P-ISSN: 2709-6254	Journal of Development and Social Sciences	April-June 2022,Vol. 3, No. 2
O-ISSN:2709-6262	http://dx.doi.org/10.47205/jdss.2022(3-II)82	[916-929]

JDSS Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Impact of Remittances on Child Health Outcomes in Punjab, Pakistan

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PAPER INFO

Received:
February 24, 2022
Accepted:
June 19, 2022
Online:
June 21, 2022
Keywords:
Child Health,
Gender.
Remittances

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ABSTRACT

Primary motive of temporary migration in developing countries like Pakistan is generally in response to the income constraint faced by the households. Therefore, to relax the resource constraint, migrants tend to remit back to their families in home countries. This study attempts to look at the impact of remittances on child health outcomes as measured by height-for-age Z-scores (HAZ) & weight-for-age Z-scores (WAZ) in Punjab, Pakistan using a cross-sectional data set from the Multiple Indicator Cluster Survey (MICS). We use an instrumental Variable Approach to correct for the endogenous decision to remit. Two Stage Least Square with an instrument that comprise of an interaction of number of banks in each district with the number of adult males in a household to create household level variation in the instrument has been used to estimate the causal relation between remittances and child's health outcomes. Our results suggest significant positive impact of remittances on both indicators of child health outcomes. Further this study confirms that gains for girls are greater relative to boys.

Introduction

The implications of migration on economies vary according to the prevailing socioeconomic conditions of home and host (destination) countries. Generally, the income differentials that persist between developed and developing countries is a major reason for external migration. From a microeconomic perspective, the effects of migration on households and communities can be complex. Specifically in developing countries, individuals migrate because of economic constraints or lack of access to the credit markets in the home country therefore the amount of remittance sent back is intertwined to the decisions making process in the migrant sending households. Migrating individuals tend to maintain economic interactions with the families left behind (Stark & Bloom, 1985), where the amount of remittance is one such channel that may help families ease their credit constraints. We argue that since young children are more vulnerable to the shocks with substantial long term health consequences therefore increase in the amount of remittance could improve their wellbeing if that amount is spent on them. The purpose of this study is to explore if the health conditions of the children in the remittance recipient households improve significantly. We estimate the causal impact of the amount of remittances on the two indicators of early child growth i.e., weight for height z-scores and height for age z-scores. The main findings of the paper confirm gains for the children in remittance recipient households. The long terms measure of nutritional outcome i.e., height for age Z-scores and the short-term measure of nutritional outcome i.e., weight for age Z-Scores both improve significantly and that the gains from remittances are largely driven by girls.

Pakistan is a developing country where along with other social problems, child malnutrition and high infant mortality is widespread. Malnutrition among children has several health effects, which include increased risk of illness and lower levels of cognitive development. Pakistan's performance regarding the child's nutritional status is not satisfactory and the measures of nutritional status of children less than five years of age, stunting and wasting, have shown a deteriorating trend over the years (Arif et al., 2012). In Pakistan, about 35% of child deaths are linked to malnutrition (UNICEF,2011).

The state of child health conditions in Pakistan have been at the periphery of developmental landscape. Pakistan has the eighth highest newborn death rate in the world where from 2001-2007, one in every ten children born died before reaching the age of five years (Afzal & Yusuf, 2013). Pakistan's performance in achieving MDGs related to health conditions of children is not satisfactory. In South Asia, Pakistan has highest mortality rate for children and women. According to the recent estimates, in under five category, 38 percent of children are underweight while 12 percent are severely underweight (Khan,2012). Therefore, the most significant social issue is the prevalence of child malnutrition. Child malnutrition is a key factor that leads to illness and death among young children and it's considered to be an important factor causing half of the deaths of children globally (Cheah et al., 2010). According to the report issued by UNICEF, 1200 children under five years of age die every day in Pakistan and more than a third of these deaths are related to malnutrition. Around 43% of the children suffer from chronic malnutrition and more than 15% from acute malnutrition (UNICEF, 2012). According to the National Nutrition survey held in 2011, indicators of malnutrition including stunting and wasting had worsened since 2001 survey.

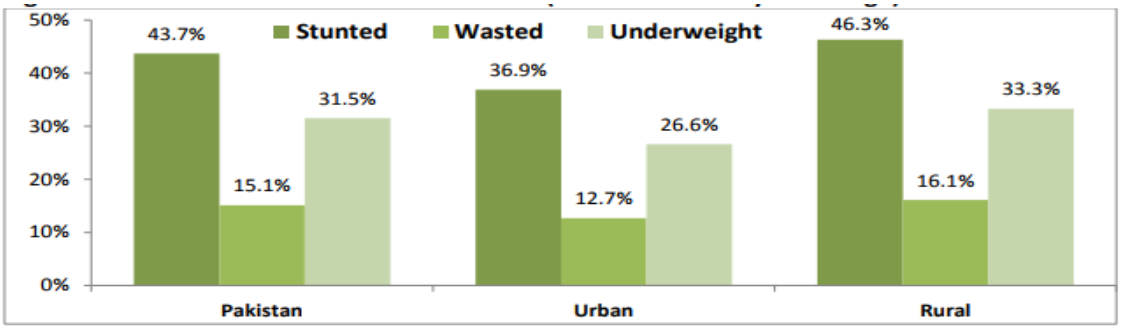

Figure 1: Prevalence of Malnutrition of children (0-59) months in Pakistan Source: National Nutrition Survey (2011)

Figure 1 shows the prevalence of malnutrition in Pakistan for children less than 5 years of age issued by National Nutrition Survey (2011). The figure clearly demonstrates the prevalence of stunting and wasting for both the rural and urban areas of Pakistan where stunting is higher in rural areas as compared to urban areas. Stunting reflects long term nutritional status of children and its adverse effects are expected to continue throughout life. It shows that around 46% of stunted children are residing in rural areas as compare 37% in urban areas. These numbers clearly demonstrate that the children living in rural areas are more likely to be severely malnourished because of lack of availability of resources in those areas.

Where vast literature provides evidence of migrants remitting back to source country which helps ease the credit constraint of the households in the receiving country not much has been explored when it comes to estimating the usage of the amount remittances at micro level by the remittance recipient households. We explore whether the amount of remittance is used to enhance the level of investment in the human capital of children left behind if channeled appropriately by the remittance recipient households.

Child's health and nutrition is one aspect of human capital which has gained a lot of attention. Lack of nutrition early in life during the developmental period can have severe consequences for the child in the long term. Several studies state that child's health can have implications for educational outcomes later in life for children in developing countries like Pakistan (Alderman et al., 2001). Therefore, it is important to explore whether the amount of remittance received by households are spent to improve the health conditions of the children and not on wasteful expenditures.

Literature Review

Several studies have looked at the impact of external migration and remittances on child health outcomes and report mixed results. On one hand, these studies confirmed that generally remittances ease the financial constraint of the households in the origin country by providing them access to credit where remittances act as a mechanism to smooth consumption pattern of the households but on the other hand we see that literature also reports negative impact of migration due to the parental absence that generally leaves children overly burdened and reduced monitoring. Migration and remittances may positively or negatively influence the health of the children left behind. Two mechanisms work in opposite direction in households where we have migrants. Firstly, migration can increase the household income resulting in availability of more resources for the children of migrants left behind in the home country. The remittance amount helps in easing the income constraint on the households which enable them to make investments in terms of human capital. Secondly, when any member of the household migrates, that may generate a short term reduction in the current income linked to migration costs such as travel, resettlement and unearned income (Koechlin,2007) .Moreover migration generally disrupts family life putting emotional stress on the children left behind . With migration of either of the parent, children are left with less supervision and are forced to take up more household work (Ponce & Olivié , 2011) .

Acosta et.al (2007) examined the relationship between remittances and child's health using anthropometric measures i.e., weight for age and height for age z-scores in Latin America. By employing multivariate analysis on children less than five years of age, they concluded that children in remittance recipient households are far better than children in non-recipient households. De & Ratha (2012) in a study used household data from Sri Lankan Integrated survey to see whether remittances reduce income constraint of the recipient households. The study found that remittance income improved child's health outcomes i.e., weight, height and BMI but there is no such evidence that households use remittance income to buy durable assets. In a research report on Albania and Macedonia, countries that are characterized by high emigration rate and remittance dependence, the authors examined the impact of migration on child health status in both countries. The results indicate that migration has positive effect on child health in Albania and it negatively affects child health in Macedonia.

On the contrary, when Ponce, Olivie & Onofa (2011) evaluated the impact of remittances on health outcomes in Ecuador using an instrumental variable approach, the results of the study indicate that remittances do not have a significant impact on child health outcomes, but it does impact the health expenditures i.e., medical expenditures which people make when they are sick. Likewise, Mansuri (2006) in a study examined whether resource inflows due to migration allow households to provide better health care and nutrition to girls, using an Instrumental variable approach. It concludes that migration has a substantial impact on child health outcomes (weight for age and height for age z-scores) for young girls. Similarly, Hildebrandt et al. (2005) examined the impact of migration on two indicators of child health: infant mortality and birth weight. Using the instrumental variable approach, the study concludes that migration from Mexico to United

States improves child health outcomes resulting in lower infant mortality and higher birth weight.

Moreover, Langworthy (2011) estimated the relationship between remittances and parental time on child health as measured by height for age and weight for age z-scores. The results indicate that both remittances and parental time have implications for child health. Parental absence has negative impact on child health which could only be compensated if migrants send significant amount of remittances back home.

This study use the similar methodology proposed in literature i.e., instrumental variable approach to gauge to the impact of remittances on child health outcomes in Punjab, Pakistan on the two anthropometric measures of child's nutritional intake.

Econometric Model for Estimating the Impact of Remittances on Child Health Outcomes

A generalized equation to estimate the health of a particular child i can be represented as:

$$\mathbf{CH_i = X_i \beta_i + \mu_i} \qquad \mathbf{(1)}$$

Where $\mathbf{CH_i}$ are the child health variables i.e., HFA Z-scores and WFA-Z-scores. The vector $\mathbf{X_i}$ includes all the control variables which might influence the health of the child. These control variables include individual characteristics of the child (comprise of age, age squared, gender), maternal characteristics (comprise of mother's education, age and marital status), health inputs(comprise of inputs which provided to the child at the time of delivery or at an early age that may acts as important indicators for the health of the child later in life. Health inputs include whether the child has been delivered by a doctor, whether he/she has been breastfed by the mother or has received all the vaccines or not), household characteristics (include the father's education, households total income, the total number of household members, the number of younger children in a household and the number of children dead in a particular household. As MICS doesn't provide any information regarding the father's education, so we have used household head's education as a proxy for father's education. The household income is likely to have an impact on child health status as it institutively suggests that family's income is a proxy for household's available resources and higher income is likely to result in more expenditure devoted to health inputs and consequently improved health outcomes. The dataset has no question that inquires directly regarding the total household income, so we have used the wealth score and household's asset composition as a proxy for household income. The wealth score is being constructed using Principal component analysis using information on consumer durables, dwelling characteristics and all other factors that might determine the household's wealth status (MICS, 2011). The number of children under five years of age and the total number of children surviving might act as a constraint on the household's present resources so both variables have been included into the analysis), health environment, parental health knowledge (we control for whether households are aware of HIV/AIDS and if households treat water before making it available for drinking) and locational/geographical characteristics (urban dummy and district dummies in Punjab).

Material and Methods

The use of OLS as a modeling choice will lead to biased results because of the following reasons:

First, Externalities like bad economic conditions, disease outbreaks or crop failure in the home country might trigger both the process of migration along with worsening the prevalent health conditions of the children (Hildebrandt et al., 2005).

Second, there appears the problem of omitted variable bias because of the presence of several child and household characteristics that are not observable. So, in order to reduce some of the bias caused by omitted variables, we have incorporated several child related, mother related, household related, demographic and socio-economic factors that are related to the health of the child.

Third, there is possibility of endogenity where the observed variables are correlated with the error term and health outcomes of the child simultaneously.

In order to deal with all these problems, in this study we will use Instrumental Variable Approach. A strong instrument can deal with the problem of endogenity, omitted variable bias and measurement error.

Last, when migrant families are compared with the non-migrant families, the migrant households do not act as a random sample. This is due to the presence of distinct differences between the income levels of both the groups. In order to deal with this problem, wealth score and households asset composition are added into the analysis. The household's asset composition does not depend on the current income level and is independent of the process of migration (Chaudhry & Arif, 2010). We have incorporated both asset composition and wealth score into our analysis.

Different studies have employed several different instrumental variables to deal with the problem of endogenity. Ponce, Olivie & Onofa (2011) used two instrumental variables for remittances. Firstly, they used a dummy variable equals to 1 if parish has any bank or money transfer institution. Secondly, they include two dummies for source country (Spain and United States). While examining the impact of remittances on income changes in Philippine households, Yang (2005) used rainfall shocks as an instrumental variable for remittances. Civilize & Frenk (2009) used the distance between each household locality and its closest western union as an instrument for remittances. Antón (2010) in a study on the impact of remittances on nutritional status of children in Ecuador used two set of instruments: the number of Western Union offices per 100,000 people at province level as an IV for remittances and proportion of households with migrants by province in 2003 as a proxy for migration networks abroad.

Model for Estimation

The instrumental variable that we use for the analysis in paper is the interaction of two variables affecting the decision of an individual to remit back to a household i.e. the number of banks in each district from State Bank of Pakistan and number of adult males in a household. We have only accounted for those 25 banks which are registered under the State Bank's Pakistan Remittance Initiative (PRI) established in 2009, initiative taken by State Bank of Pakistan, Ministry of Overseas Pakistanis and Ministry of Finance to facilitate faster, cheaper and efficient flow of remittances. The number of banks in each district are interacted with number of adult male members in each household to obtain variation at the household level (Mansuri, 2006).

The following equation estimates the second-stage estimates for the child health outcomes and Remittances.

$$\mathbf{CH_{ghi}} = \beta_1 \widehat{\mathbf{R}}_{\mathbf{ghi}} + \beta_2 \mathbf{C_{ghi}} + \beta_3 \mathbf{HI_{ghi}} + \beta_4 \mathbf{X_{hi}} + \beta_5 \mathbf{V_{hi}} + \beta_6 \mathbf{W_{hi}} + \beta_7 \mathbf{U_{hi}} + \mu_{\mathbf{ghi}} \quad \mathbf{(2)}$$

$\mathbf{CH_{ghi}}$ represents the child health outcomes, $\widehat{\mathbf{R}}_{\mathbf{ghi}}$represents fitted values of remittances from the first stage regression, $\mathbf{C_{ghi}}$ is a vector of child characteristics, $\mathbf{M_{ghi}}$ is a vector of maternal characteristics, $\mathbf{HI_{ghi}}$ is a vector of health inputs, $\mathbf{X_{hi}}$ is a vector of

household characteristics, $\mathbf{V_{hi}}$ is a vector of health environment prevalent within a household, $\mathbf{W_{hi}}$ is a vector of parental health knowledge, $\mathbf{U_{hi}}$ is a vector of household's asset composition. We have used two child health outcomes identified by our dataset as height for age (HAZ) and weight for age (WAZ) and are expressed in the form of z-scores and are recommended by World Health Organization (WHO) and National Center for Health Statistics (NCHS). Z-score values for height-for-age and weight-for-age are used in the analysis. Children's height and weight are standardized according to the following formula: $Z = (x - \mu)/\sigma$, where x is the raw score and μ and σ are the mean and standard deviation, respectively (World Health Organization, 2010). If we take an example of WAZ of a child, it's actually the difference between the weight of the child and the median weight of the reference population of the same age and sex, divided by the standard deviation (SD) of the weight of same group of children: $\text{WAZ} = \frac{\text{Wi}-\text{Wr}}{\text{SD}}$ (Arif et al, 2012).

We focus on children under 5 years of age (0-59) months. Height for Age is a measure of linear growth whereas the Weight for Age is a measure of acute and chronic malnutrition. The sample of children used for analysis is confined to those with z-scores in the range -6 >HAZ >6 & -6> WAZ>5.

The First stage regression is as follows:

$$\mathbf{R_{hi}} = \emptyset_1 IV_{hi} + \emptyset_2 \mathbf{HI_{ghi}} + \emptyset_3 \mathbf{X_{hi}} + \emptyset_4 \mathbf{V_{hi}} + \emptyset_5 \mathbf{W_{hi}} + \emptyset_6 \mathbf{U_{hi}} + \boldsymbol{\omega_{hi}} \quad \textbf{(3)}$$

Where $\mathbf{HI_{ghi}}$ Is a vector of health inputs, $\mathbf{X_{hi}}$ is a vector of household characteristics, $\mathbf{V_{hi}}$ is a vector of health environment prevalent within a household, $\mathbf{W_{hi}}$ is a vector of parental health knowledge, $\mathbf{U_{hi}}$ is a vector of household's asset composition.

Data

We have performed a cross sectional analysis using District based Multiple Indicator Cluster Survey (MICS) 2011. MICS is a household level dataset which covers all 36 districts of Punjab including 9 divisions and 150 tehsils comprising of 95,238 households covering both rural and urban areas. Further, in chosen households, all women aged 15-49 years and children under five years of age (0-59) months were selected. The data on whether the household has an external migrant and amount of remittances received by households is all part of MICS (2011) questionnaire. Information related to all the control variables which includes child's characteristics, maternal characteristics, household's characteristics etc. are all part of MICS survey.

Results and Discussion

Descriptive Statistics

Using MICS (2011) data for Punjab, Table 1 demonstrates the mean z-scores for two variables; Height for Age (HAZ) and Weight for Age (WAZ). Height for Age is a measure of linear growth whereas the Weight for Age is a measure of acute and chronic malnutrition.

Table 1
Nutritional status of children in Punjab (0-59 months)

Dependent variables	Obs	Mean	Std. Dev.	Moderate (-2 to -2.99 SD)	Severe (<-3 SD)
Height for Age z-score	61629	-1.45521	1.526028	34.70%	14.30%
Weight for Age z-score	61629	-1.48519	1.19759	31.20%	10.13%

Source: Based on author's calculation

These mean z-scores for Height-for-Age variable indicates that on average, a child less than 5 years of age in Punjab is 1.45 standard deviations below the median for a child of the same gender and age from the reference population. About 35% of children in our sample are moderately stunted whereas 14% of children are severely stunted i.e., below -3 SD of the reference population (WHO, 2010). Stunting is an indication of chronic malnutrition due to lack of nutrition for a considerably long time and it also indicates the persistence of chronic illness. The mean score Weight-for-Age variable in the sample is 1.48 which means that on average a child is 1.48 standard deviations less than an average child of the same sex and age from the reference population. Around 31% of children are moderately underweight and 10% are severely underweight which less than HAZ estimates is.

Table 2a
Summary Statistics

	Number of Observations	Mean	Standard deviation
Dependent Variables			
Height for Age Z score	61629	-1.45521	1.526028
Weight for Age Z score	61629	-1.48519	1.19759
Independent Variables			
Migration	61624	0.152213	0.359231
External Migration	61629	0.06299	0.242947
Remittances	3194	477021.7	1606746
Child's Characteristics			
Age of Child in Months	61629	29.05751	17.11174
Childs Gender (female=0,male=1)	61629	0.510782	0.499888
Number of children in HH	61629	2.091029	1.074415
Maternal Characteristics			
Mother's Education Primary	61629	0.190495	0.392695
Mother's Education Middle	61629	0.100667	0.30089
Mother's Education Secondary	61629	0.129225	0.335451
Mother's Marital Status	61629	0.977478	0.148375
Children Surviving	61301	3.413158	1.927253
Children Dead	61301	0.309342	0.74524
Health Inputs			
Child Delivered by Doctor	61629	0.277451	0.447744
Child Ever Breastfeed	61626	0.963327	0.187959
Child Receive BCG Vaccination	21246	0.8724	0.333652
Child Receive Polio Vaccination	21307	0.992397	0.086866
Child Receive Measles Vaccination	21010	0.644645	0.478632
Household's Characteristics			
Number of Household Members	61629	7.916435	3.728972

Household Head Sex(female=0,male=1)	61629	0.934836	0.246817
Household Head Education Primary	61629	0.180808	0.384862
Household Head Education Middle	61629	0.138506	0.345433
Household Head Education Secondary	61629	0.188921	0.391449
Household Head Education Higher	61629	0.105454	0.30714
Locational Factors:			
Districts	61629	16.65896	10.16479
Urban	61629	0.382093	0.485903
Health Environment			
Water Availability for Handwashing	59767	0.971372	0.16676
Treat water before drinking	61602	0.05542	0.228801
Water Filter	61508	0.016258	0.126467
Parental Health Knowledge & Disease Environment			
Has Heard of AIDS	61041	0.306417	0.461009
Had Cough and Fever for last three weeks	61112	0.027507	0.163556
Diagnosed as having Tuberculosis	61104	0.001489	0.038563
Diagnosed as having Hepatitis	61101	0.002881	0.053593

Source: Based on author's calculations

Table 2a presents the summary statistics of all the control variables. Child's characteristics suggest that about 51% of the children in our dataset are males; the average age of a child in our dataset is around 29 months. The data suggests that on average each household has 2 children. Maternal characteristics include mother's education, marital status, and number of surviving and dead children. The summary statistics show that about 19% of the mothers are educated up to primary level, 10% are up to middle level and 12% of the mothers in our dataset are educated up to secondary level. Mother's education is an important variable that can affect child's health as education promotes awareness among individuals. About 97% of the women in our dataset are married.

The health inputs data suggests that about 27% of the children are delivered by a doctor, 96% of children under the age of two are being breastfeed, 87% receives BCG vaccination, 99% receives Polio vaccination and 64% of the children are given measles vaccination. Under parental health knowledge and disease environment, about 31% of the households have AIDS awareness, only 2% can recall to have cough and fever in the last three weeks, 0.1% are diagnosed as having tuberculosis and only 0.3% are diagnosed with hepatitis which indicates the presence of good environment within the households. The health environment being present in a household indicates the health measures taken by individuals. Our data suggests that about 97% of the households have water availability for hand washing, but very few households use water treatment measures to make water safer for drinking purposes. Only 0.2% of households have water filter facility.

The household characteristics indicate that on average, each household has 8 members. Moreover, 93% of the households have male household head. About 18% of household heads are educated up to primary and secondary level, 14 % have education up to middle and around 11% of the household heads are educated up to higher level. On average about 38% of the households belong to the urban area.

Table2b
Descriptive Statistics of Household Asset Composition

	Number of Observations	Mean	Standard Deviation
Independent Variables			
Household's Asset Composition			
Household owns Home	61629	0.862451	0.344429
HH Member Own land	61600	0.312013	0.463319
Household has Electricity	61627	0.950736	0.216421
Household has Gas	61592	0.317249	0.465409
Household owns Television	61595	0.63687	0.480906
Household owns Air Conditioner	61591	0.057947	0.233645
Household owns Washing Machine	61584	0.531502	0.499011
Household owns Motorcycle	61573	0.368116	0.482297
Household owns Car	61548	0.044144	0.205418
Household owns Bicycle	61527	0.351586	0.477469
Household owns Air Cooler	61615	0.93573	0.245235
Wealth Score	61629	-0.05227	0.992903
Wealth Index 1	61629	0.190511	0.392707
Wealth Index 2	61629	0.21021	0.407461
Wealth Index 3	61629	0.225787	0.418103
Wealth Index 4	61629	0.189635	0.392015

Source: Based on author's calculations

Further we have included wealth index reported in table 2b, which is divided into five quintiles. About 19% of the households lie in the highest quintile of the wealth index, 19% lie in the lowest quintile, 21% lie in the second quintile and 23% of the households lie in the 3rd quintile of the wealth index. Our data suggests that 15% of the households have a migrant and only 6% have an external migrant. The average remittance amount received by the household is Rs 4,77021.

Before estimating the relationship between remittances received from overseas on child health measures, these first stage results are estimated. We expect the amount of remittances received from abroad to be positively related to the number of banks present in each district because the presence of banks in a particular district facilitates the process of sending remittances. The number of banks present in each district acts an IV for remittances because if the households have accessibility to channels of transmission, it will facilitate the process of sending remittances from abroad. We have chosen only those 25 banks which are registered under the State Bank's Pakistan Remittance Initiative (PRI). The total number of banks covers government, private, foreign and Islamic banks.

First Stage Results

Table 3 shows the results for the first stage regression where number of banks in a particular district are regressed on the amount of remittances received from abroad. We report simple OLS results with three different types of specifications showing that the results are robust to specification changes.

Table 3
First Stage Results: Impact of No. of Banks in each district on Remittances from Overseas

	OLS (1)	OLS (2)	OLS (3)
Dependent Variables: Remittances Received from abroad			
No. of Banks in each district No. of Adult males in HH**	12.11* (7.129)	14.81** (7.128)	14.09** (7.077)
Number of Observations	3,152	3,194	3,194
R-Squared	0.031	0/021	0/022
Child Controls	Yes	Yes	Yes
Mother Controls	Yes	Yes	Yes
Household Controls	Yes	No	Yes
Wealth Score	No	Yes	yes
Wealth Quantiles	No	No	Yes

Note: The sample comprises children 0-59 months of age with anthropometric data. Standard errors appear in parenthesis. Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

The results show that number of banks present in each district is positively related to the remittances received from abroad. All three specifications show the same result where the instrumental variable is significantly and positively related to the endogenous variable. The results are significant at 1% & 5% levels of significance. Where, the sign and significance of all the other controls in the regression is consistent with literature.

Second Stage results

Next, we estimate the second stage results where the amount of remittances received from overseas is regressed on two measures of child health i.e., height for age z-scores and weight for age z-scores.

Table 4 reports the results analyzing the relationship between the monetary amounts of remittance received from overseas and the child health. Due to the inconsistency of OLS estimates, we have used Instrumental variable estimation by using number of banks in a particular district as an IV for remittances from overseas.

Table 4
OLS, IV 2SLS: Height for Age (HFA) & Weight for Age (WFA)

Dependent Variables	**Height for Age Z-score**		**Weight for Age Z-score**	
	(1) OLS	**(2) IV-2SLS**	**(1) OLS**	**(2) IV-2SLS**
Remittances from Overseas	3.25E-08	0.00000125**	0.0000000535**	0.000000814**
R-Squared	0.1215	-	0.1563	-
Number of Observations	879	879	879	879
Child's Characteristics	Yes	Yes	Yes	Yes
Maternal Characteristics	Yes	Yes	Yes	Yes
Health Inputs	Yes	Yes	Yes	Yes
Household's Characteristics	Yes	Yes	Yes	Yes
Health Environment	Yes	Yes	Yes	Yes
Parental Health Knowledge & Disease Environment	Yes	Yes	Yes	Yes
Wealth Score	Yes	Yes	Yes	Yes
Locational Factors	Yes	Yes	Yes	Yes

Note: The sample comprises children 0-59 months of age with anthropometric data. Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Column (2) of Table 4 reports the result for IV regression where remittances from overseas (instrumented by number of banks in each district) is regressed on two measures of child health i.e. HAZ and WAZ. The results show that in remittance recipient households, both the child's height and weight increase significantly. Though the magnitude of increase in the z-scores for height and weight is very small, but the direction of increase is positive. The results suggest that sending 1 rupee (Pakistani currency) in remittances is going to increase HAZ and WAZ by 0.00000125 and 0.000000814 SD respectively. If the migrants send 1 lac rupees in remittances, it increases HAZ and WAZ by 0.12 and 0.08 SD respectively.

Estimating the Impact of Remittances on Child's Health Outcomes, by Gender

Table 5A and 5B shows the results of the data disaggregated by gender of the child in a household.

Table 5A
IV-2SLS: Height for Age (HFA), by Gender

Dependent Variables	Height for Age Z-score BOYS		Height for Age Z-score GIRLS	
	IV 2SLS	Z-Value	IV 2SLS	Z-Value
Independent Variables				
Remittances from Overseas	-1.29E-07	-0.6	0.000000591**	2.29
R Squared	0.1019		0.0659	
Number of Observations	436		443	
Child's Characteristics	Yes		Yes	
Maternal Characteristics	Yes		Yes	
Health Inputs	Yes		Yes	
Household's Characteristics	Yes		Yes	
Health Environment	Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes	
Wealth Score	Yes		Yes	
Locational Factors	Yes		Yes	

*** p<0.01, ** p<0.05, *p<0.1

Table 5A shows that the height for age Z-Scores for girls increases significantly in remittance recipient household. The statistics show that the girls are to benefit more as compared to boys in remittance recipient households.

Table 5B
IV-2SLS: Weight for Age (WFA), by Gender

Dependent Variables	Weight for Age Z-score BOYS		Weight for Age Z-score GIRLS	
	IV 2SLS	Z-Score	IV 2SLS	Z-Score
Independent Variables				
Remittances from Overseas	1.68E-07	1.05	0.000001***	3.66
R Squared	0.0952		0.0659	
Number of Observations	436		443	
Child's Characteristics	Yes		Yes	

Maternal Characteristics	Yes	Yes
Health Inputs	Yes	Yes
Household's Characteristics	Yes	Yes
Health Environment	Yes	Yes
Parental Health Knowledge & Disease Environment	Yes	Yes
Wealth Score	Yes	Yes
Locational Factors	Yes	Yes

*** p<0.01, ** p<0.05, *p<0.1

Table 5B shows that the weight for age Z-Scores for girls increases significantly in remittance recipient household. The statistics show that the girls are to benefit more as compared to boys in remittance recipient households.

Conclusion

In most of the underdeveloped countries, income constraints force households to leave their home country in search of better economic opportunities and to cope with the existing income risk. There is a huge strand of literature that confirms the evidence that remittances are one way through with households increase the accumulation of assets or increase their consumption expenditures which ultimately leads to higher standards of living but whether there is an improvement in child's nutritional status is still under explored. This paper presents a detailed analysis of the impact remittances from overseas on child health outcomes in Punjab. The focus of the study is young children aged (0-59) months which are the most vulnerable group whenever the households face any income constraint. Further, we test for the presence of intra household resource allocation bias where boys get preferential treatment in term of health care as compared to girls.

Our results suggest that remittances significantly impact both the anthropometric measures: HFA & WFA. In consonance with the existing literature, our results point towards strong effects of external migration and remittances on child health outcomes (HAZ & WAZ) by loosening the credit constraint. Since our analysis is restricted to children under 5 years of age which are not school going and spend most of their time back home, so household dynamics which includes the number of HH members, mother's education, household head's education, parental health knowledge & household's asset composition all are significantly going to impact child's health.

It is generally presumed that female children face more discrimination in HH in Asia. This study rejects this presumption; male children under five years of age have lower z-scores than female children. Further this study confirms the presence of increased bargaining power of women in households headed by females where there is an increased spousal control over the allocation of resources.

On the developmental side, our evidence is on the positive effects of remittance income calls for policies that ease remittance flow by reducing fees or by giving tax breaks. Pakistan remittance initiative (PRI) which is a joint initiative taken by State Bank of Pakistan, Ministry of Overseas Pakistanis and Ministry of Finance is a step towards promoting efficient and cheaper flows of remittances to Pakistan. Further, migration also has a spillover effect where the migrant members become aware of the new ideas and knowledge about improving child rearing practices often referred to as social remittances where the ideas, behaviors, identities and social capital flow from country of destination to country of origin. Migrant members of the household bring back not only financial remittances but also new information and values that may have a positive effect on children.

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