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Impact of Unconditional Cash Transfer on Child Nutrition in Pakistan: Evidence from Benazir Income Support Program (BISP)

Abstract *The prevalence of impaired growth of children has been an immensely painful phenomenon in developing countries. The core reasons behind impaired growth among children are the prevalence of inadequate nutrition intakes. BISP cash transfer has a long-run objective to ensure the nutritional status of the beneficiaries. Therefore, the prime objective of the study is to evaluate the effects of BISP on child nutrition (less than five years) by using the four waves of the household surveys conducted by Oxford Policy Management (OPM) to document the BISP impact evaluation. The results of RDD estimation indicate that cash transfer has positive and significant effects on child nutrition. Likewise, we also employed the household fixed-effect model. The findings also authenticate the results of RDD. Further results highlight that BISP has more significant and positive impacts on male children's nutrition than the beneficiaries' female children.*

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Introduction

The underlying paper's objective is to evaluate the impacts of the cash transfer program on Pakistan's child nutrition. The short-term goals of the BISP are to obtain consumption smoothing to cushion the effects of the hike in food prices during 2008, while the long-term objectives include women empowerment and improved level of household nutritional status. Specifically, improved nutrition among children is one of the cores long-run objectives of BISP (Ambler and de Brauw, 2019; Cheema *et al*., 2016).

Virtually, the world's 40% of stunted children are from South Asia, which means the region faces acute malnutrition. Stunting has lifelong impacts on brain development (World Bank, 2020). Likewise, Pakistan is among those countries where children are

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prey to malnutrition. According to the Demographic Health Survey (DHS), during 2017-18, 37.6% of children are found a victim of stunted growth. The gender differences are not much higher regarding child stunted growth—38.2% male children, while 37.1 female children are stunted. However, uneducated households face 47.6%, while highly educated families face 15% child stunting. These differences are further widened to the wealth quintile, where the lowest quintile is facing 56.5% child stunting growth whereas the fourth (30.4%) and fifth quintiles (22%) are facing relatively lower child stunting respectively (WHO, 2019). The latter estimates demonstrate that those households that belong to the bottom wealth quintile face a high level of child stunting. Alternatively, it means the low-income families are facing the highest level of child stunting. The primary reason for such child stunted growth among the poor is a financial constraint and low-level food-related purchasing power (Jahangeer *et al.*, 2020).

Cash transfer programs are considered a vital policy to support society's poor segment, easing financial constraints. The targeting through cash transfer programs is a source to increase household well-being in developing countries (Jahangeer *et al.*, 2020; Almas *et al.*, 2019; Barrett, 2019; Nino-Zarazua, 2019 Bhalla *et al.*, 2018; Bazzi *et al.*, 2015; Chakrabarti *et al.*, 2020; Nawaz and Iqbal, 2020a, 2020b).

Similarly, the Benazir Income Support Program (BISP) is Pakistan's largest cash transfer program. The beneficial impacts of BISP on child nutrition levels are expected to reduce the stunted growth among children of low-income families through the channel of the theory of change. These expected positive impacts on child growth are formulated by the cash transfers' findings on child impaired growth globally (Cheema *et al.*, 2016). The existing literature is showing positive impacts. The study conducted by Tiwari *et al.* (2016) has found that cash transfers have reduced food insecurity among households in Sub-Saharan African countries. Their findings indicate that a reduction in food insecurity has improved the child nutrition level among the beneficiaries. Moreover, there are heaps of studies which have identified the beneficial effects of the cash transfers on household and child nutrition in developing countries (e.g., Baird *et al.*, 2013; Manley et al., 2013; Manley and Slavchevska, 2017; Chakrabarti *et al.*, 2020; Cooper *et al.*, 2020).

In light of evidence from existing literature on cash transfer, it is expected that BISP cash transfer could have significant impacts on reducing malnutrition among beneficiaries in the long run. Therefore, this paper focuses on estimating the BISP on anthropometric growth of children (under five years) in Pakistan—three indicators: *Weight-for-Height*, *Weight-for-Age*, and *Height-for-Age*. Moreover, the underlying study maintains a focus on capture gender-specific impacts of the cash transfer. The underlying study provides long-run and short-run effects of the cash transfer.

Design and Implementation of BISP

In 2008, the incumbent federal government of Pakistan launched BISP to cushion the adverse influences of shocks in food prices. The primary objective was to maintain the consumption smoothing among beneficiaries. Moreover, the broader objective of BISP UCT is to fulfill the country's redistributive goals by awarding a minimum level of cash transfer (CT) to the poorest people who are highly vulnerable to idiosyncratic and covariate shocks in the future. Till 2019, the coverage of the BISP was over 5 million households. Nonetheless, in 2020, BISP blocked the disbursement of around 0.8 million households after reviewing their status.

In the initial phase of the program, beneficiaries were selected through parliamentarians due to the unavailability of data. This raised doubts regarding the effectiveness and transparency of the program (Government of Pakistan, 2014). To overcome this problem, a "Poverty Scorecard" for identification of the poorest people was adopted by BISP, which is a World Bank designed instrument. In 2010-11, to identify eligible people for BISP, World Bank suggested a threshold of 16.17. Below this cut-off, households are considered eligible for UCT with some exceptions.

Moreover, these eligible families must comprise ever-married women, and they must hold the Computerized National Identity Card (CNIC). In addition, these women must get themselves registered in local offices of BISP to be beneficiaries of the UCT program (Ambler and Brauw, 2019; Cheema *et al.*, 2016). The households enrolled under BISP were given PKR 1000 per month – PKR 3000 was paid quarterly. However, the benefit level gets increased steadily. With the dollar's increasing value, the benefit amount increased to around PKR 5000 quarterly (Iqbal and Nawaz, 2019, 2020).

Conceptual Framework

The conceptual framework of this objective is followed by Chakrabarti *et al.* (2020) to describe the link between cash transfers and child nutrition. They have adopted the framework, wrapped up with household production-function defined by Becker (1965). This household production function has been implemented by Strauss and Thomas (1995) to explain child health and nutrition. The model explains three distinctions. Firstly, a child nutrition production function links with a child's nutrition level to the psychological and behavioral inputs that directly impact the nutritional status. Such inputs include calorie intakes, clean water usage, and other sanitation and health-related input, cumulatively affecting the household nutrition production function. These inputs are choices that are known to the decision-makers.

The second explanation is of the input demand functions, which significantly affect preferences when these demand function inputs have interacted in the nutrition production function. Such inputs of demand function include prices, income, time, and other exogenous factors. Likewise, the third relationship is explained through the final specification of the demand function for goods and services, which is appeared directly into the utility function, contrary to inputs of demand, which only affect the utility through their influences on the nutrition (Moncayo *et al.*, 2019; Chakrabarti *et al.*, 2020). However, for this study's objective, the essential demand is the demand for child-nutrition, which is the exogenous function.

The BISP also believes in the above-discussed framework and linked it with the theory of change where BISP has specified short-term objectives and then believes in the long-term influence of cash transfers on beneficiaries. The short-term objective has been specified to support the poorest people against the adverse effects of shocks on food prices. Nonetheless, the long-term disbursement of the BISP-cash amount would allow cash recipients to plan desirable investment in food consumption and nutrition, health and education, and production assets. In return, such potential investment would help households to improve human and physical capital, which permanently graduate them out of chronic poverty (Cheema et al., 2014). In the previous section, we have reviewed the literature regarding cash transfer, which has shown the positive and significant impact of the unconditional cash transfer (i.e., Angelucci *et al.*, 2009; Zembe-Mkabile, 2016; Manley and Slavchevska, 2017; Hidrobo *et al.*, 2018; Ribas, 2019; Aizawa, 2020;

Cooper *et al.*, 2020; Chakrabarti *et al.*, 2020).

According to the BISP theory of change, in the short-run, cash transfer affects household expenditure, which are two types, i.e., food and non-food expenditures. The medium-term impacts are expected to increase calorie intake and food diversification, ultimately increasing the beneficiaries' nutritional status in the long run. Likewise, non-food expenditure enhances health utilization and educational attainment in the medium-term; however, it may lead to morbidity and school progression in the long run (Cheema *et al.*, 2016).

Data Source and Variable Description

Data Description

The underlying research paper has employed the four waves of household panel data conducted by BISP with Oxford Policy Management (OPM) to document the impact-assessment reports. The baseline survey-2011 comprises 8400 households, while the follow-up survey 2013 contains panel households in 8221. Likewise, the second follow-up survey contains 7700-panel households, whereas the follow-up 2016 contains 11395 households wherein only 3700 households are panel households. The survey of 2016 comprises 7695 additional households. This suggests the almost 50% attrition rate in the survey, conducted during 2016 (Ambler and Brauw, 2019).

Table 1. Sample Distribution for Children

Survey Period	Frequency of Child (<5 years)	% of Total Pooled Sample
Baseline survey 2011	6098	26.55
Follow-up survey 2013	5403	23.52
Follow-up survey 2014	4759	20.72
Follow-up survey 2016	6709	29.21
Total	22969	8732

As the study's primary focus is on children (below age five years), the children's sample is our primary target. The information of the desired sample is presented in table-1. For empirical analysis, we have used sample cross section-wise and then pooled the four waves.

Variable Description

To construct outcome variables, we have obtained child-specific information: weight, height, age (in months), and gender. The weight of children is measured in kilograms, while height is measured in centimeter. By utilizing these children's specific information, we have estimated three indicators of child growth, as suggested by the World Health Organization (WHO)—*weight-for-height, weight-for-age, and height-for-age*. These indicators are defined in the framework of the Z-score system. This system takes the anthropometric value as a standard deviation below/above the reference median value. The three indicators of child growth are constructed using age, gender, weight & height of children (less than five years). Using the aforementioned child-specific information, we have implemented them in STATA-Software to compute the three indicators, as mentioned above. The WHO has suggested that Height-for-Age measures stunting, under-weight is estimated by *Weight-for-Age*, while Weight-for-Height measures are wasting.

The binary variable of the BISP beneficiary is the main independent variable, whereas the PMT score is the running variable. Control variables include the child's age and gender. The household-specific factors comprise family size, head's age, gender, education, and household level calorie intakes. However, for *weight-for-height,* three thresholds are used to categorize it. Overweight is defined if the *weight-for-height score* is found above +2, while moderate wasting is defined if the score is estimated between -2 & -3. Nonetheless, severe wasting is measured if the *weight-for-height score* is estimated by below -3—the WHO specifies these standards. A brief description of all variables is given in appendix-A1 (see table-2). Similarly, the descriptive analysis of the control variables is given in appendix-A2.

Table 2. Description of Child (less than 5 years) Anthropometric Growth

Indicator	Brief Description
weight-for-age	Z-score is calculated for child less than five years on the basis of weight (kg), age, and gender by using WHO standards. It is indicator of underweight.
Moderate-underweight	Children less than five years, whose *weight-for-age* ranges -2 & -3.
Severe-underweight	Children less than five years, whose *weight-for-age* is measured less than -3.
height-for-age	It is indicator of stunted growth or malnutrition. Its Z-score is calculated for child less than five years on the basis of height (cm), age, and gender by using WHO standards.
Moderate-stunting	Children less than five years, whose score of *height-for-age* ranges -2 & -3.
Severe-stunting	Children less than five years, whose *height-for-age* is measured less than -3.
weight-for-height	It is indicator of wasting. Its Z-score is calculated for child less than five years on the basis of weight (kg), height (cm), age, and gender by using WHO standards.
Overweight	Children less than five years, whose *weight-for-height* is estimated > +2.
Moderate-wasting	Children less than five years, whose *weight-for-height* ranges -2 & -3.
Severe-wasting	Children less than five years, whose *weight-for-height* is estimated less than -3.

Empirical Strategies

This study endeavors to estimate BISP impacts on child nutrition by robust Regression Discontinuity Design (RDD) and household fixed-effect model. RDD approach is applied in the case of estimation for separate years. A household fixed effect is implemented to check what happened to the results if we pooled the four household survey waves. The reason is RDD ensures internal validity because it utilizes the subsample out of the total sample. To use the full sample, we have pooled the data of waves. The household fixed effect is then applied to capture the unobservable differences between the recipient and the non-recipient of the unconditional cash transfers.

Implementation of Robust Regression Discontinuity Design (R-RDD)

The eligibility criterion of BISP depends on the specified cut-off point of poverty score, which makes BISP receipt non-random. To evaluate the program's impacts, a simple comparison between treatment and control groups is not effective because it could confound the effects of the program with other systematic differences between beneficiaries and non-beneficiaries. The program's design is compatible with the implementation of Regression Discontinuity Design (RDD), which compares marginally ineligible and eligible households (above and below 16.17 PMT score). This design estimates the local average treatment effect (ATE) owing to its local nature, covering households closer to both sides of the eligibility criterion (Ambler and de Brauw, 2017 & 2019).

RDD estimates provide a causal effect for any intervention program by specifying a threshold below or above which an intervention is launched. Holding certain assumptions, neighboring observations to the eligibility cut-off are taken to determine whether treatment around the specified cut-off point is random. By setting the fixed bandwidth as the closest neighborhood around the threshold, we can measure the causal effect, which is considered as the local average treatment effect of the intervention program (e.g., Calonico *et al.*, 2018; Cheema *et al.*, 2016; de Groot et al., 2017; Gertler, 2004; Iqbal and Nawaz, 2020).

For the empirical purpose, we have implemented fuzzy RDD, which seems appropriate in BISP design (see Ambler and de Brauw, 2019). The final specification of the RDD, which is being used by this study, is specified as follows.

$$Y_i = \beta_0 + \lambda T_i + \beta_1(X - c) + \beta_1 T * (X - c) + \sum \beta_i Z_i + \mu_i \quad (1)$$

In the above equation, Y_i is indicating for the three indices of the child-nutrition (*weight-for-height, height-for-age, weight-for-age)*. Moreover, c represents the poverty score cut-off for BISP 16.17, and X is a continuous variable such as the poverty score variable or PMT score. T is a binary variable that takes value one if X ≥c, indicating the BISP cash transfer binary variable (treatment variable). Let h be the bandwidth of the data, which means c-h≤ X ≤ c + h. This term indicates that range of h just above and below the cut-off of BISP poverty score.

Moreover, Z_i is suggesting the control variables (already discussed in the previous section). Likewise, Ambler and de Brauw (2017 & 2019) have implemented RDD as an empirical strategy to trace the effects of BISP on labor supply by using the same data. They have estimated the validation of the RDD approach on the same data. Therefore, we have not repeated that exercise.

Apart from R-RDD, this paper has implemented the household fixed effect model to check the validation of the results estimated through R-RDD. Alternatively, the unobservable differences between beneficiaries and non-beneficiaries are captured by applying the household fixed-effect model. The existing literature is suggestive of the application of this approach when household-specific heterogeneity is required to fix (Chen *et al.*, 2016)

Results and Discussion

Descriptive Analysis

The estimated indices of child growth are further categorized by specifying the cut-offs as WHO has suggested. Table-4 indicates the percentage distribution of the prevalence

of child nutritional levels among beneficiaries and non-beneficiaries of the BISP cash transfer over time. By and large, differences between both cash recipients and non-recipients are not huge for different *height-for-age levels.* However, differences between time periods are much visible. The very low stunting growth among children of beneficiaries was, on average, 2.65% in the base period while it is 3.28% in follow-up 2016. This highlights the improvement in child growth over time. Specifically, after 2013, severe malnutrition declined from 29.03% to 24.53%. Nonetheless, the severe malnutrition among non-beneficiaries has increased from 22.44% to 23.25%. In sum, the low-level malnutrition (*height-for-age*) is increasing among children of cash recipient households as compared to non-beneficiaries (table-4). Although the differences are not much bigger, still cash recipients are having an improved level of child nutrition in the long run (from 2011-016) as compared to the short-run (from 2011-013).

Table 4. (%) Prevalence of Child Growth (under five years) by Categories: Over the Time

	BISP Beneficiaries					**Non-Beneficiaries**				
	Baseline Survey	**Survey 2013**	**Survey 2014**	**Survey 2016**	**Total**	**Baseline Survey**	**Survey 2013**	**Survey 2014**	**Survey 2016**	**Total**
Height-for-Age Categories: Stunting Growth (%)										
Very low	2.65	2.35	4.25	3.28	3.13	2.26	3.99	4.1	3.45	3.39
Low	52.22	44.54	50	50.33	49.55	57.21	51.93	56.27	51.6	54.38
Moderate	23.57	24.08	22.44	21.86	22.8	22.9	21.64	21.35	21.7	21.96
Sever	21.56	29.03	23.32	24.53	24.52	17.63	22.44	18.28	23.25	20.27
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Weight-for-Age Categories: Underweight (%)										
Very low	0.26	0.34	0.36	0.53	0.4	0.08	0.48	0.28	0.54	0.33
Low	57.44	52.77	55.91	64.45	58.91	63.35	60.54	61.65	67.29	63.09
Moderate	28.02	27.8	26.06	22.04	25.31	24.44	24.61	23.79	20.33	23.44
Sever	14.29	19.09	17.67	12.98	15.38	12.13	14.37	14.28	11.84	13.14
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Weight-for-Height Categories: Wasting (%)										
Very low	0.81	1.96	1.61	2.82	1.96	0.51	2.05	2.12	3.38	1.9
Low	77.5	77.58	72.18	79.13	77.14	80.27	76.25	72.36	78.95	77.16
Moderate	14.37	12.68	15.75	11.48	13.18	12.79	13.96	15.24	10.98	13.25
Sever	7.31	7.78	10.47	6.56	7.71	6.44	7.74	10.29	6.69	7.69
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

By using WHO (2019) Thresholds: (Very low= Z>2), (Low=z<2&z>-2), (Moderate=z<-2&z>-3), (Sever=z<=-3)

The estimates of underweight (*Weight-for-Ag Z-score*) that very low and low level of underweight among children indicates improvements from 57.44% to 64.45% during 2011 and 2016, respectively. The overall estimates suggest that 58.91% of children of beneficiary families are facing a low level of underweight. Similarly, estimates of moderate and severe underweight have declined, which also demonstrates the improved level of child growth. The third indicator, *Weight-for-Height Z-score,* which is indicating for wasting. It is evident that moderate and severe levels of wasting are declined over time, specifically during 2016 among the children of BISP cash receiving households (table-4).

Furthermore, gender differences are also observed for the beneficiary and non-beneficiary households separately. The table-5 contains information about child growth indicators with respect to gender for BISP beneficiaries. The estimates for malnutrition or stunting are suggestive that, by and large, there are not huge gender differences. Nonetheless, females are having a relatively higher level of severe malnutrition as compared to male children of beneficiaries. Similarly, male children are also facing a relatively lower level of moderate malnutrition as compared to female children (table-5).

Table 5. (%) Prevalence of Child Growth among Beneficiaries by Gender: Over the Time

	Male Child (under five years)					**Female Child (under five years)**				
	Baseline Survey	**Survey 2013**	**Survey 2014**	**Survey 2016**	**Total**	**Baseline Survey**	**Survey 2013**	**Survey 2014**	**Survey 2016**	**Total**
Height-for-Age Categories: Stunting Growth (%)										
Very low	2.42	2.26	4.18	2.9	2.9	2.89	2.45	4.32	3.71	3.39
Low	52.42	44.17	51.17	50.27	49.7	52.02	44.94	48.79	50.4	49.38
Moderate	24.21	24.53	21.81	21.85	22.91	22.89	23.6	23.08	21.87	22.68
Sever	20.95	29.04	22.83	24.99	24.49	22.19	29.01	23.81	24.02	24.55
Total	100	100	100	100	100	100	100	100	100	100
Weight-for-Age Categories: Underweight (%)										
Very low	0.25	0	0.2	0.58	0.32	0.26	0.72	0.53	0.48	0.49
Low	58.51	51.88	57.8	63.75	59.09	56.32	53.73	53.95	65.23	58.71
Moderate	28.13	29.14	25.38	22.14	25.49	27.89	26.35	26.77	21.92	25.12
Sever	13.11	18.98	16.62	13.53	15.1	15.53	19.2	18.76	12.36	15.68
Total	100	100	100	100	100	100	100	100	100	100
Weight-for-Height Categories: Wasting (%)										
Very low	1	1.69	1.12	2.8	1.86	0.61	2.25	2.11	2.85	2.07
Low	76.21	75.85	70.95	77.33	75.6	78.86	79.47	73.45	81.14	78.8
Moderate	15.19	14.38	16.11	12.18	14.02	13.51	10.83	15.38	10.69	12.27
Sever	7.6	8.08	11.82	7.68	8.51	7.02	7.46	9.06	5.32	6.86
Total	100	100	100	100	100	100	100	100	100	100

By using WHO (2019) Thresholds: (Very low= Z>2), (Low=z<2&z>-2), (Moderate=z<-2&z>-3), (Sever=z<=-3)

The gender differences for underweight of the child less than five years are showing that male children are relatively having higher percentages of low and very low underweight as compared to female children. However, as moderate and severe underweights are concerned, there are not many differences between both genders. Moreover, the indicator of wasting is showing that female children of beneficiaries are having relatively lower levels of wasting as compared to male children.

In sum, malnutrition and underweight measures demonstrate that male children have relatively lower levels as compared to female children. In the case of wasting, female children have relatively improvements as compared to male children.

Empirically Estimated Results

Results Obtained Robust-RDD Estimation

Table-6 comprises the estimated results obtained from the Robust RDD approach for four rounds of the panel household surveys separately. It is evident that BISP unconditional cash transfer has any insignificant effects on height-for-age in 2013, but it does have significant impacts on the periods of 2014 and 2016. These impacts are suggestive that BISP does not have an impact on reducing the stunted growth of children under age five years in the short-run. Hence, BISP is leaving beneficial and significant impacts on the indicator of malnutrition. The positive impacts can be explained as the increase in the *height-for-age* exhibit, reducing malnutrition around the cut-off. The insignificant impacts of cash transfer in the short run are understandable. Stunted growth among children is not a short phenomenon which indicates impaired growth owing to the poor nutrition level of households. Hence, we can say that BISP has significant impacts on reducing impaired growth in the long run among the households which lay around the fixed bandwidth of 5 around the poverty score cut-off of 16.17.

Table 6. BISP Impacts on Child Growth: R-RDD Estimates

	Height-for-Age	**Weight-for-Age**	**Weight-Height**
First Follow-up Survey 2013			
RDD estimate	0.0416	0.3890**	0.0650
	(0.111)	(0.154)	(0.123)
Bandwidth (h)	5	5	5
Number of observations left of cut-off	1390	1390	1390
Number of observations right of cut-off	964	964	964
Total Sample	5403	5403	5403
Kernel	Uniform	Uniform	Uniform
Second Follow-up Survey 2014			
RD robust estimate	0.3946***	0.4948**	0.5420***
	(0.167)	(0.203)	(0.180)
Bandwidth (h)	5	5	5
Number of observations left of cut-off	780	780	780
Number of observations right of cut-off	507	507	507
Total Sample	3191	3191	3191
Kernel	Uniform	Uniform	Uniform
Third Follow-up Survey 2016			
RD robust estimate	0.3196***	0.4572***	0.3272***
	(0.818)	(0.101)	(0.094)
Bandwidth (h)	5	5	5
Number of observations left of cut-off	2732	2732	2732
Number of observations right of cut-off	2757	2757	2757
Total Sample	6679	6679	6679
Control Variables: Child Age, Gender, and Gender of the Head, Household Size, Female Ratio, and Calorie Intakes			

*"Robust Standard Errors in Parentheses: *** p<0.01, ** p<0.05, * p<0.1"*

Similarly, BISP is showing significantly beneficial influences on the indicator of wasting (among children below five years age). The improvement in this indicator is showing the absence of wasting outcomes among children under five years. It is clearly demonstrated in table-5.6 that robust RDD estimates are found to have significant and positive effects during each sampled period. These results are implying that unconditional cash transfer is helping beneficiaries in reducing wasting outcomes among children of beneficiaries in both the short -and long-run. The wasting is suggestive that children are thin due to acute food insecurity. Furthermore, wasting appears owing to a rapid decline in the nutritional status over a short span of time. Hence BISP cash transfer appears to be an important policy tool to assist the families in avoiding the wasting among children less than five years.

Moreover, the third indicator of child growth is *weight-for-height*, which is suggesting an underweight outcome among children if the Z-score is below -2. RDD estimation is showing the positive and significant impacts on reducing the underweight in the long run (during 2014-16), but it has insignificant impacts in the short-run (from 2011 to 2013). Underweight is demonstrating under-nutrition among children. Children in developing countries like Pakistan are facing the problem of under-nutrition, especially in the poorest households. Hence, the cash transfer by BISP is playing a role in dealing with such problems among beneficiaries.

The abovementioned discussion has made evident that unconditional cash transfer disbursed by BISP is helping the poor households to deal with the prevailing issue of child poverty. Three indicators of child poverty include stunted or impaired growth, wasting, and underweight among children less than five years. On the basis of RDD findings, we obtain three conclusions. Firstly, BISP cash transfer does not have significant impacts on reducing the stunted growth in the short run. Nonetheless, it has positive and significant impacts in the long run. Secondly, the cash transfer has strong impacts on the outcome of wasting, which means there is a reduction in child wasting in both the short and long run. Thirdly, BISP cash transfer has significant impacts on reducing underweight among children only in the long run. It is worth mentioning here that the findings of the RDD approach are obtained through the fixed bandwidth of 5 points around the left and right sides of the eligibility threshold around the poverty score.

BISP Cash Transfer and Child Nutrition: Household Fixed Effect Model

After discussing the findings obtained from RDD, the household fixed effect model has been applied to evaluate the impacts of cash transfer on child nutrition in Pakistan. In this respect, three models have been estimated for each indicator of child nutrition. Table-7 contains the estimated results by employing three specifications, i.e., without time, by introducing time and introducing the PMT score in the model to control the economic differences among the households.

The estimated results highlight that overall BISP does not have any significant impact on height-for-age Z-score when all sample is pooled. These results are contradictory, which we have discussed in the case of RDD estimation (see table-6). It is worth remembering that the RDD estimates model by specifying the fixed bandwidth of 5 around the left and right side of the poverty score. Those beneficiaries who are closer to the cut-off point are relatively much richer than that of belong to bottom quintile of PMT. However, household fixed effect captures pooled sample of all four years. Model-3

includes PMT score as explanatory variable and is interacted with BISP dummy variable. It gives us significant effects of BISP unconditional cash transfers on stunting growth. Hence, the implications of these findings are suggestive that those beneficiaries who are having higher PMT score are experiencing positive influences on height-for-age. If look at the binary variable of BISP without interactive term is showing negative impacts of BISP. It suggests that extremely poor households are still facing child stunting, nonetheless, BISP has positive impacts on the child stunting of relatively lower poor BISP beneficiaries.

Likewise, impacts of BISP cash transfer on wasting of child less than five year are found statistically significant and positive without time dummies. But, as time dummies are introduced in the model, impacts become insignificant. However, overall, we can conclude BISP has significant and positive influences on reducing the wasting. Similarly, the disbursement of the BISP amount is showing advantageous and significant influences on *weight-for height*. The positive and significant impacts are indicating that BISP unconditional cash transfer is helping the beneficiaries to reduce the under-weight disease among the children less than five years (table-7).

By concluding the aforementioned findings, overall BISP recipients are experiencing the improved nutritional status among children (less than 5 years). Virtually, household fixed effect model has supported the findings obtained from robust RDD approach. Hence, BISP unconditional cash transfer has strong impacts in long run rather than in short run. Another finding arises, BISP is showing much strong effects on the child nutrition of those households which have relative higher PMT score rather than extremely poor.

Table 7. BISP Unconditional Cash Transfers and Child Nutrition (under 5 years): Household Fixed Effect

	Height-for-age			**Weight-for-age**			**Weight-for-height**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
BISP	0.0294	0.000495	-0.462*	0.144*	0.0863	-0.0825	0.189**	0.128*	0.270
	(0.120)	(0.121)	(0.255)	(0.0758)	(0.0780)	(0.167)	(0.0788)	(0.0591)	(0.185)
PMT Score			0.00937			-0.0304			-0.0445
			(0.0491)			(0.0304)			(0.0355)
BISP* PMT Score			0.0363**			0.0140			-0.0102
			(0.0159)			(0.0117)			(0.0124)
Child Age	-0.0382***	-0.0383***	-0.0378***	-0.0092***	-0.0095***	-0.0094***	0.0189***	0.0186***	0.0185***
	(0.0007)	(0.0008)	(0.0008)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)
Child Gender	-0.0662**	-0.0684**	-0.0780**	-0.0392*	-0.0427*	-0.0432*	-0.0878***	-0.0910***	-0.0842***
	(0.0320)	(0.0320)	(0.0326)	(0.0223)	(0.0224)	(0.0228)	(0.0250)	(0.0249)	(0.0255)
Househ-old size	-0.0106	-0.0124	-0.0130	-0.00239	-0.00943	-0.0106	0.00801	-0.000385	-0.0017
	(0.0114)	(0.0119)	(0.0124)	(0.00778)	(0.00806)	(0.00848)	(0.00896)	(0.00890)	(0.0092)

Gender Head	0.0268	0.00278	-0.00641	-0.0763	-0.0272	-0.0450	-0.114	-0.0247	-0.0527
	(0.115)	(0.118)	(0.121)	(0.0775)	(0.0775)	(0.0802)	(0.0828)	(0.0840)	(0.0880)
Female Ratio	-0.0356	-0.0357	-0.0330	0.0319	0.0265	0.0409*	0.0908*	0.0931*	0.0982*
	(0.0633)	(0.0636)	(0.0662)	(0.0279)	(0.0275)	(0.0287)	(0.0537)	(0.0524)	(0.0540)
Unempl-oyed Ratio	-0.0193	-0.0159**	-0.0121**	-0.0191***	-0.0104**	-0.00940	-0.0114	-0.00131	-0.00250
	(0.0152)	(0.0059)	(0.0067)	(0.007)	(0.0007)	(0.0079)	(0.0106)	(0.0104)	(0.0108)
Head age	0.00264	0.00206	0.00264	0.00250	0.000681	0.00163	0.00195**	-0.000175	0.000908
	(0.00305)	(0.00308)	(0.00320)	(0.00199)	(0.00199)	(0.00211)	(0.0007)	(0.00204)	(0.00216)
Head Education	0.0150*	0.00905	0.0145**	0.00390	0.00254	0.00560*	-0.00767**	-0.00476	-0.00420
	(0.00821)	(0.00807)	(0.00570)	(0.00460)	(0.00461)	(0.00325)	(0.00379)	(0.00370)	(0.00395)
Calorie intake	2.71e-05	3.26e-05	4.05e-05*	1.46e-05	2.05e-05	2.59e-05*	-7.98e-07	3.81e-06	3.43e-06
	(2.18e-05)	(2.20e-05)	(2.26e-05)	(1.33e-05)	(1.35e-05)	(1.40e-05)	(1.66e-05)	(1.67e-05)	(1.74e-05)
Rural	0.135**	0.128*	0.117*	0.0539	0.0658	0.0699	-0.0270	-0.00296	0.0123
	(0.0687)	(0.0688)	(0.0703)	(0.0482)	(0.0484)	(0.0494)	(0.0562)	(0.0564)	(0.0579)
Constant	-0.686***	-0.611***	-0.787	-1.536***	-1.518***	-1.100**	-1.700***	-1.737***	-1.093*
	(0.233)	(0.234)	(0.813)	(0.149)	(0.148)	(0.502)	(0.174)	(0.172)	(0.584)
Time	no	yes	yes	no	yes	yes	No	yes	Yes
Household FE	yes	yes	yes	yes	yes	yes	Yes	yes	Yes

*"Robust Standard Errors are given in Parentheses: *** p<0.01, ** p<0.05, * p<0.1"*

Moreover, we control child age, and gender, and household related information such as female ratio, family size, unemployed ratio, and head education, calorie intake of household, and regional and time dummies. The findings highlight that child age, and child gender have significant impacts while household-specific characteristics such as unemployed ratio, education of household head, and household calorie intakes are the significantly affecting the child nutrition other than BISP cash transfer.

BISP and Child Nutrition: Child's Gender Differences

This section is furnished with the discussion upon the impacts of BISP cash transfer on child nutrition with respect to gender of child less than five years. In this regard, we have applied the household fixed effect model to estimate the empirical model. Table-8 presents that BISP cash transfer does have insignificant impacts on the *height-for-age* for both male and female children. Nonetheless, in the case of interaction term of PMT score with BISP, we have found significant and negative effects on *height-for-age* score for female-children. This implies that BISP cash transfer does not have the positive impacts on the female children of relatively fewer poor households as compared to those which are highly poor beneficiaries.

In the case of weight-for-age and *weight-for-height* indices, BISP cash transfers do not unleash any significant influence on aforementioned indicators of child nutrition for female babies. But it demonstrates positive and significant impacts of cash transfer on reducing wasting and underweight problem among male children (table-8). It may suggest that male children are given more care from their parents from BISP cash

transfer, which is possibly happening in country like Pakistan, particularly in low income households.

As per findings, the interaction term of BISP with PMT score is negative while the BISP binary variable is insignificant in the case of male children. These findings validate that poor households are feeding more to the male babies. In Pakistan, specifically mothers pay more heed over dietary requirement of the male. Therefore, the prevalence of underweight and wasting problems among male babies is deteriorated due to the positive and significant impacts of BISP cash transfer.

Table 8. BISP Cash Transfer and Child Growth (under 5 years) by Gender: Household Fixed Effect

	Height-for-Age			**Weight-for-Age**			**Weight-for-Height**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Gender of Child=Male									
sBISP	0.169	0.123	-0.163	0.273**	0.215*	-0.0717	0.252**	0.203*	0.0204
	(0.188)	(0.189)	(0.375)	(0.111)	(0.115)	(0.211)	(0.118)	(0.117)	(0.243)
PMT Score			0.0259			-0.0733*			-0.132***
			(0.0617)			(0.0398)			(0.0373)
BISP* PMT Score			0.0204			0.0234			0.0179
			(0.0242)			(0.0164)			(0.0169)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time	No	YES	YES	No	YES	YES	No	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	10,498	10,498	10,115	10,498	10,498	10,115	10,498	10,498	10,115
R-squared	0.151	0.157	0.154	0.013	0.018	0.019	0.096	0.103	0.103
Gender of Child=Female									
BISP	-0.128	-0.161	-0.813*	0.0160	-0.0385	-0.326	0.135	0.0849	0.253
	(0.181)	(0.181)	(0.419)	(0.107)	(0.110)	(0.272)	(0.122)	(0.119)	(0.272)
PMT Score			-0.0592			-0.00102			0.0652
			(0.0812)			(0.0538)			(0.0550)
BISP* PMT Score			0.0495**			0.0197			-0.0159
			(0.0243)			(0.0191)			(0.0181)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time	No	YES	YES	No	YES	YES	No	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	9,913	9,913	9,548	9,913	9,913	9,548	9,913	9,913	9,548
R-squared	0.193	0.196	0.196	0.045	0.053	0.052	0.074	0.090	0.092

Control variables: Child Age, Household size, Female Ratio, Unemployment Ratio, Calorie Intakes, Head Age, Gender and Education, Region

*Robust standard errors are given in parentheses: while *** p<0.01, ** p<0.05, * p<0.*

Concluding Remarks

This research aims at evaluating the influence of the BISP on the child-nutrition. The estimated results from R-RDD are showing that disbursement of the BISP amount have significantly beneficial effects on the child-nutrition of those households which are placed around the fixed bandwidth of the poverty score cut-off (5 points). In short run, it does not have any significant impact on *height-for-age*, but significant and positive

effects are found in long run. Similarly, the cash transfer is showing significant influences on wasting and underweight among children less than five years in both short-and-long run. The findings obtained from RDD are based on the households which have higher poverty score but rounding eligibility cut-off point up to fixed bandwidth of 5 points. Such households are relatively lesser poor as compared to those households which have lower poverty score. This indicates RDD findings may hold internal validity, but it not necessary that external validity holds across the whole sample. Therefore, this research has made endeavor to explore the impacts through implementation of the household effect model by pooling the data of four waves of household panel survey.

Findings obtained from household fixed effect model are suggestive of the no significant impacts of BISP on stunted growth or Height-for-Age z-score, but becomes significant if we include the interactive terms of the PMT score with BISP binary variable in order to taking into account of hetrogenity among the beneficiaries. Furthermore, in the case of *weight-for-age* and *weight-for-height*, BISP cash transfer is demonstrating the positive and significant impacts for children less than five years. Further findings are showing that the poor households are feeding more to the male children as they receive cash transfers.

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