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Fathers' Migration and Nutritional Status of Children in India: Do the Effects Vary by Community Context?

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Abstract

BACKGROUND—Due to international and internal migration, millions of children in developing countries are geographically separated from one or both of their parents. Prior research has not reached a consensus on the impacts of parental out-migration on children's growth, and little is known about how community contexts modify the impact of parental out-migration.

OBJECTIVE—We aim to assess the overall impacts of fathers' previous and current migration experiences on children's nutritional status in India and how the impacts are shaped by community socioeconomic contexts and community gender norms.

METHODS—Using data from the Indian Human Development Survey collected in 2011–2012, we estimated community fixed-effect regression models predicting the nutritional status of children (ages 10–15) and examined the interactions among fathers' migration, child's gender, and community contexts.

RESULTS—The results showed that children of returned migrants had lower height and Body Mass Index (BMI) than children of non-migrants. Fathers' current absence was associated with lower height and BMI for adolescents in communities with high levels of socioeconomic development but not for those in communities with low levels of development. Fathers' current absence due to migration was especially harmful for girls in communities with strict norms of female seclusion.

CONTRIBUTION—Our findings highlight that the effects of father's out-migration on children are conditioned by the level of communities' socioeconomic development and community gender

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contexts, which helps to reconcile the previously mixed findings on the effects of parental migration on child outcomes.

Keywords

Migration; parental absence; left-behind children; nutritional status; community context; India

Introduction

Due to the massive flows of internal and international labor migration, millions of children in developing countries are geographically separated from one or both of their parents. Parental out-migration is a family strategy that leads to conflicting consequences. Labor out-migration can provide remittances that improve the economic conditions of the families staying behind (De Brauw and Rozelle, 2008; Mberu 2006; Taylor, Rozelle, and De Brauw 2003). However, at the same time, parental migration leads to family disruption and reduces parental input in children's development. Previous studies have reported mixed findings on the overall implications of parental migration for children's well-being and development. Some studies have suggested that parental absence due to migration is detrimental to children's physical health (Davis and Brazil 2016; Gibson, McKenzie, and Stillman 2011; Lu 2015; Tong, Luo, and Piotrowski 2015), psychological well-being (Botezat and Pfeiffer 2014; Dillon and Walsh 2012; Murphy, Zhou, and Tao 2016; Ye and Pan 2011), and educational outcomes (Lahaie, Hayes, Piper, and Heymann 2009; Wen and Lin 2012). Others have reported positive influences from parental out-migration on children's health (Hildebrandt and McKenzie 2005; McKenzie 2005; Mu and De Brauw 2015), educational attainment (Kandel and Kao 2001; Wen, Su, Li, and Lin 2015), and behavioral outcomes (Wen, et al. 2015). Still, other studies have found that the impacts of parental migration on children's well-being are weak and inconsistent (Ren and Treiman 2016; Xu and Xie 2015).

Despite the different measurements and analytical strategies employed by these studies (Hamilton and Choi 2015), a more important theoretical reason for the mixed findings is that the impacts of parental out-migration can depend on the characteristics of children, families, and social contexts. A number of studies have shown that the effects of parental migration vary by whether one or both parents are absent, gender of the migrant parent, and the presence of grandparents in the origin household (Huang, Song, Tao, and Liang 2018; Tong, et al. 2015). However, much less attention has been paid to how the impacts of parental out-migration on children's well-being are contingent on social contexts. Cross-national comparative studies have identified different consequences of parental out-migration for children's health across social settings (Lu 2015; Nguyen 2016). Research using data from the Child Health and Migrant Parents in South-East Asia (CHAMPSEA) study found that parental out-migration had different impacts on children's psychological well-being, resilience, risk of stunting in the Philippines, Vietnam, Indonesia, and Thailand (Graham and Jordan 2011, 2013; Jordan and Graham 2012). Scholars have attempted to attribute the distinct findings to the different levels of socioeconomic development in these countries, but they have been unable to empirically test the hypotheses on the contextual effects due to the small number of countries included in the studies. In this paper, we take advantage of the economic and cultural diversity across communities in India to empirically test whether the

effects of parental out-migration on early adolescents' nutritional status are contingent on communities' socioeconomic development and gender norms.

Undernutrition among adolescents remains a public health problem in low- and middle-income countries, even though overweight has increased in many contexts. A study in India reported that 37%–38% of children ages 10–16 years are stunted, and 50%–64% suffer from thinness (Haboubi and Shaikh 2009). For early adolescents ages 10–14, malnutrition is an important risk factor contributing to many of the predominant causes of death, such as intestinal infectious diseases, diarrheal diseases, and lower respiratory infections (Christian and Smith 2018). For females, stunting is a risk factor for poor pregnancy outcomes including small-for-gestational-age and preterm birth (Kozuki et al. 2015). Children's physical growth is determined by both nutrition and diseases. Because nutritional status and illness are interconnected, underweight and stunting in adolescence reflect poor nutrition, infection, and environmental stress accumulated over time.

We choose to focus on early adolescence (ages 10–15 years) because this stage is characterized by rapid physical growth, increased nutrient requirements, cognitive and emotional development, and unique experiences within the households. Adolescents could attain 15–25% of adult height and about half of the adult weight in adolescence (Christian and Smith 2018). To support the rapid growth, nutrition requirements increase dramatically during early adolescence. At these ages, children also become more self-conscious and possibly more sensitive to family disruptions (Davis and Franzoi 1991). Moreover, girls start to internalize gender roles and follow gender-specific norms during adolescence (Abu-Ali and Reisen 1999; Lawler and Nixon 2011). The experiences of children in this age group are quite distinct from those of young children. While parental absence affects young children via the lack of parental attention and changes in household resources, for slightly older children, there is also a change in time demands because they have to fill in for the absent parent by taking over household or farm chores.

Using national representative data from the Indian Human Development Survey (IHDS), this study constitutes the first effort to examine the influence of parental out-migration on the nutritional status of early adolescents in India. We focused only on the effects of fathers' migration because labor migration in India is dominated by men, and solo male out-migration is a common strategy to diversify family income in India. (Solo female migration is less common, but can happen under certain circumstances. For instance, some young Indian women migrate to metropolitan cities to work as waitresses, in call centers, or in garment factories.) We aimed to answer several research questions represented in Figure 1. First, what are the overall impacts of fathers' migration on the nutritional status of early adolescents in India? Second, how do the effects of father's out-migration vary across communities with different levels of socioeconomic development? Third, how are the effects of father's out-migration on boys and girls conditioned by communities' gender contexts?

Fathers' Migration and Left-Behind Children in India

The Indian census defines a migrant as a person enumerated in the Census at a different place (i.e. village or town) than his/her last place of residence. In the 2011 Census, India had

454 million migrants based on place of last residence (Office of the Registrar General and Census Commissioner 2011), marking an increase from 30% of the total population in 2001 to 37% in 2011. While two-thirds of the migrants were women, who usually migrated at the time of marriage, there were 141 million migrant men in 2011 for whom work and employment were their main reasons for migration. The number of men who migrated for work and business purposes (42.4 million) was five times more than the number of women who migrated for the same reasons (8.5 million). Moreover, in 2015, 16 million persons from India were living outside the country, contributing to the most significant diaspora in the world (Department of Economic and Social Affairs 2016).

Solo male migration is a prevalent livelihood strategy adopted by families in India. Due to low incomes, uncertain employment conditions, and expensive housing in migration destinations, male workers often leave their wives and children in places of origin. In regions such as Bihar and Uttar Pradesh, it is common for men to live in large cities for decades, only visiting their families twice a year (Deshingkar, Sharma, Kumar, Akter, and Farrington 2008; Gulati 1993). Moreover, in many rural areas, Indian men often undertake short-term migration during agricultural downtime or when agricultural labor demand is high in other regions. A study conducted in 2009 suggested that about 11.3% of a sample of Indian children (ages 5 and 8 years) did not see their fathers daily because they worked far from home, and this figure had increased from 6.5% in 2007 (Nguyen 2016). Using data from the second wave of the IHDS collected in 2011–12, we find that about 13% of Indian children under age 15 had a migrant father who was currently away or had migrated for at least one month during the past five years.

Geographic diversity in migration behaviors and state-level variation in outmigration have been identified in India (De Haan 1997; Gulati 1993). We argue that instead of treating geographic diversity as a black box, it is important to understand specific aspects of community contexts that shape the social, economic and cultural diversity of India. States like Rajasthan, Uttar Pradesh, and Bihar see substantial outmigration. These states are also far more likely to be rural and have lower levels of community development than the other states in India, which are factors that push migrants out of the origin communities. For example, more than 75% of the population in these states lives in rural areas compared to less than 60% in more developed states like Tamil Nadu and Maharashtra. Similarly, gender context tends to vary widely between Northern India compared to Southern and Eastern India (Dyson and Moore 1983). For instance, there is a stronger adherence to patriarchal family norms, and higher levels of son preference and control over women’s behaviors in Northern India than Southern and Eastern India. Hence, we try to break down the geographic differences in the impact of migration by looking at the socioeconomic development of local areas as well as its gender context.

Why Does Father’s Migration Matter to Children’s Nutritional Status?

Empirical research in both developed and developing countries found that children living with single parents have worse developmental outcomes than children in two-parent families (Amato 2001; Dawson 1991). The literature on family dissolution suggested that parental presence ensures the healthy development of children through two primary mechanisms:

economic resources and socio-cultural resources (McLanahan and Sandefur 1994). Following a divorce, separation, and parental death, children's health can be undermined by diminished economic resources, reduced quality of parenting, and stress and confusion directly related to the family changes (Amato 2000). Parents and children both need to adjust to the changes in family relationships and figure out their new roles and functions. Using family theories on parental absence and children's outcomes as a guiding framework, we elaborate on how parental out-migration may affect children's nutritional status in both positive and negative ways in the context of India (see Figure 2).

First, unlike other types of parent-child separation (i.e. divorce and deaths of parents) resulting in a decline in economic resources, parental out-migration is often associated with improved economic conditions because of the remittances sent back by migrant parents. Family members' migration has been shown to improve household economic resources and living standards (Aghajanian, Alihoseini, and Thompson 2014; Hadi 1999; Hugo 2002). The increased economic resources allow left-behind families to access quality food, water, household sanitation, and healthcare services (Amuedo-Dorantes and Pozo 2011; Antón 2010; Mu and De Brauw 2015). By bringing economic resources back to the origin households, fathers' out-migration can have positive impacts on children's nutritional status. However, previous research has identified different types of labor migration in the Indian context. Taking migration as a survival strategy, some male workers tended to undertake seasonal work in nearby villages and towns to supplement their family income (Desai and Chatterjee 2016). In contrast, for life enhancement, other migrants traveled a long distance to work in large cities or foreign countries (often for longer periods) (Desai and Chatterjee 2016). The short-term seasonal migrants may only be able to send limited economic remittances, while the long-term migration could potentially bring high economic returns despite the higher costs of the trips. Therefore, we expect that long-term migration has more beneficial effects on adolescents' nutritional status than short-term seasonal migration.

Another mechanism through which father's out-migration influences children's nutritional status is the transmission of health knowledge. Existing research provided some evidence that rural to urban migrants tend to have more health knowledge than non-migrant residents in rural areas in the context of Mexico (Hildebrandt and McKenzie 2005). Another study showed that the duration of residence in a destination city in China is positively associated with migrant women's knowledge about reproductive health (Wang, Ping, Zhan, and Shen 2005). In developing countries, migrants living in migration destinations usually are exposed to more socioeconomically developed contexts than their origin communities. Migrants tend to learn health knowledge through the mass media and social interactions with local residents and transmit the knowledge to staying-behind caregivers. However, this might not be true in the context of India where migrants could face language barriers in migration destinations. Besides, migrants living in isolated areas such as worker's dorms or slums may have limited interaction with local residents or exposure to the mass media. Nevertheless, the richer health knowledge among migrants compared with non-migrants can be attributed not only to migrants' interaction with local residents in the destinations but also to the interactions among migrants themselves. Menjívar (2012) suggested that Guatemalan immigrants in the U.S. regularly share medical knowledge in their social network, helping

one another with information about treatments and health advice. This could happen among migrant workers in India as well.

However, the absence of fathers due to migration also directly leads to reduced parental time and energy devoted to children. The remaining caregivers, whether mothers or grandparents, have to undertake additional household responsibilities, chipping away at the time they can spend in childcare. For example, without fathers to take care of household management tasks such as shopping for food, mothers might have less time to prepare quality food, to bathe children frequently, maintain a sanitary home environment, or to use health services to boost children's health. Prior research found that children in migrant households receive less breastfeeding and fewer immunizations (Hildebrandt and McKenzie 2005). Besides, the reduced monitoring and supervision due to absent fathers can increase the likelihood of delinquency and deviant behaviors among children (Coley and Medeiros 2007), leading to higher risks of accidents and risky health behaviors. Left-behind children are also more likely to engage in unhealthy behaviors, including drinking, smoking, and illicit drug use (Wen and Lin 2012).

When fathers are away, older children sometimes have to take on more responsibilities performing housework, farming, and caring for younger siblings (Antman 2011; Chang, Dong, and MacPhail 2011; Ye and Pan 2011). These added responsibilities can reduce children's time and energy available for studying, playing, and socially interacting with peers, which is detrimental to their physical development. In areas of India with poor facilities, household members still spend substantial amounts of time fetching water and firewood. By doing these household chores, children of migrants could be more susceptible to infections and substantial energy consumption, which contributes to undernutrition.

The Moderating Role of the Community Context

Communities' Socioeconomic Development—How the countervailing mechanisms for the effects of parental out-migration play out largely depends on communities' social and economic environments. In resource-poor communities, adolescents' health suffers primarily from poor housing conditions, inferior personal hygiene, and lack of access to clean water and nutritious food. A lack of health knowledge may also impair adolescents' health and nutrition in resource-poor contexts. The increased economic resources from remittances and the transmission of health knowledge, therefore, may outweigh the negative impacts of reduced parental attention, resulting in a positive net impact of parental out-migration on children's nutritional status in these contexts.

In contrast, in communities with relatively high levels of socioeconomic development, where the standards of living and levels of health knowledge are less likely to threaten children's health, the impacts of the reduced quality of parenting may become more prominent. In economically developed areas (e.g. communities in metropolitan cities), remittances have limited ability to improve the quality of life due to the high costs of living. Further, because the caregivers (mainly mothers) in more developed communities already have relatively high levels of education, the health of their children may not benefit from the transmission of health knowledge. Therefore, fathers' absence due to out-migration thus might have a negative overall effect on the nutritional status of left-behind children in communities with

higher levels of socioeconomic development. In a comparative study, Lu (2015) found that parental migration had a more positive impact on children's physical growth in Indonesia, a resource-poor context, than it had in Mexico, a context with higher levels of economic development. Researchers in the CHAMPSEA Project showed that parental outmigration has different impacts on physical growth and mental health of children in the Philippines and children in Thailand, Vietnam and Indonesia, and encouraged future research to examine contextual factors that might explain this finding (Graham and Jordan 2011, 2013). We hypothesize that father's out-migration has more positive influences on early adolescents' health in less developed communities than in wealthier communities for the reasons stated above and empirically test this hypothesis in this study.

Communities' Gender Context—In addition to regional variation in development, India exhibits large geographic diversity in culture, values, and norms. In Indian society, sons are valued more than daughters due to the prevalence of the patrilineal and patriarchal family norms, but son preference is much stronger in North India than in other parts of India (Lahaie, et al. 2009). In communities with strong son preference, household resources tend to be unequally allocated between boys and girls. Previous studies have found that girls often are given less nutritious food than boys (Kandel and Kao 2001) and have higher mortality than boys in the majority of states in India (Arnold, Choe, and Roy 1998). When son preference exists in migrant households, the economic resources and health-related information transmitted from migrant fathers might be more likely to be used to boost the nutritional status of boys than girls. Moreover, in a context where boys are prized, girls are more likely to help mothers and grandparents with housework, farming, and caregiving in their fathers' absence, which could undermine girls' health and nutritional status. We, therefore, expect that out-migration by fathers has more positive effects on the nutritional status of boys than on the nutritional status of girls.

However, these gender effects can further be contingent on communities' gender context, as indicated by the strength of son preference and gender norms. In communities with widespread son preference, the unequal allocation of family resources between boys and girls could be starker, and girls might be required to undertake more household chores and caregiving responsibilities. Fathers' absence thus could have more detrimental effects on the health of girls than boys.

Another important aspect of communities' gender norms is the practice of purdah or female seclusion, which is the most visible marker of gender in India. Motivated by the ideology that women should be modest, obedient, docile, and attached to the home, South Asian societies have a strong normative preference for female seclusion (Sharma 1990). Purdah is performed in a variety of ways, including "wearing a full burqa, covering one's face with a shawl or sari when in the presence of men, lowering voices and eyes in the presence of men, remaining in separate rooms or behind a screen when unrelated men are present, or not going to public places unaccompanied" (Stroope 2015:290). The practice of purdah varies widely across regions and communities in India due to differences in social systems, kinship structures, and gender norms (Desai and Andrist 2010).

In communities with a norm of purdah practice, fathers' absence could be more detrimental to the health of left-behind girls than boys for several reasons. First, women in communities in which purdah is widely practiced have little freedom of physical mobility and few opportunities to obtain an education and participate in labor market activities, so parents have fewer incentives to invest in girls than boys. The family disruption and possible shortage of family resources resulting from parental out-migration can undermine the nutritional status and health of girls more than boys in these social contexts. Second, the belief that women belong to the domestic sphere and should be secluded may reinforce gender role expectations that girls should take care of housework when there is a labor shortage in the household. Third, the practice of purdah affects mothers' ability to manage household issues and take care of children. For instance, in some regions, women may not do grocery shopping or go to the post office without male companions. When this situation is combined with son preference, fathers' absence compromises girls' health before boys' health.

Data and Methods

Data

This study analyzed data from the IHDS interviews collected by the National Council of Applied Economic Research (NCAER) in India and the University of Maryland in 2004–2005 and 2011–2012 (Desai, Vanneman, and National Council of Applied Economic Research 2011–12). Using a multistage sampling strategy, the IHDS drew a representative sample from 34 states and union territories, encompassing 971 urban blocks and 1,503 villages in 388 districts in India[1]. The 2004–2005 survey collected data on 41,554 randomly selected households with more than 200,000 individuals, and 83% of these households, including any split households, were re-interviewed in 2011–2012. An additional sample of 2,148 households was included to refresh the urban sample where the re-contact rates were lower. This process resulted in a 2011–2012 sample of 42,152 households containing 215,748 individuals. The household questionnaire covered a wide range of topics, including household economic activities, social networks, living standards, household members' demographic characteristics, education, work status, income, and health. In each survey, at least one eligible women ages 15–49 years old from each household were interviewed and they responded to additional questions about health, gender relations, fertility, and natal care and provided information about their children's health and education. In both waves, the IHDS team carried out village-level focus group discussions among village government officials, local businessmen, and other adults to collect information about the village structure, infrastructure, labor market characteristics, land use, and agricultural production, among other factors.

[1]In rural areas, IHDS household sample is a composite of several different subsamples, including a reinterview sample of households previously interviewed mostly in 1994–95 for the Human Development Profile of India (HDPI), N=13,900, and new households comprised of a replacement sample for lost village listings in HDPI, a refresher sample from HDPI districts, and an extension sample from states and union territories not sampled in 1994 (N=13,110). The HDPI employed a complicated multistage sample and the new households were also drawn using a multistage sampling method. In urban areas, cities or towns were sampled from states with probabilities proportional to population and 45 households were randomly selected from each town (15 households in each Census-defined neighborhood within the town).

This study used the second wave of IHDS data collected in 2011–2012 because the first wave of the survey did not have information on respondents' recent migration experiences. We focused analysis on 12,217 children in early adolescence (ages 10–15 years), a stage of rapid physical growth, increased nutritional requirements, and cognitive and emotional development. We restricted the analysis to 11,452 adolescents who had biologically plausible values on anthropometric measures, who had information about fathers[2], and whose fathers were married to their mothers at the time of the IHDS-II interview[3]. Removing the cases with missing values on other variables further reduced the analytical sample to 11,295 adolescents. These adolescents belonged to 7,732 households and 2,131 communities in the analytical sample. On average, each community contained 5.3 adolescents. The number of adolescents in a community ranged from 1 to 57, with a standard deviation of 4.44.

Key Measures

The dependent variables for this study are height-for-age and Body mass index (BMI)-for-age. We converted both variables into z scores using the age- and gender-specific WHO standards (de Onis et al. 2007). Cases with biologically implausible scores for the dependent variables (beyond −6 or 6 for height-for-age z scores and beyond −5 and 5 for BMI-for-age z scores) were removed. Height-for-age and BMI-for-age are measures of children's physical growth. Height-for-age is used to identify children who suffer from stunting (defined as −2 standard deviation from the mean). BMI-for-age is an indirect measure of body fatness, which can be used to detect thinness (−2 standard deviation below the mean). Children's physical growth is immediately caused by both dietary intake and illness. Low physical growth is a result of multiple risk factors, including insufficient nutritional intake, energy consumption (activities in which children participate), quality of living environment (such as hygiene), and experiences of infectious and chronic diseases. Because adolescents experience few chronic and infectious diseases, it is appropriate to use physical growth as an indicator of health.

The focal independent variable, fathers' migration status, was constructed using information from two survey questions. First, in the household questionnaire, the respondent was asked: "Does any woman/man in the household has a *husband/wife* who lives outside the household?" If the husbands/fathers were currently away, we considered them as "current migrants" in this study[4]. In addition, the IHDS-II interview asked whether any household members had left to find seasonal/short-term work for at least one month during the past five years and returned to live in the household. Fathers identified in this question were defined as "returned migrants." Fathers who had not made any migration trips for at least one month in the past five years and were not currently absent are considered non-migrants in this study. We constructed a categorical variable distinguishing among non-migrants, returned

[2]Among all children ages 10–15, about 3.78% have missing information on their fathers, because either the fathers have died (3.37%) or the parents were separated or divorced.
[3]3.77% of children ages 10–15 are excluded because their mothers were widowed or separated/divorced.
[4]Because there are no requirements for duration or destination of migration in this question, currently absent fathers are considered migrants regardless of when they left the households and how far they were away from home. Similarly, there is no requirement for the destination in our definition of returned migrants. Based on the recorded destinations, among all migrant fathers in this sample, 55% migrated to urban destinations, 19% moved to rural destinations, and 26% had unknown destination.

migrants (fathers who had made a migration trip in the past five years and returned by the time of the IHDS-II), and current migrants (migrant fathers absent at the time of the IHDS-II interview). Due to their long periods of absence, long-term and often long-distance migrants were most likely to be captured in the survey as current migrants. The returned migrants were often seasonal workers who took jobs in nearby villages and towns for shorter periods. (In our sample, the returned migrants were absent for 1.3 years on average and current migrants were on average absent for three years until the IHDS-II interview.)

We examined the conditioning roles of two aspects of communities' characteristics: community socioeconomic development and community gender context. Communities' socioeconomic development was a composite measure based on their location (urban vs. rural) and development indicators (e.g., availability of electricity, piped water, modern gas, and telephones in the community). Urban/rural designations were made according to the 2011 Census[5]. We further divided urban areas into large metropolitan cities (including Mumbai, Kolkata, Delhi, Chennai, Bangalore, and Hyderabad) and smaller cities. Rural areas were divided into villages with high levels of infrastructure facilities and those without. Villages with at least 6 of the following 10 facilities were considered more-developed villages and the remaining were considered less-developed villages. The list of 10 infrastructure facilities included electricity, paved road, Kirana (grocery) shop, bus stop, landline and mobile access to a telephone, post office, police station, bazaar, and bank. Therefore, community socioeconomic development was measured by a categorical variable distinguishing metropolitan urban community, other urban communities, more-developed rural communities, and less-developed rural communities.

The communities' gender context was captured by two variables. In the IHDS, all the eligible women (ages 15–49 years old) in the sample were asked the number of sons and daughters they would ideally like to have. Using this information, we measured community-level son preference by calculating the proportion of women in the community who desired more sons than daughters. The second variable, communities' gender norms, was also an aggregated measure from the sample based on the proportion of women in a community who practiced purdah.

We included control variables capturing children's demographic characteristics, family socioeconomic status, mother's characteristics, and household structure. These variables were selected because they determine children's access to family economic and social-cultural resources, which in turn affect their nutritional status. Children's demographic characteristics were measured by gender (1=girls) and age in month which are directly related to their height and weight. Family socioeconomic status was captured by the father's education, mother's education, household assets, and castes and religious groups. Father's education and mother's education were the numbers of years of education received by the father and the mother. Household assets were originally a sum of 30 items indicating whether the household had certain consumer goods (such as TVs, motor vehicles, air

[5]In Census, an area is classified as an urban unit if the place is declared by the state government under a statute as a municipality, corporation, cantonment board, or notified town areas committee, etc. In addition, places are classified as urban if they satisfy all the following criteria: a minimum population of 5000, at least 75% of the male working population engaged in non-agricultural economic pursuits, and a density of population of at least 400 per square kilometer.

coolers, telephone, etc.) and housing features (such as flush toilets, electricity, and piped indoor water). We constructed a categorical variable to reflect the quintiles of household assets. Castes and religious groups were measured by a categorical variable indicating if the family belonged to the forward Caste, other backward classes (OBC)[6], Dalit, Adivasi, Muslim, or other religious groups (including Christian, Sikh, and Jain). Mother's age and height (measured in centimeters) were controlled for because they determined children's biological endowment. We also included a few variables reflecting the household structure. A dummy variable was used to indicate the presence of grandparents in the household. The total number of children under age 15 living in the household and whether the mother had any child under age 5 were controlled for. A large number of children in the household tend to dilute the resources allocated to each child and the presence of young children may attract parental attention away from adolescents.

Analytical Methods

We first calculated the descriptive statistics for the characteristics of children, households, and communities (see Table 1). We then employed ordinary least squares (OLS) regression models to assess the impacts of fathers' migration status on children's height-for-age and BMI-for-age while controlling for family characteristics and community fixed-effects.

The community fixed-effect model can be expressed using the following equation.

$$y_{ij} = \beta_0 + \beta_1 RetMig_{ij} + \beta_2 CurMig_{ij} + \beta_3 X_{3ij} + \cdots + \beta_p X_{pij} + \gamma_j + \varepsilon_{ij}$$

y_{ij} represents the health outcome of child i in community j, $RetMig_{ij}$ and $CurMig_{ij}$ are dummy variables for the migration status of the child's father, X_{3ij} through X_{pij} are control variables measuring the individual and family characteristics of the child. γ_j is the fixed effect of community j. The main effect of the father's migration status on child health is reflected by the coefficients β_1 and β_2. The estimation of these coefficients is based on differences among children living in the same community because all between community variation is captured by the community fixed effects. We also use robust clustered error to allow for correlation among children in the same households.

Research on the impacts of migration is challenged by the issue of selectivity bias because not all households are equally likely to send migrants, and the factors that affect the likelihood of migration may also be associated with children's health outcomes. Migration tends to be chained and clustered, so many predictors of migration are community-level factors, such as local wage levels, location, transportation conditions, social networks, and economic shocks. By including community fixed-effects, we were able to rule out all the observed and unobserved community features that could simultaneously influence fathers' tendency towards out-migration and children's nutritional status. We thus could compare children of migrants and children of non-migrants living in the same community. We also tried to control for a variety of household and parental characteristics to eliminate factors

[6]OBC is a term used by the Government of India to classify castes which are educationally or socially disadvantaged.

that could confound the relationship between fathers' out-migration and children's nutritional status.

To test the conditioning effects of community contexts, we included in subsequent models the interaction terms between fathers' migration status and communities' socioeconomic development and the three-way interactions among fathers' migration status, children's gender, and communities' gender contexts (measured by community-level son preference and practice of purdah). Because communities' socioeconomic development and gender contexts are community-level variables, their main effects are absorbed by the community fixed-effects and cannot be estimated. Yet, we are able to estimate how the effect of fathers' migration is conditioned by these community characteristics.

Results

Table 1 presents the weighted descriptive statistics of the dependent and independent variables. The weighted mean height-for-age z score was −1.62, and the average BMI-for-age z score was −1.08, indicating that children in India had average heights and weights below the median heights and weights for children of the same gender and age in a global reference population. Although overweight becomes a health issue in many parts of the world, in the context of India, a low BMI-for-age is considered a negative health outcome because it indicates undernutrition and is associated with morbidity among adolescents in developing countries (Christian and Smith 2018). According to the WHO growth trajectory, a BMI-for-age below −2 SD is defined as "thinness" and −3 SD is considered "severe thinness." About 25% of children in our sample were thin and about 8.3% were severely thin (statistics not shown in tables).

About 13% of children in early adolescents had fathers who had migrated within the past five years before the IHDS-II. The fathers of 5.69% of children had returned, and the fathers of 7.16% of children were still absent at the time of the IHDS-II. (As shown in Appendix A, the percentages of returned migrant fathers and current migrant fathers were similar for boys and girls. But the percentages of returned and current migrant fathers were lower in more developed urban communities than in less developed rural communities.) About half of children were boys, and their average age was 12.25 years (147 months). On average, mothers were 36 years old and were 151.53 centimeters tall. Mothers on average had received less than five years of education, while fathers typically obtained seven years of education. About one-third of children co-resided with at least one grandparent. On average, each household had 2.79 children younger than age 15, and 4.48% of children in the sample lived in households that had children younger than age 5 years. The average birth order was 2.54, indicating the relatively high total fertility rate in India. About one-fifth of households belonged to the forward castes, 37% belonged to OBC 22% were Dalits, 6% were Adivasis, 12.8% were Muslim, and the remaining 1.8% were in other religious groups. The households in the analytical sample were more likely to be in the middle quintile of assets than in the poorest and richest quintiles.

Regarding the community contexts, about 7% of communities were characterized as metropolitan-urban communities, 24% as other urban communities, 31% as more-developed

villages, and 38% as less-developed villages. In a typical community, 28% of women expressed son preference, and 64% practiced purdah. (The values for both variables ranged from 0% to 100%.)

Table 2 presents the community fixed-effect linear regression models predicting children's height-for-age z scores. Model 1 included the main predictor (fathers' migration status) and all the individual- and family-level control variables. According to the coefficient, children of returned migrants tended to have lower height-for-age than children of non-migrants (b = −0.14, C.I. = (−0.28, 0.00)), whereas fathers' current absence due to migration was not associated with shorter stature in children.

In Model 2 in Table 2, we included the interaction terms between fathers' migration status and communities' levels of socioeconomic development. The coefficients for the interaction terms indicated that the effects of fathers' current absence varied by communities' levels of socioeconomic development. The marginal effects of fathers' current absence on communities' levels of economic development were predicted at the means of all the other control variables and presented in Figure 3. In metropolitan-urban communities, fathers' current absence due to migration was associated with lower height-for-age among children, whereas in other urban communities and both more-developed and less-developed rural communities, fathers' current migration had positive or much smaller negative effects on children's height. This is partially consistent with our expectation that the father's outmigration has a more detrimental impact on children's nutritional status in socioeconomically developed communities than in less developed communities.

The interaction between fathers' migration status and children's gender was included in Model 3 in Table 2. The coefficient showed that girls tended to be shorter than boys (b = −0.17, C.I. = (−0.23, −0.12)), but the effects of fathers' migration status were not different for boys and girls. We further examined whether there were any gender differences in the impacts of fathers' out-migration in certain community contexts by including the three-way interaction among fathers' migration, children's gender, and communities' gender norms in subsequent models. In Model 4, the coefficients for the interaction terms showed that the gender gaps in the effects of fathers' migration status were not conditioned by the levels of son preference in the communities. In Model 5, the coefficient for the interaction between gender and purdah practices (b = −0.18, C.I. = (–0.32, –0.04)) suggested that girls were more disadvantaged in communities where a higher share of women practiced purdah. However, the community-level practice of purdah did not shape how fathers' out-migration influenced boys' and girls' nutritional status.

Table 3 presents the community fixed-effect models predicting BMI-for-age among Indian children. Similar to the effects of migration on children's height, the coefficients in Model 1 showed that children of returned migrants tended to have lower BMI-for-age than children of non-migrants (b = −0.13, C.I. = (−0.26, 0.00)), while the BMI-for-age of children of current migrants and children of non-migrants did not differ. In Model 2, we assessed the interaction effects between fathers' migration status and communities' levels of socioeconomic development. The coefficients for the interaction terms indicated that the effects of fathers' current absence due to migration varied across communities with different levels of

development. We calculated the marginal effects of fathers' current absence for the four types of communities of different levels of development, while holding other variables at their means. The marginal effects presented in Figure 4 showed that fathers' absence was associated with lower BMI among children in metropolitan-urban communities, predicted higher BMI among children in other urban communities and less-developed rural communities, and had minimal effects on the BMI of children in more-developed rural communities.

In Model 3 in Table 3, the positive coefficient for gender implied that girls had higher BMI than boys (b = 0.19, C.I. = (0.14, 0.25)). The coefficient for the interaction terms between fathers' migration status and gender indicated that the influence of fathers' out-migration on children's BMI did not differ between boys and girls in general. In Models 4 and 5, we further examined whether fathers' migration status affected boys and girls differently in communities with different gender contexts. The coefficients for the interaction terms in Model 4 revealed no gender gap the impact of fathers' migration on children's BMI across communities of different levels of son preference. In Model 5, the coefficient for the three-way interaction among fathers' current absence, children's gender, and community-level practice of purdah (b = −0.76, C.I. = (–1.39, –0.13)) indicated that gender differences in the effects of fathers' out-migration were shaped by communities' gender norms. The marginal effects of fathers' current migration were predicted for boys and girls in two extreme situations of communities' gender contexts: no women practiced purdah, and all women practiced purdah. As presented in Figure 5, fathers' current migration was associated with lower BMI for boys and higher BMI for girls in gender-egalitarian communities where no one practiced purdah. However, fathers' current migration increased boys' BMI and reduced girls' BMI in communities with severely unequal gender norms where all women practiced purdah.

Conclusions and Discussion

Previous studies on the impacts of parental migration on the health and well-being of children staying behind have reported mixed findings, including positive, neutral and negative effects. In addition to the possible methodological differences among the studies, one important theoretical explanation for the mixed findings is that the impacts of parental out-migration on children are contingent on individual, family, and contextual characteristics. This study has embraced the complexities of this relationship and examined the heterogeneous effects of fathers' migration on the nutritional status of adolescent boys and girls living in different types of communities.

First, we found that children whose fathers were returned migrants had lower heights and BMIs than children of non-migrants. This relationship was not conditional on communities' development levels or gender contexts. As shown in previous studies using the same data set, returned migrants tend to undertake seasonal work in nearby villages and towns as a survival strategy, whereas currently absent migrants tend to be long-term migrants working in large cities and even abroad for life enhancement (Desai and Chatterjee 2016). Consequently, migrants who travel for short periods and return might only be able to send limited economic remittances, while their absence leads to labor shortages in the household and on

the family farm. Children's nutritional status thus is jeopardized because the positive effect through remittances is not able to compensate for the negative influences through the reduced parental time and energy and increased demand for children to help with household chores, farm work, and caregiving tasks. Currently absent fathers, who usually engage in long-term migration, have less detrimental effects on children's nutritional status possibly because they can send more economic and social remittances to their households.

This study has also highlighted the role of community contexts in shaping the effects of fathers' out-migration on children's growth. We found that fathers' current migration had positive or null effects on the growth of children living in resource-poor contexts but impeded children's growth in socioeconomically developed metropolitan cities. We proposed four potential mechanisms through which father's outmigration influences children's nutritional status. Remittances and health knowledge are the positive pathways and the lack of parental attention and increased child responsibility are the negative pathways. The negative effects observed in metropolitan communities could be attributable to the weaker positive mechanisms operating in metropolitan communities than in other communities. First, income and the standard of living are higher in metropolitan cities than in other urban and rural of communities. Therefore, the remittances sent by the migrants could make less difference in improving the living conditions of families in metropolitan areas given the high living costs. Based on our data, although the average remittances received by the families in metropolitan areas is slightly higher than remittances received by families in other communities, the remittances is only equivalent to one fifth of the household expenditures in the past year in metropolitan communities, which is the lowest among all types of communities. Second, father's out-migration could have a weaker positive impact through the transmission of health knowledge in metropolitan areas because women (the main caretakers) in metropolitan areas are in general more educated and better equipped with health knowledge than women in other communities. Therefore, bringing back health knowledge would not benefit children's health in metropolitan areas as it does in other less-developed communities. These results help reconcile the findings of previous studies on left-behind children reporting different health effects of parental out-migration on children's health. Given that parental migration can influence children's health and growth through countervailing mechanisms, community contexts may determine which mechanisms become more salient, thus leading to different consequences for children's growth.

The results suggest that fathers' current absence is more detrimental to the nutritional status of girls than boys in communities with traditional gender norms indicated by a high proportion of women practicing purdah. The preference for female seclusion tends to confine women to the domestic realm and to prevent them from participating in activities in public space, including labor market activities. Therefore, families would expect low returns to girls' education in the labor market and are less motivated to invest in girls than in boys. Therefore, in such communities, the remittances are more likely to be used to improve boys' nutrition, while the caregivers' time and attention devoted to girls are reduced after the fathers' out-migration. By confining women to the domestic realm, the practice of female seclusion also helps to solidify women's responsibilities in household work and caregiving. When the outmigration of fathers leads to a shortage of household labor, adolescent girls, rather than boys, are expected to help with household chores, farm work, and caring family

members. The added responsibilities may expose girls to more infectious diseases, lead to a higher energy consumption, and thereby cause undernutrition.

This research is not without its limitations. First, communities' gender contexts were measured by two items reflecting a narrow aspect of gender norms in Indian society. Future research could consider other gender-related norms such as the practice of dowry, women's decision-making power, and parents' relationships with sons and daughters. Second, including community fixed effects controlled for all the community-level observed and unobserved confounders, but we were unable to infer causal relationships between fathers' migration and children's nutritional status. Unmeasured individual and family characteristics could confound this relationship. Third, although we find a negative impact of father's migration on children's physical growth in metropolitan cities, the estimation is based on a small number of cases in the sample. We encourage future research on left-behind children and family members in India to oversample families with out-migrants in large metropolitan areas to capture this relatively small population.

In sum, this research reveals the complexities in the relationship between father's out-migration and children's growth. First, by distinguishing between returned migrants and current migration, this study revealed that different types of migration can have distinct effects on left-behind children. Future researchers are encouraged to study whether the impacts of out-migration on children vary by other characteristics of migration, including duration, remittances, destinations, and distance. Moreover, this paper highlighted the importance of considering the possible heterogeneous effects of migration on the health and well-being of left-behind family members across different community contexts. In particular, how gender role expectations and ideologies operate at the family and community levels needs to be considered when examining the influence of parental out-migration on the developmental outcomes of children in countries with ingrained gender inequality.

In additional to the geographic variability, researchers also need to account for the temporal variation in the health effects of migration. India has recently imposed national lockdown to prevent the spread of COVID-19. However, it has a devastating impact on migrant workers and their families. Many migrants have lost jobs but are not able to return home due to the shutdown of transportation services. Some migrants stay in government shelters with inferior conditions, some are stuck in cities without housing or sufficient food, and others choose to walk back to their villages (Biswas 2020). The health of migrants will suffer from hardship during the lockdown and the risks of contracting the virus in shelters and during the trip home. Further, the health and wellbeing of their family members staying behind will also be negatively impacted by the job losses of the migrants and the difficulty to manage daily life during the lockdown in the absence of the migrant men. Future research is needed to examine the implications of the lockdown on the health of migrant workers and their families in India in the short and long terms.

Appendix A.: Percentages of Children in Migrant Households by Child's Gender and Community Type

	Gender		Community Type				
	Boy	Girl	Metropolitan urban	Other urban	More-developed rural	Less-developed rural	Total
Father's migration status							
Non-migrant	5,248	4,767	720	2,741	3,118	3,436	10,015
(%)	89.21	88.08	97.56	93.87	86.93	84.84	88.67
Returned migrant	297	318	10	67	209	329	615
(%)	5.05	5.88	1.36	2.29	5.83	8.12	5.44
Current migrant	338	327	8	112	260	285	665
(%)	5.75	6.04	1.08	3.84	7.25	7.04	5.89
Total N	5,883	5,412	738	2,920	3,587	4,050	11,295

References

Abu-Ali A, and Reisen CA (1999). Gender role identity among adolescent Muslim girls living in the US. Current Psychology, 18(2), 185–192.

Aghajanian A, Alihoseini J, and Thompson V (2014). Husband's circular migration and the status of women left behind in lamerd district, iran: A pilot study. Asian Population Studies, 10(1), 40–59.

Amato PR (2000). The consequences of divorce for adults and children. Journal of Marriage and Family, 62(4), 1269–1287.

Amato PR (2001). Children of divorce in the 1990s: an update of the Amato and Keith (1991) meta-analysis. Journal of Family Psychology, 15(3), 355. [PubMed: 11584788]

Amuedo-Dorantes C, and Pozo S (2011). New evidence on the role of remittances on healthcare expenditures by mexican households. Review of Economics of the Household, 9(1), 69–98.

Antman FM (2011). The intergenerational effects of paternal migration on schooling and work: What can we learn from children's time allocations? Journal of Development Economics, 96(2), 200–208. [PubMed: 22505791]

Antón JI (2010). The impact of remittances on nutritional status of children in ecuador. International Migration Review, 44(2), 269–299.

Arnold F, Choe MK, and Roy TK (1998). Son preference, the family-building process and child mortality in india. Population Studies, 52(3), 301–315.

Biswas S (2020). Coronavirus: India's pandemic lockdown turns into a human tragedy. BBC News. Retrieved from https://www.bbc.com/news/world-asia-india-52086274

Botezat A, and Pfeiffer F (2014). The impact of parents migration on the well-being of children left behind–initial evidence from Romania. ZEW-Centre for European Economic Research Discussion Paper, (14–029).

Chang H, Dong X. y., and MacPhail F (2011). Labor migration and time use patterns of the left-behind children and elderly in rural China. World Development, 39(12), 2199–2210.

Christian P, and Smith ER (2018). Adolescent undernutrition: Global burden, physiology, and nutritional risks. Annals of Nutrition and Metabolism, 72(4), 316–328. [PubMed: 29730657]

Coley RL, and Medeiros BL (2007). Reciprocal longitudinal relations between nonresident father involvement and adolescent delinquency. Child Development, 78(1), 132–147. [PubMed: 17328697]

Davis J, and Brazil N (2016). Migration, remittances and nutrition outcomes of left-behind children: A national-level quantitative assessment of Guatemala. PloS one, 11(3), e0152089. [PubMed: 27002528]

Davis MH, and Franzoi SL (1991). Stability and change in adolescent self-consciousness and empathy. Journal of Research in Personality, 25(1), 70–87.

Dawson DA (1991). Family structure and children's health and well-being: data from the 1988 National Health Interview Survey on child health. Journal of Marriage and the Family, 573–584.

De Brauw A, and Rozelle S (2008). Migration and household investment in rural China. China Economic Review, 19(2), 320–335.

De Haan A (1997). Unsettled settlers: Migrant workers and industrial capitalism in Calcutta. Modern Asian Studies, 31(4), 919–949.

Department of Economic and Social Affairs. (2016). International migration report 2015. New York: United Nations.

Desai S, and Andrist L (2010). Gender scripts and age at marriage in India. Demography, 47(3), 667–687. [PubMed: 20879683]

Desai S, and Chatterjee E (2016). Male migration from rural India: Divergent pathways to long-term and circular migration. Paper presented at the Population Association of America, Washington D.C., March 31–April 2, 2016.

Desai S, Vanneman R, and National Council of Applied Economic Research, N. D. (2011–12). India Human Development Survey-II (IHDS-II). ICPSR36151-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research.

Deshingkar P, Sharma P, Kumar S, Akter S, and Farrington J (2008). Circular migration in Madhya Pradesh: Changing patterns and social protection needs. European Journal of Development Research, 20(4), 612–628.

Dillon M, and Walsh CA (2012). Left behind: The experiences of children of the Caribbean whose parents have migrated. Journal of Comparative Family Studies, 43(6), 871–902.

Dyson T, and Moore M (1983). On kinship structure, female autonomy, and demographic behavior in India. Population and Development Review, 35–60.

Gibson J, McKenzie D, and Stillman S (2011). What happens to diet and child health when migration splits households? Evidence from a migration lottery program. Food Policy, 36(1), 7–15.

Graham E, and Jordan LP (2011). Migrant parents and the psychological well-being of left-behind children in Southeast Asia. Journal of Marriage and Family, 73(4), 763–787. [PubMed: 22163371]

Graham E, and Jordan LP (2013). Does having a migrant parent reduce the risk of undernutrition for children who stay behind in South-East Asia? Asian and Pacific Migration Journal, 22(3), 315–347. [PubMed: 24966445]

Gulati L (1993). In the absence of their men: The impact of male migration on women. New Delhi: Sage Publications.

Haboubi GJ, and Shaikh RB (2009). A Comparison of the nutritional status of adolescents from selected schools of South India and UAE: A cross-sectional study. Indian journal of community medicine: Official publication of Indian Association of Preventive & Social Medicine, 34(2), 108. [PubMed: 19966955]

Hadi A (1999). Overseas migration and the well-being of those left behind in rural communities of Bangladesh. Asia-Pacific Population Journal, 14(1), 43–58. [PubMed: 12295290]

Hamilton ER, and Choi KH (2015). The mixed effects of migration: Community-level migration and birthweight in Mexico. Social Science & Medicine, 132, 278–286. [PubMed: 25174770]

Hildebrandt N, and McKenzie DJ (2005). The effects of migration on child health in Mexico: The World Bank.

Huang Y, Song Q, Tao R, and Liang Z (2018). Migration, family arrangement, and children's health in China. Child Development, 89(2), e74–e90. [PubMed: 27982411]

Hugo G (2002). Effects of international migration on the family in Indonesia. Asian and Pacific Migration Journal, 11(1), 13–46.

Jordan LP, and Graham E (2012). Resilience and well-being among children of migrant parents in South-East Asia. Child Development, 83(5), 1672–1688. [PubMed: 22966930]

Kandel W, and Kao G (2001). The impact of temporary labor migration on Mexican children's educational aspirations and performance. International Migration Review, 35(4), 1205–1231.

Kozuki et al. (2015). Short maternal stature increases risk of small-for-gestational-age and preterm births in low-and middle-income countries: Individual participant data meta-analysis and population attributable fraction. The Journal of Nutrition, 145(11), 2542–2550. [PubMed: 26423738]

Lahaie C, Hayes JA, Piper TM, and Heymann J (2009). Work and family divided across borders: The impact of parental migration on Mexican children in transnational families. Community, Work & Family, 12(3), 299–312.

Lawler M, and Nixon E (2011). Body dissatisfaction among adolescent boys and girls: the effects of body mass, peer appearance culture and internalization of appearance ideals. Journal of Youth and Adolescence, 40(1), 59–71. [PubMed: 20058058]

Lu Y (2015). Internal migration, international migration, and physical growth of left-behind children: A study of two settings. Health & place, 36, 118–126. [PubMed: 26495753]

Mberu BU (2006). Internal migration and household living conditions in Ethiopia. Demographic Research, 14, 509–540.

McKenzie D (2005). Beyond remittances: the effects of migration on Mexican households In Özden Ç and Schiff M (Eds.), International migration, remittances and the brain drain (pp. 123–147). New York: McMillan and Palgrave.

McLanahan S, and Sandefur G (1994). Growing up with a single parent. What hurts, what helps. Harvard University Press, Cambridge, MA.

Mu R, and De Brauw A (2015). Migration and young child nutrition: evidence from rural China. Journal of Population Economics, 28(3), 631–657.

Murphy R, Zhou M, and Tao R (2016). Parents' migration and children's subjective well-being and health: evidence from rural China. Population, Space and Place, 22(8), 766–780.

Nguyen CV (2016). Does parental migration really benefit left-behind children? comparative evidence from Ethiopia, India, Peru and Vietnam. Social Science & Medicine, 153, 230–239. [PubMed: 26921838]

Office of the Registrar General & Census Commissioner. (2011). Provisional -D-5 migrants by place of last residence, age, sex, reason for migration and duration of residence-2011.

Onis MD, Onyango AW, Borghi E, Siyam A, Nishida C, and Siekmann J (2007). Development of a WHO growth reference for school-aged children and adolescents. Bulletin of the World health Organization, 85, 660–667. [PubMed: 18026621]

Ren Q, and Treiman DJ (2016). The consequences of parental labor migration in china for children's emotional wellbeing. Social Science Research, 58, 46–67. [PubMed: 27194651]

Sharma U (1990). Public employment and private relations: Women and work in India In Stichter S and Parpart J (Eds.), Women, employment and the family in the international division of labour (pp. 229–246). Philiadelphia: Temple University Press.

Stroope S (2015). Seclusion, decision-making power, and gender disparities in adult health: examining hypertension in India. Social Science Research, 53, 288–299. [PubMed: 26188454]

Taylor JE, Rozelle S, and De Brauw A (2003). Migration and incomes in source communities: A new economics of migration perspective from China. Economic Development and Cultural Change, 52(1), 75–101.

Tong Y, Luo W, and Piotrowski M (2015). The association between parental migration and childhood illness in rural China. European Journal of Population, 31(5), 561–586.

Wang F, Ping R, Zhan S, and Shen A (2005). Reproductive health status, knowledge, and access to health care among female migrants in Shanghai, China. Journal of Biosocial Science, 37(5), 603–622. [PubMed: 16174349]

Wen M, and Lin D (2012). Child development in rural China: Children left behind by their migrant parents and children of nonmigrant families. Child Development, 83(1), 120–136. [PubMed: 22181046]

Wen M, Su S, Li X, and Lin D (2015). Positive youth development in rural China: The role of parental migration. Social Science & Medicine, 132, 261–269. [PubMed: 25176335]

Xu H, and Xie Y (2015). the causal effects of rural-to-urban migration on children's well-being in China. European Sociological Review, 31(4), 502–519.

Ye J, and Pan L (2011). Differentiated childhoods: impacts of rural labor migration on left-behind children in China. The Journal of Peasant Studies, 38(2), 355–377. [PubMed: 21744548]

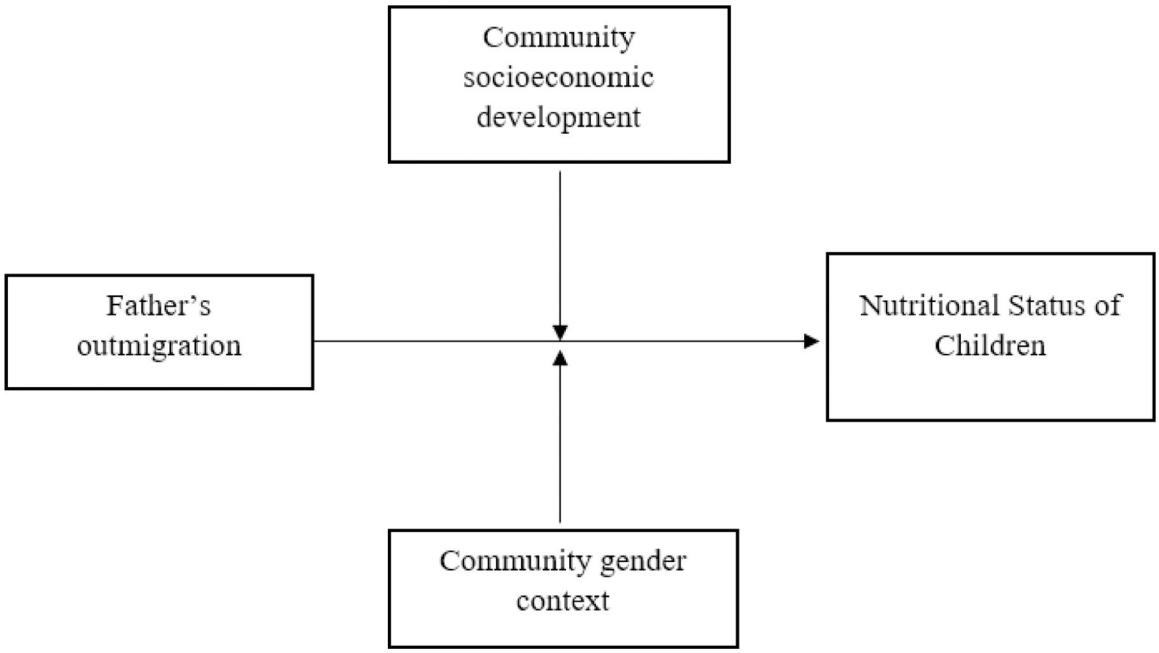

Figure 1:
The Impact of Father's Outmigration on the Nutritional Status of Children, Conditional on Community Socioeconomic Development and Gender Contexts

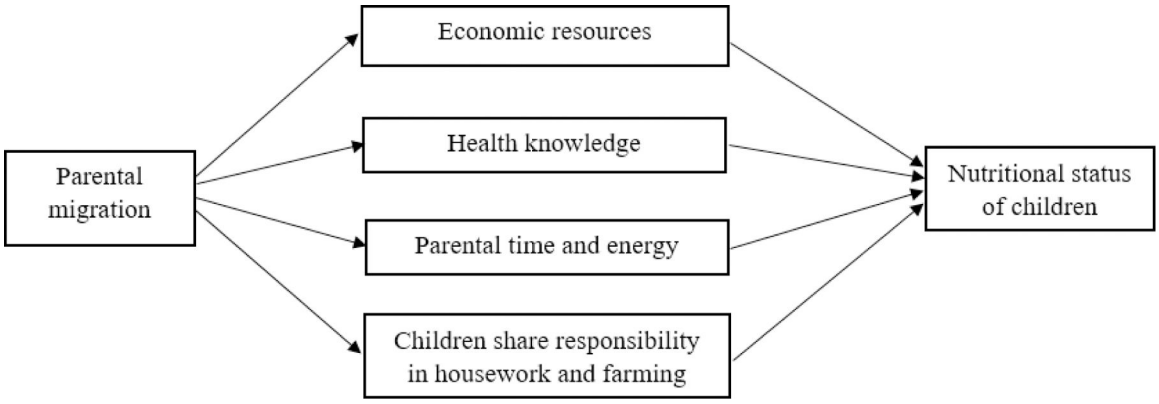

Figure 2:
Theoretical Pathways through which Parental Migration Influences the Nutritional Status of Children

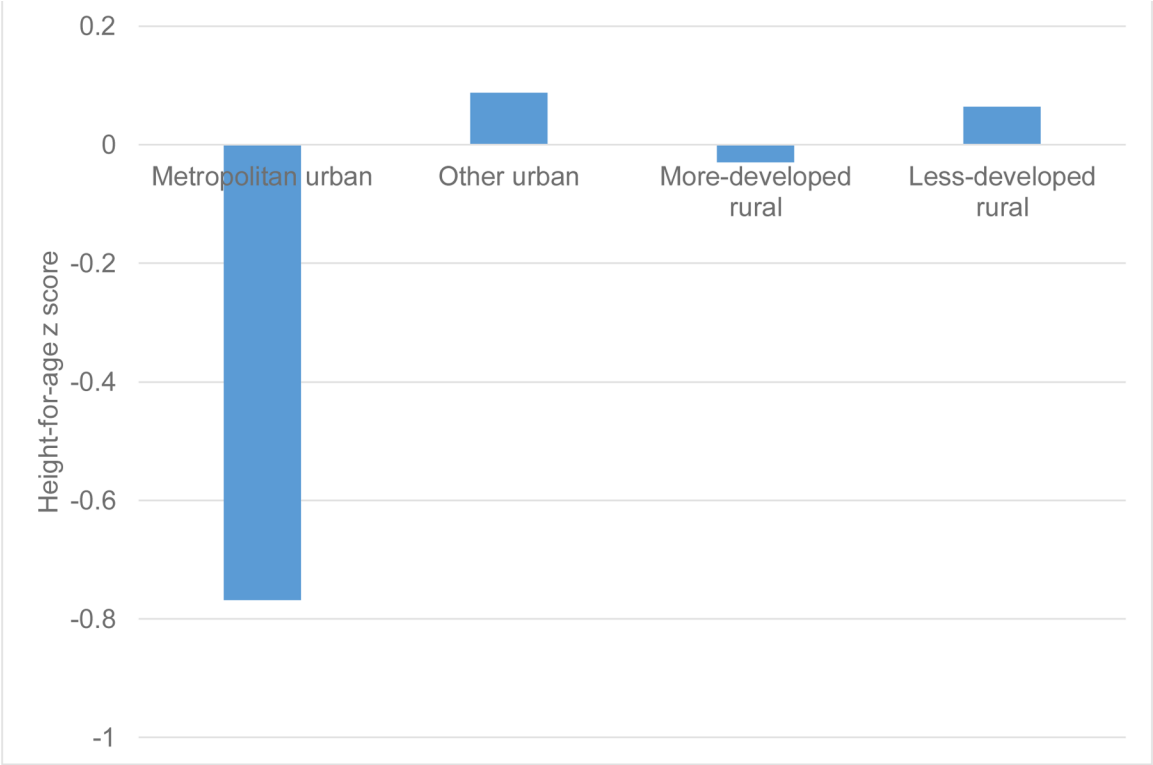

Figure 3:
Marginal Effects of Father's Current Migration on Height-for-age among Children 10–15 years old in India, by Community Socioeconomic Development

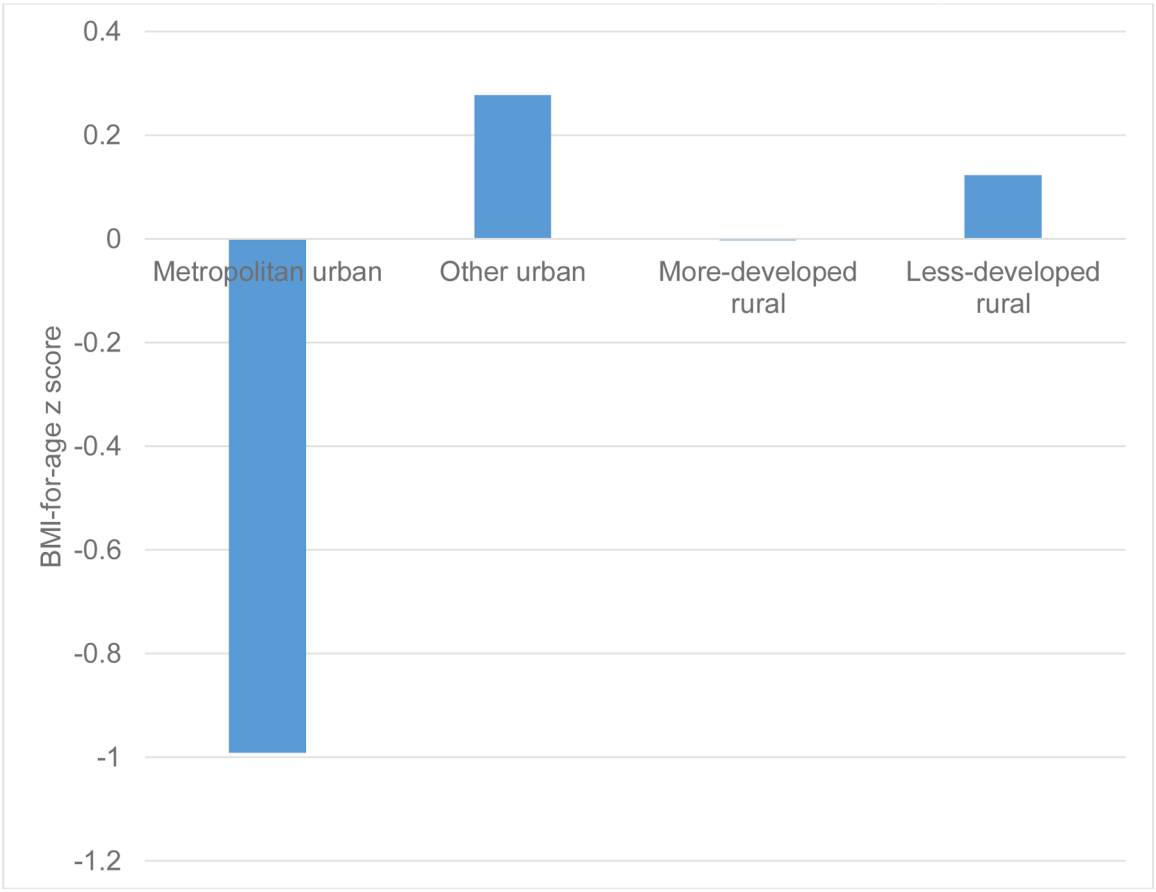

Figure 4:
Marginal Effects of Father's Current Migration on BMI-for-age among Children 10–15 years old in India, by Community Socioeconomic Development

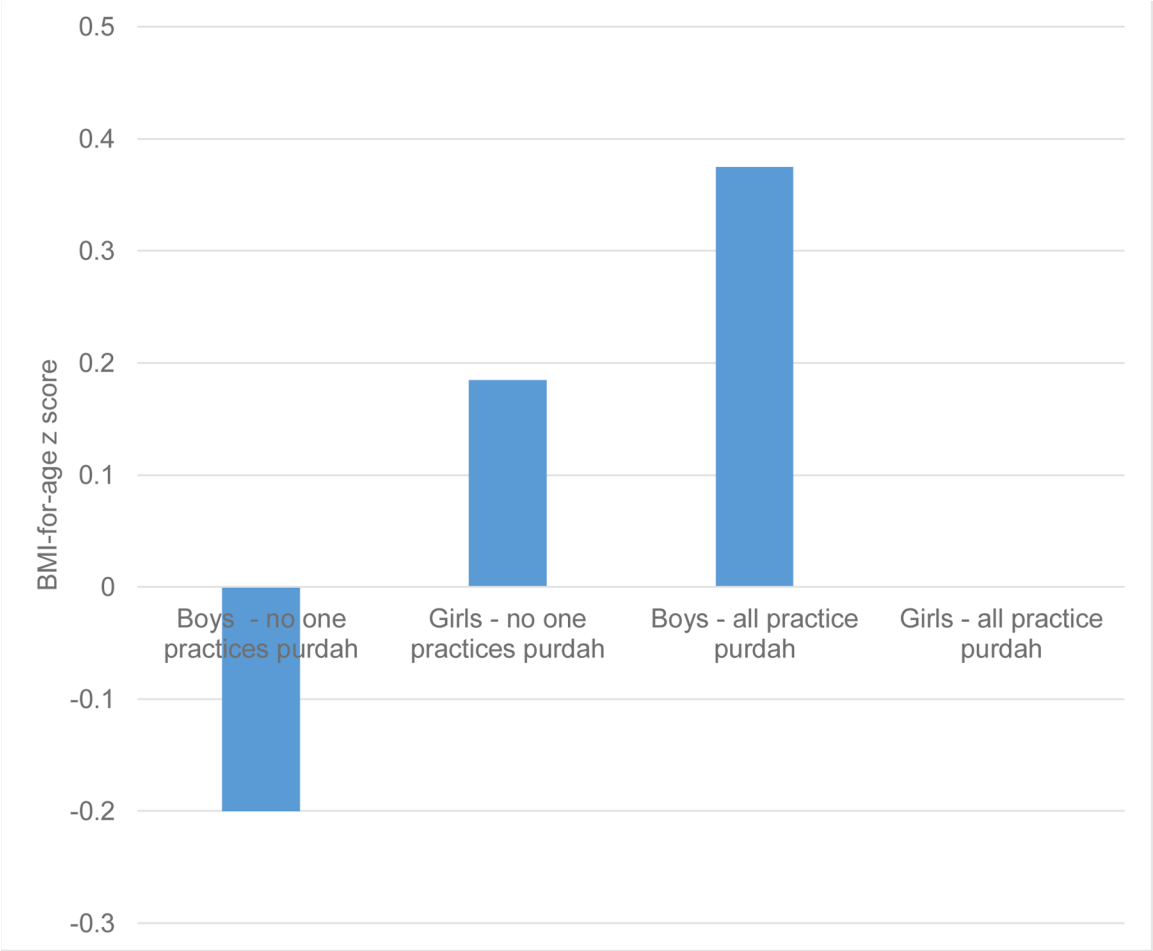

Figure 5:
Marginal Effects of Father's Current Migration on BMI-for-age among Children 10–15 years old in India, by Gender of the Child and Community Gender Norms

Table 1.

Weighted Descriptive Statistics of the Analytical Variables, IHDS-II, 2011–2012

Variable	Mean or Percentage	Standard Deviation
Height-for-age z score	−1.62	1.43
BMI-for-age z score	−1.08	1.41
Father's migration status		
Non-migrant	87.15%	
Returned migrant	5.69%	
Current migrant	7.16%	
Gender		
Boys	52.42%	
Girls	47.58%	
Age (in months)	147.01	21.06
Mother's age	36.33	5.45
Mother's height	151.53	7.58
Mother's years of education	4.70	4.75
Father's years of education	7.07	4.75
Coresidence with grandparents	28.07%	
Number of children (under age 15) in the household	2.79	1.21
Any children under age 5	4.48%	
Birth order	2.54	1.66
Caste and religious groups		
Forward caste	19.60%	
OBC	37.25%	
Dalit	22.36%	
Adivasi	6.12%	
Muslim	12.83%	
Christian, Sikh, Jain	1.83%	
Household assets		
Poorest	19.21%	
2nd quintile	17.86%	
Middle quintile	24.59%	
4th quintile	20.09%	
Richest	18.25%	
Community context		
Level of socioeconomic development		
Metropolitan urban	6.86%	
Other urban	24.14%	
More-developed rural	31.18%	
Less-developed rural	37.83%	
Son preference (proportion of women express son preference)	.28	.18
Purdah practice (proportion of women perform purdah)	.64	.37

Variable	Mean or Percentage	Standard Deviation
Number of children	11,295	
Number of communities	2,131	

Table 2.

Community Fixed-Effect Regression Models Predicting the Height-for-Age Z Scores among Children (ages 10–15) in India, IHDS-II 2011–12

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**
Father's migration status										
Non-migrant (ref.)										
Returned migrant	−0.14	[−0.28 – 0.00]	0.24	[−0.25 – 0.72]	−0.09	[−0.25 – 0.08]	−0.11	[−0.49 – 0.27]	−0.37	[−0.75 – 0.00]
Current migrant	0.02	[−0.12 – 0.16]	−0.77	[−1.42 – −0.12]	−0.04	[−0.23 – 0.16]	−0.15	[−0.52 – 0.23]	0.05	[−0.35 – 0.45]
Interaction with the level of socioeconomic development										
Returned migrant × other urban			−0.51	[−1.14 – 0.13]						
Returned migrant × more-developed rural			−0.37	[−0.91 – 0.18]						
Returned migrant × less-developed rural			−0.35	[−0.87 – 0.17]						
Current migrant × other urban			0.86	[0.13 – 1.58]						
Current migrant × more-developed rural			0.74	[0.05 – 1.43]						
Current migrant × less-developed rural			0.83	[0.15 – 1.51]						
Interaction with the child's gender										
Girls	−0.17	[−0.22 – −0.12]	−0.17	[−0.22 – −0.12]	−0.17	[−0.23 – −0.12]	−0.10	[−0.20 – 0.00]	−0.06	[−0.16 – 0.04]
Returned migrant × girls					−0.09	[−0.30 – 0.12]	−0.28	[−0.76 – 0.20]	0.12	[−0.30 – 0.55]
Current migrant × girls					0.12	[−0.10 – 0.34]	0.27	[−0.16 – 0.70]	0.09	[−0.39 – 0.57]
Interaction with community gender context										
Returned migrant × son preference							0.03	[−1.03 – 1.09]		
Current migrant × son preference							0.34	[−0.73 – 1.41]		
Girls × son preference							−0.29	[−0.61 – 0.04]		
Returned migrant × girls × son preference							0.63	[−0.72 – 1.98]		
Current migrant × girls × son preference							−0.43	[−1.68 – 0.82]		
Returned migrant × purdah practice									0.35	[−0.13 – 0.83]
Current migrant × purdah practice									−0.14	[−0.66 – 0.38]
Girls × purdah practice									−0.18	[−0.32 – −0.04]
Returned migrant × girls × purdah practice									−0.24	[−0.81 – 0.32]

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	95% C.I.	b	95% C.I.	b	95% C.I.	b	95% C.I.	b	95% C.I.
Current migrant × girls × purdah practice									0.07	[−0.55 – 0.69]
Age (in month)	−0.03	[−0.05 – −0.02]	−0.03	[−0.05 – −0.02]	−0.03	[−0.05 – −0.02]	−0.03	[−0.05 – −0.02]	−0.03	[−0.05 – −0.02]
Age squared	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]
Mother’s age	0.03	[0.02 – 0.04]	0.03	[0.02 – 0.04]	0.03	[0.02 – 0.04]	0.03	[0.02 – 0.04]	0.03	[0.02 – 0.04]
Mother’s height	0.05	[0.04 – 0.05]	0.05	[0.04 – 0.05]	0.05	[0.04 – 0.05]	0.05	[0.04 – 0.05]	0.05	[0.04 – 0.05]
Mother’s years of education	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]
Father’s years of education	−0.00	[−0.01 – 0.01]	−0.00	[−0.01 – 0.01]	−0.00	[−0.01 – 0.01]	−0.00	[−0.01 – 0.01]	−0.00	[−0.01 – 0.01]
Coresidence with grandparents	−0.02	[−0.09 – 0.05]	−0.02	[−0.09 – 0.05]	−0.02	[−0.09 – 0.05]	−0.02	[−0.09 – 0.05]	−0.02	[−0.09 – 0.05]
Number of children in the household	−0.06	[−0.10 – −0.03]	−0.06	[−0.09 – −0.03]	−0.06	[−0.09 – −0.03]	−0.06	[−0.10 – −0.03]	−0.06	[−0.09 – −0.03]
Any children under age 5	−0.15	[−0.30 – 0.01]	−0.15	[−0.30 – 0.01]	−0.15	[−0.30 – 0.01]	−0.15	[−0.30 – 0.01]	−0.15	[−0.30 – 0.01]
Birth order	−0.06	[−0.09 – −0.04]	−0.06	[−0.09 – −0.04]	−0.06	[−0.09 – −0.04]	−0.06	[−0.09 – −0.04]	−0.06	[−0.09 – −0.04]
Caste and religious groups										
Forward caste (ref.)										
OBC	−0.13	[−0.23 – −0.02]	−0.12	[−0.23 – −0.02]	−0.13	[−0.23 – −0.02]	−0.13	[−0.23 – −0.02]	−0.13	[−0.23 – −0.02]
Dalit	−0.11	[−0.23 – 0.00]	−0.11	[−0.23 – 0.00]	−0.11	[−0.23 – 0.00]	−0.11	[−0.23 – 0.00]	−0.11	[−0.23 – 0.00]
Adivasi	−0.18	[−0.36 – −0.00]	−0.18	[−0.36 – −0.00]	−0.18	[−0.36 – −0.00]	−0.18	[−0.36 – −0.00]	−0.19	[−0.37 – −0.01]
Muslim	−0.14	[−0.30 – 0.03]	−0.14	[−0.30 – 0.03]	−0.14	[−0.30 – 0.03]	−0.14	[−0.30 – 0.03]	−0.14	[−0.30 – 0.02]
Christian, Sikh, and Jain	−0.19	[−0.42 – 0.03]	−0.19	[−0.42 – 0.03]	−0.20	[−0.42 – 0.03]	−0.19	[−0.42 – 0.03]	−0.20	[−0.43 – 0.02]
Household assets										
Poorest (ref.)										
2nd quintile	0.19	[0.07 – 0.30]	0.19	[0.07 – 0.30]	0.19	[0.07 – 0.30]	0.19	[0.07 – 0.30]	0.19	[0.07 – 0.30]
Middle quintile	0.22	[0.09 – 0.34]	0.22	[0.09 – 0.34]	0.22	[0.09 – 0.34]	0.22	[0.09 – 0.34]	0.22	[0.09 – 0.34]
4th quintile	0.34	[0.20 – 0.48]	0.34	[0.19 – 0.48]	0.34	[0.20 – 0.48]	0.34	[0.19 – 0.48]	0.34	[0.19 – 0.48]
Richest	0.53	[0.37 – 0.70]	0.53	[0.37 – 0.70]	0.54	[0.37 – 0.70]	0.53	[0.37 – 0.70]	0.53	[0.37 – 0.70]
Constant	−6.18	[−7.69 – −4.66]	−6.17	[−7.69 – −4.65]	−6.37	[−7.89 – −4.86]	−6.37	[−7.89 – −4.86]	−6.38	[−7.89 – −4.86]
Community fixed effects	Yes		Yes		Yes		Yes		Yes	
Number of persons	11,295		11,295		11,295		11,295		11,295	
Number of communities	2,131		2,131		2,131		2,131		2,131	
Log Likelihood	−16846		−16844		−16845		−16841		−16839	

Table 3.

Community Fixed-Effect Regression Models Predicting the BMI-for-Age Z Scores among Children (ages 10–15) in India, IHDS-II 2011–12

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**	**b**	**95% C.I.**
Father's migration status										
Non-migrant (ref.)										
Returned migrant	−0.13	[−0.26 – 0.00]	−0.49	[−1.27 – 0.28]	−0.12	[−0.30 – 0.05]	0.14	[−0.25 – 0.53]	0.15	[−0.32 – 0.62]
Current migrant	0.09	[−0.04 – 0.21]	−0.99	[−2.03 – 0.04]	0.07	[−0.10 – 0.23]	−0.09	[−0.43 – 0.25]	−0.20	[−0.57 – 0.17]
Interaction with the level of socioeconomic development										
Returned migrant × other urban			0.24	[−0.61 – 1.09]						
Returned migrant × more-developed rural			0.58	[−0.23 – 1.39]						
Returned migrant × less-developed rural			0.25	[−0.54 – 1.05]						
Current migrant × other urban			1.27	[0.18 – 2.36]						
Current migrant × more-developed rural			0.99	[−0.07 – 2.05]						
Current migrant × less-developed rural			1.11	[0.07 – 2.16]						
Interaction with the child's gender										
Girls	0.19	[0.14 – 0.25]	0.19	[0.14 – 0.25]	0.19	[0.13 – 0.25]	0.18	[0.07 – 0.29]	0.10	[−0.01 – 0.22]
Returned migrant × girls					−0.01	[−0.22 – 0.21]	−0.07	[−0.54 – 0.40]	−0.12	[−0.66 – 0.41]
Current migrant × girls					0.04	[−0.17 – 0.24]	0.27	[−0.15 – 0.70]	0.57	[0.06 – 1.09]
Interaction with community gender context										
Returned migrant × son preference							−0.75	[−1.72 – 0.22]		
Current migrant × son preference							0.51	[−0.40 – 1.43]		
Girls × son preference							0.04	[−0.29 – 0.38]		
Returned migrant × girls × son preference							0.14	[−1.16 – 1.44]		
Current migrant × girls × son preference							−0.77	[−1.91 – 0.37]		
Returned migrant × purdah practice									−0.34	[−0.90 – 0.22]
Current migrant × purdah practice									0.38	[−0.08 – 0.85]
Girls × purdah practice									0.14	[−0.02 – 0.29]
Returned migrant × girls × purdah practice									0.11	[−0.55 – 0.78]
Current migrant × girls × purdah practice									−0.76	[−1.39 – −0.13]

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	95% C.I.	b	95% C.I.	b	95% C.I.	b	95% C.I.	b	95% C.I.
Age (in month)	−0.04	[−0.06 – −0.02]	−0.04	[−0.06 – −0.02]	−0.04	[−0.06 – −0.02]	−0.04	[−0.06 – −0.02]	−0.04	[−0.06 – −0.02]
Age squared	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]	0.00	[0.00 – 0.00]
Mother's age	0.02	[0.01 – 0.02]	0.02	[0.01 – 0.02]	0.02	[0.01 – 0.02]	0.02	[0.01 – 0.02]	0.02	[0.01 – 0.02]
Mother's height	−0.00	[−0.01 – 0.00]	−0.00	[−0.01 – 0.00]	−0.00	[−0.01 – 0.00]	−0.00	[−0.01 – 0.00]	−0.00	[−0.01 – 0.00]
Mother's years of education	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]	0.01	[−0.00 – 0.02]
Father's years of education	0.00	[−0.00 – 0.01]	0.00	[−0.00 – 0.01]	0.00	[−0.00 – 0.01]	0.00	[−0.00 – 0.01]	0.00	[−0.00 – 0.01]
Coresidence with grandparents	−0.03	[−0.10 – 0.05]	−0.03	[−0.10 – 0.04]	−0.03	[−0.10 – 0.05]	−0.03	[−0.10 – 0.05]	−0.03	[−0.10 – 0.04]
Number of children in the household	−0.05	[−0.08 – −0.02]	−0.05	[−0.08 – −0.02]	−0.05	[−0.08 – −0.02]	−0.05	[−0.08 – −0.02]	−0.05	[−0.08 – −0.02]
Any children under age 5	−0.06	[−0.20 – 0.09]	−0.05	[−0.20 – 0.09]	−0.06	[−0.20 – 0.09]	−0.05	[−0.20 – 0.09]	−0.06	[−0.20 – 0.09]
Birth order	−0.04	[−0.06 – −0.01]	−0.04	[−0.06 – −0.01]	−0.04	[−0.06 – −0.01]	−0.04	[−0.06 – −0.01]	−0.04	[−0.06 – −0.01]
Caste and religious groups										
Forward caste (ref.)										
OBC	−0.07	[−0.17 – 0.04]	−0.06	[−0.17 – 0.04]	−0.07	[−0.17 – 0.04]	−0.06	[−0.17 – 0.04]	−0.06	[−0.17 – 0.04]
Dalit	0.01	[−0.10 – 0.12]	0.01	[−0.10 – 0.12]	0.01	[−0.10 – 0.12]	0.01	[−0.10 – 0.12]	0.01	[−0.10 – 0.12]
Adivasi	−0.08	[−0.27 – 0.10]	−0.08	[−0.27 – 0.11]	−0.08	[−0.27 – 0.10]	−0.08	[−0.27 – 0.10]	−0.08	[−0.27 – 0.11]
Muslim	0.07	[−0.09 – 0.24]	0.07	[−0.10 – 0.24]	0.07	[−0.09 – 0.24]	0.07	[−0.10 – 0.24]	0.08	[−0.09 – 0.24]
Christian, Sikh, and Jain	0.00	[−0.27 – 0.28]	0.01	[−0.27 – 0.28]	0.00	[−0.27 – 0.28]	0.00	[−0.27 – 0.27]	0.00	[−0.27 – 0.28]
Household assets										
Poorest (ref.)										
2nd quintile	0.13	[0.02 – 0.24]	0.13	[0.03 – 0.24]	0.13	[0.03 – 0.24]	0.13	[0.02 – 0.23]	0.13	[0.02 – 0.24]
Middle quintile	0.12	[0.00 – 0.24]	0.12	[−0.00 – 0.24]	0.12	[0.00 – 0.24]	0.12	[−0.00 – 0.24]	0.12	[−0.00 – 0.24]
4th quintile	0.26	[0.12 – 0.40]	0.26	[0.12 – 0.40]	0.26	[0.12 – 0.40]	0.26	[0.12 – 0.40]	0.26	[0.12 – 0.40]
Richest	0.47	[0.32 – 0.63]	0.47	[0.32 – 0.63]	0.47	[0.32 – 0.63]	0.47	[0.32 – 0.63]	0.47	[0.32 – 0.63]
Constant	1.32	[−0.20 – 2.84]	1.33	[−0.19 – 2.85]	1.51	[−0.01 – 3.03]	1.51	[−0.01 – 3.04]	1.50	[−0.02 – 3.02]
Community fixed effects	Yes		Yes		Yes		Yes		Yes	
Number of persons	11,295		11,295		11,295		11,295		11,295	
Number of communities	2,131		2,131		2,131		2,131		2,131	
Log Likelihood	−17303		−17295		−17303		−17300		−17297	