	-0.181** (0.089) [-0.037]	-0.161* (0.094) [-0.033]	-0.199** (0.088) [-0.041]	-0.214** (0.086) [-0.044]	-0.178* (0.091) [-0.037]
Child Characteristics					

Gender (Base: Girl)	0.077* (0.042) [0.016]	0.088* (0.045) [0.018]	0.075* (0.041) [0.016]	0.071* (0.040) [0.015]	0.081* (0.043) [0.017]
Birth Order	0.062** (0.025) [0.013]	0.073*** (0.028) [0.015]	0.058** (0.024) [0.012]	0.054** (0.023) [0.011]	0.066** (0.026) [0.014]
Birth Size (Base: Small)					
Medium	-0.136** (0.060) [-0.028]	-0.119* (0.065) [-0.025]	-0.147** (0.059) [-0.030]	-0.159*** (0.057) [-0.033]	-0.132** (0.062) [-0.027]
Large	-0.276*** (0.078) [-0.057]	-0.243*** (0.083) [-0.050]	-0.297*** (0.076) [-0.061]	-0.318*** (0.074) [-0.066]	-0.269*** (0.080) [-0.056]
Breastfeeding (Base: No)	-0.192** (0.082) [-0.040]	-0.170** (0.086) [-0.035]	-0.209*** (0.080) [-0.043]	-0.224*** (0.078) [-0.046]	-0.188** (0.083) [-0.039]
Diarrhea (Base: No)	0.266*** (0.087) [0.055]	0.304*** (0.093) [0.063]	0.251*** (0.085) [0.052]	0.236*** (0.083) [0.049]	0.281*** (0.089) [0.058]
Model Statistics					
Observations	768	104	184	292	188
Wald Test of	16.41	15.18	18.73	20.37	17.01
Exogeneity ($\chi^2(1)$)					
Prob > χ^2	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.209	0.197	0.225	0.238	0.211

Source: Estimated by the authors; see notes to Table 3.

BISP works better when mothers have more say. The interactions between BISP and the economic, social and overall scores are negative and significant in the full sample and in Khanewal, Multan district and Vehari, although the economic and social interactions are not significant in Lodhran. The familial interaction is not significant for the whole division and passes the 10 percent level only in Multan district and, for stunting, in Khanewal. The political interaction is never significant. So the transfer protects most the children whose mothers already have more economic and social empowerment. The reason is that a mother with a strong voice can make sure the money is spent on food and care instead of on other household needs. At the same time, the extra money lets her act on priorities she could not afford before (Duflo, 2012). This is what collective household models predict when cash is paid to the parent who cares more about child nutrition (Attanasio & Lechene, 2010; Armand et al., 2020). It supports the argument of Vir (2016) that cash transfers and women's empowerment work best for child nutrition when they go together. It also helps explain why Manley

et al. (2013) found such different results across cash transfer programmes, since the same cash may do less where mothers have little control over how it is spent.

Recent diarrhoea is the largest risk factor. It is linked to a 5.1-point higher chance of stunting, 5.8 points for wasting and 5.5 points for underweight, with the largest effects in Lodhran (up to 6.6 points for wasting). Diarrhoea reduces the body's ability to absorb nutrients and causes loss of appetite, and undernourished children in turn catch infections more easily, so the two feed each other (Siddiqi et al., 2023). Diarrhoea also points to unsafe water and poor sanitation (Khan et al., 2019). The effect is largest for wasting, because wasting reflects recent weight loss, which a bout of diarrhoea causes directly. This agrees with Checkley et al. (2008), who found across several countries that children with more episodes of diarrhoea before age two were more likely to be stunted, and with Khan et al. (2019) and Siddiqi et al. (2023) for Pakistan. The larger effect in Lodhran fits with its poorer water and sanitation.

Large size at birth is the strongest protective factor (−5.4 to −6.0 points), and medium size at birth is also protective compared with small size. Children born small often start life with low nutrient stores and are more likely to fall ill, and many never catch up in growth. This agrees with Abbas et al. (2021), who show that low birth weight raises the risk of stunting and wasting in Sindh, and with Christian et al. (2013), who found that children born small or preterm in low- and middle-income countries had higher risks of stunting, wasting and underweight. Since birth size depends on the mother's own nutrition during pregnancy, this result also points to the importance of maternal nutrition (Black et al., 2013).

Breastfeeding is linked to lower risk on all three measures (−3.8 to −4.2 points). Breast milk gives young children the nutrients they need and protects them against diarrhoea and other infections, which in turn protects their growth (Victora et al., 2016). It is also clean and free, which matters in poor households with unsafe water. This result is in line with Rahman (2016) and with the Pakistani evidence of Siddiqi et al. (2023).

Each additional birth order is linked to a 1.2 to 1.4 point higher risk of undernutrition. When there are more children, food, money and the mother's time are shared among more of them, so later-born children get less (Rahman, 2016; Siddiqi et al., 2022). Mothers who have had many births may also be in poorer health themselves. Jayachandran and Pande (2017) found a similar birth-order gradient in child height in India. Boys are a little more likely than girls to be undernourished (1.5 to 1.7 points in the full sample). This is significant at the 10 percent level in every sample and at the 5 percent level for stunting in Lodhran. Boys are thought to be more biologically vulnerable to infection and growth problems in early life (Thurstans et al., 2020). The result matches Thurstans et al. (2020), who found in a meta-analysis that boys are more likely to be undernourished than girls, and Wamani et al. (2007), who found that boys were more stunted than girls in Sub-Saharan Africa. It differs from Jayachandran and Pande (2017), who found that son preference in India favoured boys. The larger effect in Lodhran suggests that the gap between boys and girls widens where resources are scarcest.

The protective links of BISP, empowerment, birth size and breastfeeding are largest in Multan district and become weaker towards Lodhran, where several empowerment and interaction terms lose significance. Diarrhoea and birth order, in contrast, matter most in Lodhran. Pseudo R^2 values follow the same order. Because the Lodhran sample is small (104 mothers) and the district confidence intervals overlap, this pattern should be read as a rough guide only, not a formal test. Where water, sanitation and health services are weaker, protective household factors seem to do less and the risks from infection seem to do more. This fits with Mahmood et al. (2020), who found that stunting in Punjab is closely linked to district wealth and services.

Conclusion and Policy Implications

This paper studied how BISP receipt and mothers' empowerment were related to stunting, wasting and underweight among children under five in Multan Division, using a matched survey and IV-probit models. Children of BISP recipients were less likely to be undernourished in every district, and so were children whose mothers had higher economic, social and overall empowerment scores. Familial empowerment was not significant in Lodhran for wasting and underweight, and political empowerment was never significant there. Economic empowerment gave the most protection, and the transfer protected most where mothers already had more economic and social empowerment. Diarrhoea was the largest risk factor, while large birth size and breastfeeding were strongly protective. Almost every protective link was strongest in Multan district and weakest in Lodhran.

These results have four policy lessons. First, BISP should continue and its real value should be protected. The evidence from Punjab shows that adding nutrient supplements or advice on feeding and care to BISP, starting in Lodhran and Vehari, would greatly increase its effect. Second, programmes that build income and assets for BISP women, such as savings groups and skills training, would strengthen the economic channel that protects children most. Third, investment in clean water, sanitation and hygiene and in access to oral rehydration therapy, with Lodhran first, would address the largest risk we found. Fourth, nutrition advice for mothers during pregnancy, birth-spacing services and support for breastfeeding through Lady Health Workers would improve birth size, birth spacing and feeding practices. Nutrition advice that also includes husbands and mothers-in-law could help mothers act on their own choices.

The study has some limitations. It uses cross-sectional data, and BISP status is measured at the time of the survey, while stunting reflects conditions since birth. We cannot prove that house and land ownership affect child nutrition only through the mother's empowerment. Like Kiani (2023), we did not instrument BISP receipt. If families who join the programme differ in ways the survey does not record, its coefficient may be biased, and the same applies to the BISP $\times$ empowerment interactions, which were also not instrumented. Recipients were matched by locality, not randomly assigned, district samples are small, and only one child per mother enters the regressions. Birth size and breastfeeding depend on mothers' memory. Future studies could follow the same children over time, extend the models to all 1,179 children with standard errors clustered by mother, and test whether adding nutrition components to BISP in Multan Division closes the gap between the poorest and the best-off districts.

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