Nutritional Status of Argentinian Preschool Children:
The Role of Family Structure

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ABSTRACT

We explore the influence of family structure on the nutritional status of Argentinian children aged 2-5 years with data drawn from the nationally representative National Survey of Health and Nutrition (2004-5).
We use logistic regressions to model two outcomes: stunting (low height-for-age) and overweight (excessive weight-for-height). For the stunting model, we find that two-parent families have significantly better outcomes when they have relatives in residence with them and that single parenting per se does not have adverse effects. The beneficial role of relatives is reversed for overweight: Children living with one or two parents have significantly higher odds of being overweight when relatives are present in their household. Single parenting is associated with lower odds of overweight but only if relatives are not part of the residential family.

INTRODUCTION

Family structures have deep cultural roots and are continuously shaped by demographic, social, and economic changes. In the United States, family patterns have been changing since the second half of the last century,[1] and in Latin America the diversification of family structures is ongoing at a very rapid pace.[2]

The effect of family structure on offspring's well-being has earned a considerable amount of research in the United States. Of particular importance is the association between family structure and children's physical and mental health.[3, 4, 5] According to Carr and Springer (2010),[6] family is among the most powerful influences on health as it provides economic, social and psychological resources, along with strains, that can protect or may threaten, the health of its members.

Existing research on the health of young children in less developed countries is focused on nutritional status. This is due to the fact that the combination of under-nutrition and infectious disease is the major health problem for lower income countries, while overweight is becoming one of the top causes of disease burden, especially in middle income countries. Malnutrition occurs when a diet has either insufficient nutrients or some gross imbalance/overabundance of certain nutrients so that it causes health problems. It is a category of disease that includes both under-nutrition and over-nutrition, although malnutrition is frequently used to mean just under-nutrition. Commonly used measures of under-nutrition are stunting (short height-for-age) and wasting (low weight-for-length/height). Overweight and obesity (excessive weight-for-height) are used as indicators and measures of over-nutrition.[7, 8]

Child health has been recognized to influence health and achievement across an individual's life course and nutritional status is a very important indicator of child health. The consequences of malnutrition before age five are diverse. Stunting often results in IQ deficits, poor school performance and impaired health and educational and economic performance in adulthood.[9, 10] Overweight in children sets them up for obesity and other health risks throughout childhood and into adulthood and it is associated with several adverse health outcomes, including Type 2 diabetes.[11, 12, 13]

In Latin America and the Caribbean, the relationship between family structure and young children´s nutritional status has been studied by relatively few researchers. Desai (Brazil, Colombia, and the Dominican Republic)[14] found that children whose mothers are in consensual unions are the most likely to be stunted and children living with legally married mothers are the least likely to be malnourished. Bronte-Tinkew and DeJong (Jamaica)[15] found that children living in a single-parent, cohabiting couple or extended households (as opposed to living in a married couple household) are at a greater risk of stunting. Fernald and Neufeld (Mexico)[16] found that both paternal absence and household size increased the risk of stunting as well as concurrent stunting and overweight but not of overweight.

Like other Latin American countries, Argentina is going through sociocultural processes that affect family structure and composition and are consistent if not with all at least with some of the characteristics of the second demographic transition.[17,18] Researchers have studied different aspects of nutrition of Argentinian children, including nutritional status[19,20,21] and links to socioeconomic conditions.[22] However, we are unaware of any study that has analyzed the

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influence of family structure on the nutritional health of preschool-aged children. Our work aims at filling this gap and contributing to our understanding of the role of family structure as a social determinant of child nutrition in developing country settings.

This study uses a rich dataset and logistic regressions to assess the role of the family in preschool children's nutritional status in Argentina. Our analysis sample of slightly over 11,600 children ages 2-5 is drawn from the nationally representative 2004-5 National Survey of Nutrition and Health (Encuesta Nacional de Nutrición y Salud: ENNyS). Focusing on stunting and overweight, we explore whether single parenthood is associated with better or worse outcomes and whether relatives (overwhelmingly grandparents) reinforce or reverse such associations.

Briefly stated, we obtain two important results regarding the links between stunting and family type: Two-parent (couple) families have significantly better outcomes when they have relatives with them, and single parenting per se does not have adverse effects. The beneficial role of relatives is reversed for overweight: Children living with one or two parents have significantly higher odds of being overweight when relatives are present in their household. Single parenting decreases the odds of overweight –as compared to two-parent families- but only if relatives are not part of the residential family.

DATA AND MEASURES

Data

We use data from the 2004-5 ENNyS developed by the Argentine Ministry of Health.[23] Our analysis focuses on children 2-5 years of age with information conducive to the identification of family structure. Although there are more than 15,000 preschool children with weight and height data in the ENNyS sample, family structure can be identified for only 12,363 children. Of these, 11,664 and 11,625 had complete data (including head of household's schooling) for our multivariate analysis of stunting and overweight, respectively. Prevalence rates of stunting and overweight among children with complete data were not different than those among children for whom complete data were not available.

Measures.

Family and Household. We use the concepts of *Household* and *Family* as defined by Argentina's National Institute of Statistics and Censuses.[24] A *household* is a group of individuals (related by kinship or not) residing together and sharing food expenses or other "vital" expenditures. The *Head of Household* is chosen by "recognition" by all other household members. A *family* consists of two or more individuals from the same *household* who are related by birth, marriage, or adoption. The definition is extended to include cohabiting couples. The ENNyS data includes a residential household roster that we use to identify a child's family. This identification is only possible when a child in our dataset is the *Head of Household's* child, and consequently our analysis is restricted to these children (about 80% of total number of children ages 2-5 in the dataset). We also decided to exclude a very small number of children living in households that include non-relatives (150 cases). As a result, all *households* in our analysis sample are *families,* and the two concepts can be used interchangeably. We use *household* to remain true to ENNyS terminology in all cases except when talking about a child's *family type*.

Family Type .Research in the U.S. and in some developing countries found significant differences in health outcomes for children living with cohabiting versus married parents but unfortunately, our dataset does not have information regarding the legal status of cohabiting partners, and we are unable to distinguish between married and unmarried couples. We classify families in four groups (1) couple: head of household, partner and child/children, (2) couple and relative/s: head of household, partner, child/children and relative/s, (3) single parent: head of household and child/children, and (4) single parent and relative/s: head of household, child/children and relative/s. The category "relative" includes a child's grandparents, aunts/uncles and other kin (e.g., cousins, great grandparents).

Child nutrition/health. Growth assessment using anthropometric indicators provides the best measurement of nutritional status for infants and preschool children since inadequate food intake combined with infections invariably affects growth. We use two indicators to measure very different aspects of nutrition and health: height-for-age and weight-for-height. A child's height-for-age is the result of genetics and net nutrition since birth. Weight-for-height, on the other hand, is a measure of current nutritional status and also a net measure reflecting the balance between current intakes and claims on those intakes. Appropriate height-for-age can measure long term growth, while appropriate weight-for-height reflects proper body proportion.

To compare children of different age and gender, we combine anthropometric data with date of birth to create a height-per-age z-score (*HAZ*) and weight for height z-score (*WHZ*) using the World Health Organization guidelines.[25] A z-score of 0 is the median of the reference population of children from Brazil, Ghana, India, Norway, Oman, and the United States. A z-score of -1 indicates that the child is 1 standard deviation below the reference-population median for his/her gender and age. A child is considered *stunted* (or with chronic malnutrition) if his/her z-score of height-for-age (HAZ) is less or equal to -2 and *overweight* if his/her z-score of weight-for-height (WHZ) is bigger or equal to 2.

Household size (adjusted) .We adjust household size taking into consideration its demographic composition to obtain an "adult equivalent" measure or *Adjusted Household Size*. Following the guidelines from Argentina's National Institute of Statistics and Censuses (INDEC), we use an equivalence scale that reflects age-gender specific energy/caloric needs.[26]

Head of Household Schooling. Because in many cases the child's mother cannot be identified with certainty, we use the head of household's schooling as a proxy for the educational attainment of the person who will most likely make decisions affecting the entire household. Four standard education categories are considered: primary incomplete, primary complete, secondary incomplete and secondary complete or more.

Wealth Index/ Segments. We construct a summary measure of a household's economic well-being using information on housing characteristics and physical assets following Filmer and Pritchett's method of principal components.[27] The following eight variables were used: dwelling type, floor material, number of people per room (excluding kitchen and bathroom), water source, toilet type, electricity, refrigerator, telephone (land line). The resulting index has mean 0 and standard deviation of 1 but for interpretation ease, we shift the index by 5 units so that all values are positive. Our resulting *Wealth Index* has a mean of 5 and a standard deviation of 1. We assign households in our sample of interest (children 2- 5 years) to quartiles to create four wealth segments.

Food Assistance. There were several government sponsored programs in place at the time of the data collection. These programs targeted children, women, and older adults providing food (in-kind), vouchers, milk, or access to meals in a community setting. A specific poverty measure was used as a qualifying criterion. There were also programs sponsored by NGO's, religious organizations, and others. Our variable is a dummy that has a value of 1 if someone in the household received any type of food assistance in the previous three months.

STATISTICAL METHODS

Multivariate Analysis. Two logistic regression models are used to analyze the influence of family structure on the health of preschool children. In the first one the dependent variable indicates whether the child is stunted or not, while in the second it indicates whether he/she is overweight. The main independent variable is family type, and we adjust for age, sex, and household characteristics (size, head of household schooling, wealth, and food assistance). Because a household could contribute with more than one child, we correct for cluster effects. In addition, after fitting the models we obtain mean predicted probabilities over the estimation sample for different family types. Table 1 shows the odds ratios and standard errors for the two logistic regressions when *couple* is the reference category for family type. The reference categories for head of household education and wealth segment are secondary complete or more and top wealth segment, respectively. Figure 1 shows our models' mean predicted probabilities (and 95% confidence intervals) by family type.

Stunting. There are two important findings regarding the links between family types and stunting: Two- parent (couple) families have significantly better outcomes when they have relatives with them, and single parenting per se does not have adverse effects. Children from two parent families with relative/s have significantly lower odds of stunting than those from single parent or two-parent families (36% and 27% lower respectively). Or, putting it differently, if a child was moved from a two parent family with relative/s to a single or two parent family, his/her odds of stunting would increase by 55% or 38% respectively. A striking gradient by family type is predicted by our model (Figure 1). The average predicted probability of stunting if all children from our sample were living with both parents and relative/s is 5.8%; with a single parent and relative/s, 6.9%; with just two parents, 7.7%; and with only a single parent, 8.6%. This result suggests a beneficial effect on stunting of living with relative/s in both one- and two-parent families. Our results show that children in larger, less educated, and poorer households have higher odds of stunting. Belonging to a family with a head of household with primary incomplete (complete) instead of one whose head completed secondary school or more increases a child's odds of stunting by 57% (23%). Children in the lowest wealth segment have the highest odds of stunting, with 83% higher odds than those in the top segment. Our findings signal that food assistance is primarily going to the intended

recipients (those in the lowest wealth segments). Receiving food assistance is a strong indicator of socioeconomic status and children in this category have 72% higher odds of stunting that those who do not receive food assistance.

Overweight. The beneficial effect of relative/s is reversed for the case of overweight and residing with just one parent has a protective effect. Females and children from households receiving some form of food assistance have lower odds of overweight. Being in a family with two parents and relative/s increases the odds of child overweight by 26% compared to children living with two parents and no relatives. Children living with only a single parent have significantly lower odds of being overweight, 29% lower than those living with two parents. Adding relatives to a single parent household increases the odds of a child being overweight by 53% and by 77% if a partner and relative/s are added. Children in the lowest wealth segment have the lowest odds of overweight (21% lower odds than those in the top segment) and receiving food assistance decreases the odds by 20%. The lack of an effect of head of household education on overweight suggests that the education effect is being captured by the other two indicators of socioeconomic status (wealth and food assistance). We confirm this by running a logistic regression (not reported here) without wealth or food assistance, and in this case all the education categories are significant. A significant overweight gradient by family type is also predicted by our model (Figure 1). The average predicted probability of overweight if all children from our sample were living with both parents and relative/s is 11.3%; with a single parent and relative/s, 9.9%; with just two parents, 9.2%; and with only a single parent, 6.7%. This result suggests that living with relatives is associated with child overweight in both one- and two-parent families.

SUMMARY

This study investigated the associations between family structure and nutritional status among Argentinean preschool children. We examined two malnutrition indicators: stunting (for under-nutrition) and overweight (for over-nutrition). Our main findings focused on the role of relatives (grandparents in over 80% of cases) and the advantage/disadvantage of single-parent families that in our sample are overwhelmingly female headed.

We found that resident relatives in two-parent families have a mixed effect on child malnutrition: They decrease the odds of stunting but increase the odds of overweight. Resident relatives in single-parent families have no significant effect on stunting but increase the odds of overweight. These results are in accordance with those from recent studies on grandparents and child nutrition.[28, 29, 30]

Single-parent households –without relatives- were associated in our case with lower odds of overweight and were not associated with higher odds of stunting (when compared to two-parent families). Although some of these findings are in accordance with those for Jamaica and Mexico, others are not. We believe this is due to significant differences in the analysis sample, age group and socioeconomic representation being the most important ones.

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TABLE 1: LOGISTICS REGRESSIONS

	Stunting		Overweight	
	Odds Ratio	Std. err.	Odds Ratio	Std. err.
Age (months)	0.99*	0.003	1.01**	0.003
Sex (1=female)	1.00	0.07	0.77***	0.05
Family Type				
Couple & relative/s	0.73*	0.09	1.26*	0.14
Single parent & relative/s	0.88	0.19	1.09	0.22
Couple (ref)				
Single parent	1.13	0.14	0.71*	0.10
Household Characteristics				
Household size (adjusted)	1.14***	0.03	0.93**	0.03
Head of Household Schooling				
Primary incomplete	1.57***	0.19	0.90	0.12
Primary complete	1.23*	0.13	0.96	0.09
Secondary incomplete	1.05	0.11	0.87	0.08
Secondary complete or more (ref)				
Household Wealth Index				
Segment 1 (bottom)	1.83***	0.25	0.79*	0.09
Segment 2	1.18	0.16	0.95	0.10
Segment 3	1.06	0.14	0.96	0.09
Segment 4 (top) (ref)				
Food Assistance				
Receives some	1.72***	0.14	0.80**	0.07
N. of cases	11664		11625	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

FIGURE 1: PREDICTED MALNUTRITION BY FAMILY TYPE