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Running head: PATERNAL ABSENCE AND UNDERNUTRITION

What Difference Can Fathers Make?

Evidence from Peru about the Impact of Early Paternal Absence on Stunting

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Abstract

The long-term consequences of paternal absence on children's well-being are not well understood. This study assesses whether paternal absence during infancy is associated with chronic undernutrition when children are five years old as well as how paternal absence compromises mothers' ability to care for offspring. We used data from Young Lives, a 15-year cohort study of children in four countries (n=1949 in Peru). One-year-olds whose fathers were sometimes and never present were more malnourished at age 5 than children whose fathers were always or usually present. For example, among rural boys, height-for-age z-scores were -2.1 for boys whose fathers were always present, -1.8 for boys whose fathers were usually present and -2.6 for boys whose fathers were sometimes and never present ($p<.001$). Findings from this research indicate that paternal absence compromises mothers' ability to care for their children. For example, in urban homes where fathers were never present, children ate significantly fewer snacks and meals than in homes where fathers were always or usually present (4.9 snacks versus 5.0 and 5.2 snacks, respectively, $p=0.0479$), mothers were significantly less likely to receive child support (13.5% of never present fathers, 30.6% of usually present fathers and 58.0% of sometimes present fathers gave child support, $p<0.001$), and household expenditures on children (for example, boys' and girls' uniforms) were low. Resilient children—those whose fathers were never present but who were not stunted—provide insight into how some at-risk children remained well-nourished. In this group, factors that protected against malnutrition included maternal education, wealth, the number of snacks and meals the child consumed, the use of soap, payment for medical fees and medicines and the amount of schooling mothers wanted their children to complete. Programs and policies designed to reduce malnutrition must be based on a fuller understanding of how paternal absence puts children at risk.

Fathers have the potential to positively impact their children through 1) financial and other resources 2) childrearing and mentoring, and 3) social capital above and beyond what mothers contribute (Booth & Crouter, 1998). There is considerable evidence to suggest that fathers' absence from the home has a negative short- and long-term impact on health, nutrition, psychosocial development, cognition and the educational experiences of children (Clarke, Joshi, & Di Salvo, 2000; Joshi, et al., 1999; Sahn & Alderman, 1997; Sigle-Rushton & McLanahan, 2004). In homes where fathers influence the allocation of resources and make substantial contributions to household income, their absence may affect the amount and quality of food and healthcare available to children and, concomitantly, children's physical and cognitive development.

Paternal absence is becoming more common (Lang & Zagorsky, 2001) and may result from migration—either temporary or long-term—illegitimate childbirth, marital discord, or abandonment (Frank & Wildsmith, 2005). Migration in particular continues to be an important contributor to paternal absence (Frank & Wildsmith, 2005). These trends are mirrored in Peru where results from the Demographic and Health Survey indicate that 1 in 4 children come from homes where fathers are absent (Cespeda, Davila, Fort, Ulloa, & Castro, 2004). Unfortunately, little is known about how absence of fathers affects the nutritional status of their children.

One of the challenges associated with studying paternal absence in less-industrialized nations has been the lack of large longitudinal datasets that are sufficiently rich to shed light on these relationships. The purpose of this study is to determine: 1) whether paternal absence during infancy is associated with chronic undernutrition when children are five years of age and 2) how paternal absence compromises mothers' ability to nurture and care for their children.

Understanding the way paternal absence affects children is critical to designing programs and policies that ensure their well-being.

Method

Study Setting

Young Lives (YL) is an international study of childhood poverty. The study follows approximately 12,000 children every 3-5 years in four countries (Ethiopia, India, Peru and Vietnam). It began in 2002 and will continue for 15 years. In each country, YL tracks two cohorts: infants one year of age (n=2000) in 2002 and children eight years of age (n=1000) in 2002. This study focuses on the younger cohort from Peru. Grupo de Análisis para el Desarrollo (GRADE) and the Instituto de Investigación Nutricional (IIN) implemented the study in Peru.

In Peru, the study sample consisted of 20 districts that were selected through a multi-stage sampling strategy that consisted of systematic sampling based on poverty ranking and the random sampling of 100 households in each district. All three geographic regions of Peru (coastal, highland and jungle), as well as urban and rural sites, were represented by the sample (Crookston, et al., In Press).

Study Subjects

The younger Peruvian cohort is comprised of 2,052 children aged 6-17.9 months at enrollment. Subjects were recruited from randomly selected communities within the 20 districts. Within each community, the starting point for data collection was also randomly chosen. Data were gathered from 100 children in each site. Between rounds 1 and 2, only 3.5% of children were lost to follow-up. Ethical approval for this study was obtained from London South Bank University, the London School of Hygiene and Tropical Medicine, the University of Reading and

the Instituto de Investigación Nutricional. Written informed consent was obtained from all household heads or guardians.

Data Collection

First and second round data (R1 and R2) were collected in 2002 and 2006/2007, respectively. Three teams consisting of six interviewers each collected household and child-level data. Interviews were conducted on one or more days depending on family preference and in total lasted approximately four hours.

Data Management

Staff from IIN used the Delphi program (Austin, TX, USA) to enter data from rounds 1 and 2 into the computer. Then data were then transferred to Microsoft Access (version 2000, Seattle, WA, USA).

Measures

The survey instruments contained a core questionnaire used in all four countries participating in the YL study. In addition, investigators from each country added context-specific questions. The questionnaire used in Peru included additional information on demographics, household composition, socioeconomic and cultural characteristics of families, public services available to families, social capital, perceptions of psychosocial well-being of the individual and family, anthropometric data for children, and cognitive development.

Defining paternal absence

In round 1 of data collection, each respondent (in most cases, the mother of the index child) was asked: 'How often does the biological father see the child?' We defined 'daily contact' with the child as least risky and 'no contact in the last six months' as most risky. 'Weekly,' 'monthly' and 'less than monthly' comprised a middle risk category. There are a

variety of reasons fathers may not see their children including migration, marital disruption and death. The YL database does not contain information about *why* fathers do not see their children. Consequently, we examined marital status to better understand some of the *potential* causes of absence. We defined 'permanent partner' as least risky and 'divorced or separated' as most risky with 'single' and 'widowed' comprising a middle risk category. While marital status does not directly indicate reasons fathers were absent, it gives us a sense of the types of relationships in the home during children's infancy. Consequently, we combined variables measuring paternal absence and marital status. Eighty six percent of children's parents were in a permanent union, 5.9% were single or widowed and 8.0% were divorced or separated. Hereafter we refer to the combined paternal absence/marital status variable as 'paternal absence.'

Measuring nutritional status

Stunting at five years of age was used as the outcome indicator because 1) stunting is more prevalent than wasting in Latin America 2) it represents a greater threat to public health, and 3) it represents the long-term impact of poor diets and infection (Cespeda, et al., 2004; Chopra, 2003; Clarke, et al., 2000; Crookston, et al., In Press; Frank & Wildsmith, 2005; Frongillo, de Onis, & Hanson, 1997; Hwang & Lamb, 1997; Johnson & Rogers, 1993; Joshi, et al., 1999; Kurz & Johnson-Welch, 2000; Lamb, et al., 1988; Lang & Zagorsky, 2001; Madhavan & Townsend, 2007). Stunting was defined as a height-for-age z-score (HAZ) less than -2.0 standard deviations below the mean of the international reference standard. The EpiNut module of EpiInfo (version 2000, Centers for Disease Control and Prevention, Atlanta, GA, USA) was used to calculate anthropometric indicators according to the World Health Organization (WHO) International Growth Reference standard (available at: http://www.who.int/childgrowth/en/).

Analysis

All statistical analyses were conducted using SAS statistical software (version 9.1, Cary, NC, USA). Our data were both categorical and continuous. Percentages, Pearson chi-square tests and Fisher's Exact Test were used to describe the characteristics of respondents and to test associations between 1) paternal absence and height-for-age z-score (HAZ) 2) caregiving behaviors and nutrition, and 3) paternal absence and caregiving behaviors. In our analyses, we adjusted for and, when appropriate, carried out separate analyses based on sex, geographic region (coastal, mountain, and jungle) and setting (urban and rural). As noted in the Discussion section of this paper, is often difficult to encourage absent fathers to become involved in their offspring's lives. Given this reality, we analyzed data from resilient children; namely, those who sometimes and never saw their fathers but who were well-nourished. Among children who *sometimes* saw their fathers, we used the chi-square statistic to compare those who were stunted and those who were not. Separately, we did the same for children who *never* saw their fathers. We evaluated mixed effects regression models to assess data with a cluster design. Using the MIXED procedure from SAS, we examined the association between paternal absence and undernutrition, after accounting for a range of sociodemographic variables. Variables were retained or dropped from the model based on p values (<.1). Odds ratios and 95% confidence intervals were calculated for retained variables. We evaluated models for interaction.

Results

Table 1 presents sociodemographic information about study participants, stratified by site (urban vs. rural). A comparison of boys and girls revealed no significant differences by sex. Consequently, demographic variables are presented for both sexes combined. Nutritional status

at round 1 and round 2 was better for urban children, compared to those living in rural areas (R1 z-score: -1.0 and -1.9; $p<0.0001$, R2 z-score -1.2 and -2.2, $p<.0001$). Urban and rural children were equally likely to always see their father (80.7% in urban areas and 81.4% in rural areas); however, rural children were more likely than urban children to never see their fathers (9.5% of rural children and 4.7% of urban children never saw their fathers, $p<0.0001$). Urban families were significantly smaller than rural families and were more likely to have grandparents living at home. Mothers in urban areas reported more years of education (9.6 years) and greater household wealth (28.9% in the wealthiest quintile) than mothers in rural areas (4.7 years of education and 2.5% in the wealthiest quintile; $p<0.0001$ for both comparisons).

(insert table 1 about here)

Children with fathers who were never present and children from rural areas (and in particular, boys) were most likely to be chronically malnourished (see Figure 1). Because both the sex of child and the site (urban/rural) influenced HAZ, we stratified analyses. Surprisingly, children with fathers who were usually present were less likely to be stunted than children whose fathers were always present. Even so, the trend is toward greatest malnutrition among children whose fathers were never present.

(insert figure 1 about here)

Findings presented in Tables 2a and 2b display caregiving behaviors across the four levels of paternal absence, by urban and rural setting. In urban settings, children of fathers who were always and usually present consumed the greatest quantity of snacks and meals throughout

the day ($p = 0.0479$). This was not the case for rural children. In urban settings, the lowest percentage of 'child support' as reported by mothers was, not surprisingly, observed among children of fathers that were always present (2.0%) and may represent mothers' misunderstanding of the question. Homes where fathers were never present received significantly less child support than homes where fathers were usually and sometimes present (13.5%, 20.6% and 58.0%; $p<0.0001$). In rural settings, fathers who were usually present displayed the lowest level of child support, save fathers who were always present ($p<0.0001$).

In urban settings, there were few differences between groups with respect to soap use. In rural settings, the lowest rates of self-reported use of soap were in homes where fathers were never present and always present (66.7% and 65.0%; $p=0.0278$).

Household expenditure on school uniforms was used as a proxy for caregiver involvement in children's lives. For urban boys and girls, households with fathers who were always and usually present were more likely than households with fathers who were sometimes and never present to purchase uniforms. A similar pattern was observed for children living in rural settings, except expenditures for boys' school uniforms was not significant. In both urban and rural settings, expenditures on medical fees and medicines, expectations for the amount of schooling children would complete and attendance at preschool were similar for children whose fathers were always, usually, sometimes and never present.

(insert tables 2a and 2b about here)

While not a focus of this study, we also explored the link between caregiving behaviors and nutritional status. As expected, there was an association between key caregiving behaviors

such as the number of snacks and meals consumed, use of soap, expenditures on medical fees and medicines, expectations for the amount of schooling children would complete and nutritional status (results not presented in table form). The association between caregiving and nutritional status was especially pronounced in urban areas.

As noted previously, we examined resilient children; namely, those who sometimes and never saw their fathers but who were well-nourished. Table 3 provides findings from those analyses. Among children whose fathers were sometimes present, two factors distinguished between children who were and were not stunted: mother's education ($p=0.0006$) and socioeconomic status ($p<0.0001$). Both maternal education and wealth were protective against stunting.

Among children whose fathers were never present, factors that protected against malnutrition included maternal education, wealth, the number of snacks and meals the child consumed, the use of soap, payment for medical fees and medicines and the amount of schooling mothers wanted their children to complete. Few children attended preschool, making it difficult to arrive at statistically meaningful conclusions.

It is important to note the magnitude of difference between well-nourished children whose fathers were never present and malnourished children whose fathers were never present. When compared to mothers of malnourished children, mothers of well-nourished children had on average 4 more years of schooling. One in four were in the wealthiest quintile (compared to one in 25 households with malnourished children). Children who were well-nourished ate one more snack or meal per day than children who were malnourished. In addition, mothers of well-nourished children were about twice as likely as mothers of malnourished children to spend money on medical fees and medicines.

(insert table 3 about here)

Results from multivariate analyses suggest that paternal absence when children were one year of age was associated with stunting when children were 5, even after adjusting for potential confounding influences (see Table 4). Compared to children whose fathers were always present, children whose fathers were never present were significantly less likely to be well nourished ($p=0.0033$). Other factors associated with stunting include rural residence, the presence of older siblings, younger maternal age and poverty.

(insert table 4 about here)

Discussion

At the outset of this paper, we outlined two hypotheses: 1) children whose fathers were absent when they were one year of age are more likely than children whose fathers were present at one year of age to be stunted, and 2) paternal absence compromises mothers' ability to nurture and care for their children. Understanding the way paternal absence influences children is critical to designing programs and policies that encourage fathers to take an active role in their children's lives and to ensure their well-being.

Paternal absence and stunting

With respect to the first hypothesis, findings from this research indicate that paternal absence when children are one year old is associated with the chances that a child will be stunted at five years of age. These results are similar to findings from previous research which shows

that children from single-parent homes or cohabiting households are at higher risk of stunting, even after adjusting for income (Bronte-Tinkew & DeJong, 2004) and a study of South African children that reports that children who saw their father less than weekly had higher rates of malnutrition (Chopra, 2003).

While our findings document a clear relationship between paternal absence and stunting, they are somewhat unusual: children whose fathers were *always* present were more malnourished than children whose fathers were only *sometimes* present. This outcome contradicts what would seem logical; namely, greater paternal presence results in better nutritional outcomes. One possible explanation for our results relates to why fathers are absent. As noted previously, paternal absence may result from work away from home—either temporary or permanent—marital conflict or other factors and may have a positive, negative or neutral effect on children. Based on previous research, it seems likely that children from father-absent homes fare better if the reason for absence is work, not domestic tension (Santrock, 1972, 1977). Relative to non-working fathers (whether absent or present), fathers who work away from home may be better equipped to support their children financially through remittances for children's shelter, food and schooling (Madhavan & Townsend, 2007). However, in Brazil, researchers found that absence of a partner increases rates of malnutrition even after adjusting for financial contributions (Carvalhaes, Benicio, & Barros, 2005).

Factors other than paternal absence may explain stunting. For example, our results indicate that socioeconomic status and maternal education were important predictors of stunting. Findings on the impact of maternal education are consistent with results from previous research in Indonesia (Semba, et al., 2008). Results from our analyses of resilient families further underscore the importance of education: maternal education protected against stunting among

children whose fathers were *sometimes* and *never* present. Our findings are consistent with results from other studies that show that availability of resources, access to services and maternal education are associated with better nutritional status (Begin, Frongillo, & Delisle, 1999; Frongillo, et al., 1997; Sahn & Alderman, 1997).

Paternal absence and caregiving

With respect to the second hypothesis, findings from this research indicate that paternal absence may compromise a mother's ability to care for her children. For example, in urban homes with never present fathers, children ate significantly fewer snacks and meals, mothers were significantly less likely to receive child support, and household expenditures on boys' and girls' uniforms was low. Unfortunately, there is limited research on the impact of paternal absence on mothers' ability to provide adequate care for their children, making it difficult to determine whether our findings are consistent with the literature or unique. Understanding the relationship between paternal absence and caregiving is important because of the strong association between mother's caregiving behaviors and children's nutritional status (Begin, et al., 1999).

Limitations

This study suffers from several limitations. Perhaps most importantly, we do not know why fathers were absent. Consequently, we cannot reach conclusions about the nutritional impact of absence because of work versus absence due to marital conflict. Our composite measure of paternal absence and marital conflict is one approach to addressing this shortfall. However, a more nuanced measure of paternal absence is needed; namely, one that captures the reasons fathers spend time away from their children. A second limitation of this research is that we have few direct measures of fathers' accessibility as well as involvement and concern for their

children (Hwang & Lamb, 1997; Lamb, et al., 1988). Thus, more explicit measures of accessibility, involvement and concern are needed.

Research implications

As indicated previously, there is a need for more explicit measures of why fathers are absent as well as level of involvement and concern for children. Additionally, longitudinal studies in other settings would further our understanding of the relationship between paternal absence, caregiving and health, including nutritional status.

Future quantitative and qualitative research should also distinguish between households where mothers, fathers or both control the household budget. There is mounting evidence to suggest that father-led homes tend to divert economic resources toward external expenditures (e.g., farm machinery, alcohol, tobacco, etc.), while mother-led homes favor children's nutritional needs (Kurz & Johnson-Welch, 2000; Onyango, Tucker, & Eisemon, 1994). Indeed, several authors (Johnson & Rogers, 1993; Rogers, 1996) have shown that children in households headed by mothers experience less malnutrition compared to households headed by fathers, largely because of women's tendency to focus greater financial resources on children. However, it is unclear how this dynamic interfaces with paternal absence to impact child nutrition.

Future research should also focus on resilient children—those whose fathers are absent but who are not stunted. Research of this nature can provide insight into the specifics of how some at-risk children remain well-nourished.

Program implications

Findings from this research suggest several avenues for reducing the deleterious effects of paternal absence on children's nutritional status. First, government and non-governmental efforts to improve children's health should focus not only on improving mothers' caregiving behaviors such as immunizations, breastfeeding, introduction of complementary foods and careseeking when children are sick (Begin, et al., 1999), but should actively involve fathers as well. Results from this study indicate that while *never* present fathers are largely uninvolved in their children's lives, *sometimes* present fathers are. For example, 58.0% of sometimes present fathers in urban areas provided child support in the previous 12 months and 98% wanted their children to complete 13-18 years of schooling. These findings provide hope that fathers who are only sometimes at home can assume a greater role in their children's growth and development.

Resilient children provide clues about which programs might be most effective at reducing chronic malnutrition. Findings from our analyses of resilient children point to the importance of supporting mother's education and reducing poverty. Government and non-governmental efforts should also focus on improving the number of snacks and meals the child consumes, hygiene and parents' expectations for the amount of schooling their children will complete.

Conclusion

Malnutrition—and in particular, stunting—remains a significant public health challenge among children in developing countries, especially for children in households headed by mothers. If programs and policies are to successfully improve the care children receive and reduce malnutrition, they must be built on a fuller understanding of paternal absence and the variety of other risk factors—biological, social and otherwise—that put children at risk.

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References

Begin, F., Frongillo, E. A., & Delisle, H. (1999). Caregiver Behaviors and Resources Influence Child Height-for-Age in Rural Chad. *Journal of Nutrition, 129*(3), 680-686.

Booth, A., & Crouter, A. C. (Eds.). (1998). *Men in families: When do they get involved? What difference does it make*. Mahwah, NJ, USA: Lawrence Erlbaum Associates.

Bronte-Tinkew, J., & DeJong, G. (2004). Children's nutrition in Jamaica: do household structure and household economic resources matter? *Social Science & Medicine, 58*(3), 499-514.

Carvalhaes, M., Benicio, M. H. D., & Barros, A. J. D. (2005). Social support and infant malnutrition: a case-control study in an urban area of Southeastern Brazil. *British Journal of Nutrition, 94*(3), 383-389.

Cespeda, R., Davila, E., Fort, A., Ulloa, L., & Castro, Z. (2004). *Peru: Encuesta Demografica y de Salud Familiar*: Direccion Nacional de Censos y Encuestas, Direccion de Tecnica de Demografia e Indicadores Sociales.

Chopra, M. (2003). Risk factors for undernutrition of young children in a rural area of South Africa. *Public Health Nutrition, 6*(07), 645-652.

Clarke, L., Joshi, H., & Di Salvo, P. (2000). Children's family change: reports and records of mothers, fathers and children compared. *Population trends*(102), 24.

Crookston, B., Dearden, K., Alder, S., Porucznik, C., Stanford, J., Merrill, R., et al. (In Press). Impact of Early and Concurrent Stunting on Cognition. *British Journal of Nutrition*.

Frank, R., & Wildsmith, E. (2005). The grass widows of Mexico: Migration and union dissolution in a binational context. *Social Forces, 83*(3), 919-947.

Frongillo, E. A., de Onis, M., & Hanson, K. M. P. (1997). Socioeconomic and demographic factors are associated with worldwide patterns of stunting and wasting of children. *Journal of Nutrition, 127*(12), 2302-2309.

Hwang, C. P., & Lamb, M. E. (1997). Father involvement in Sweden: A longitudinal study of its stability and correlates. *International Journal of Behavioral Development, 21*(3), 621-632.

Johnson, F. C., & Rogers, B. L. (1993). Children's Nutritional-Status in Female-Headed Households in the Dominican-Republic. *Social Science & Medicine, 37*(11), 1293-1301.

Joshi, H., Cooksey, E., Wiggins, R., McCulloch, A., Verropoulou, G., & Clarke, L. (1999). Diverse family living situations and child development: A multi-level analysis comparing longitudinal evidence from Britain and the United States. *International Journal of Law, Policy and the Family, 13*(3), 292-314.

Kurz, K., & Johnson-Welch, C. (2000). Enhancing Nutrition Results: The Case for a Women's Resources Approach. *International Center for Research on Women: Washington, DC. Research Overview*.

Lamb, M. E., Hwang, C. P., Broberg, A., Bookstein, F. L., Hult, G., & Frodi, M. (1988). The Determinants of Paternal Involvement in Primiparous Swedish Families. *International Journal of Behavioral Development, 11*(4), 433-449.

Lang, K., & Zagorsky, J. L. (2001). Does Growing Up with a Parent Absent Really Hurt? *Journal of Human Resources, 36*(2), 253-273.

Madhavan, S., & Townsend, N. (2007). The social context of children's nutritional status in rural South Africa 1. *Scandinavian Journal of Public Health, 35*(3), 107.

Onyango, A., Tucker, K., & Eisemon, T. (1994). Household headship and child nutrition: a case study in Western Kenya. *Social Science & Medicine, 39*(12), 1633-1639.

Rogers, B. L. (1996). The implications of female household headship for food consumption and nutritional status in the Dominican Republic. *World Development, 24*(1), 113-128.

Sahn, D. E., & Alderman, H. (1997). On the determinants of nutrition in Mozambique: The importance of age-specific effects. *World Development, 25*(4), 577-588.

Santrock, J. W. (1972). Relation of type and onset of father absence to cognitive development. *Child Development, 43*(2), 455-469.

Santrock, J. W. (1977). Effects of Father Absence on Sex-Typed Behaviors in Male Children - Reason for Absence and Age of Onset of Absence. *Journal of Genetic Psychology, 130*(1), 3-10.

Semba, R. D., de Pee, S., Sun, K., Sari, M., Akhter, N., & Bloem, M. W. (2008). Effect of parental formal education on risk of child stunting in Indonesia and Bangladesh: a cross-sectional study. *Lancet, 371*(9609), 322-328.

Sigle-Rushton, W., & McLanahan, S. (2004). Father Absence and Child Well-being: A Critical Review. In D. Moynihan, L. Rainwater & T. Smeeding (Eds.), *The Future of the Family* (pp. 116-155). New York: Russell Sage Foundation.