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## Baseline Results

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# Improving Center-Based Child Care in Panama: Baseline Results

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**Abstract:** The quality of center-based child care, which depends upon the type of environment and the types of interactions between caregivers and children, is thought to be of critical importance for improving child development outcomes. This report describes the study design, the empirical strategy, and the baseline results for a randomized control trial which upgraded public child care centers in Panama. Data were collected on child care centers and on eligible children and families that lived near the centers. The data describe the child care habits of the study population in great detail, and show very low use of formal child care and an important participation of parents and non-parental relatives in child care. The study also measures how often mothers multitask, ie take care of their children while simultaneously doing household work. The treatment and control populations are well balanced across a variety of characteristics, as is expected in a randomized experiment. The results in this report highlight the need for investments in cost-effective interventions to improve the quality of public daycare centers in Panama.

JEL Codes: C93, I15, I25, J13

Keywords: early childhood development, center-based child care, impact evaluation, randomized control trial, Panama

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# 1. Introduction

Center-based child care can play an important role in the lives of young children and their families. For many children, daycare centers provide the building blocks for cognitive development, vocabulary, nutrition, gross and fine motor skills, socialization, and other foundations of child development (Van der Gaag, et al., 1997; Urzua & Veramendi, 2011; Behrman et al., 2004; Bernal et al., 2009; Martinez et al., 2017). Furthermore, by providing a safe environment for their children, daycare centers may increase the amount of time parents can spend working and engaging in other productive activities. It is well established that the quality of child care, which depends upon the type of environment and the frequency and type of interactions between children and their caregivers, is central to children's psycho-social and cognitive development and can lead to sustained long-term benefits (Burchinal et al., 2010; OECD, 2001, 2006; Shonkoff & Phillips, 2000; Gertler et al., 2014; Campbell et al., 2002, 2014; Currie, 2001). In fact, studies have shown that low-quality care may even be detrimental to children's development (Rosero & Oosterbeek, 2011). Therefore, identifying public policies that effectively improve the quality of daycare centers is of paramount importance (Araujo et al., 2015). This challenge is particularly acute in low-income settings, where availability of center-based care may be limited and resources for investing in quality are limited.

This paper presents the results of a baseline study for a center-based child care improvement program in Panama. Panama's Comprehensive Early Childhood Care policy seeks to ensure that all children under six years old<sup>2</sup> receive early stimulation, education, preventive comprehensive healthcare, and adequate nutrients. The country's primary operational arm for the provision of center-based child care is through government-run centers known as Comprehensive Early Childhood Care Centers (CAIPI, for its acronym in Spanish). The Ministry of Social Development (MIDES, for its acronym in Spanish), with support from the Inter-American Development Bank (IDB)<sup>3</sup>, is implementing significant quality improvements to over 44 CAIPIs throughout the country. The project includes an innovative randomized control trial (RCT) that will experimentally evaluate the impacts of investments on structural and process indicators of quality of care and on child development outcomes. This report presents the results of the evaluation baseline survey, which provides valuable and unique information about the status of early childhood care in Panama and is the first survey to our knowledge that focuses exclusively on child care and the quality of early education centers in the country.

Prior to the baseline survey studied in this paper, information on the quality or impact of CAIPIs on early childhood development in Panama was limited. A preliminary MIDES survey of the shortcomings of CAIPIs found that some of the centers did not meet the quality standards needed to provide adequate care to children (MIDES, 2011a). According to the data, there was a variation in the type (public, private, NGO) and size of the CAIPIs, which generated differences in the quality of care and in the centers' investments and expenses. For example, the monthly cost of care per child was \$15 USD in centers that offered basic services, but \$45 USD in centers that incorporated additional services (MIDES, 2011b).

International evidence of the impact of center-based child care generally shows positive effects on measures of child development and school performance, though negative short-run behavioral effects have also been observed. The analysis of the Integrated Child Development Program (PIDI, by its Spanish acronym) program in Bolivia showed short-term effects on children's motor

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<sup>2</sup> Although the mandatory age to enter formal preschool education (provided by the Ministry of Education) is 4 years old, MIDES notes that there are children outside of this age who attend the CAIPI.

<sup>3</sup> Through project PN-L1105

development, language, and socio-emotional skills (Van der Gaag, et al., 1997). Similarly, in the case of Chile, studies conducted by Veramendi and Urzúa (2011) found that children attending kindergarten had better performance in school achievement tests upon entering primary school. However, an analysis of the Community Welfare Homes program in Colombia found that, in the short term, attending daycare centers increased the frequency of aggressive behavior, on one hand, but on the other hand, reduced isolation and increased appropriate social interactions (Bernal & Fernández, 2013). Similarly, attendance improved children's cognitive development, especially in language, math, and general knowledge—effects that seem to be maintained in the long term.

The evidence surrounding the effects of minimum program quality standards on child development, especially in Latin America, is much more limited. A recent study in Bolivia showed that investments in child care centers significantly improved quality measures, including interactions between children and caregivers. However, the study lacked final child development outcomes (Johannsen et al., 2019). In OECD countries, various studies have found that high-quality centers have the greatest impact on child development (Burchinal et al., 2010; OECD, 2001, 2006; Shonkoff & Phillips, 2000). More specifically, the evidence shows that high-quality centers lead to improvements in language and mathematics and have even larger effects on children in poverty. The literature does not clearly specify which minimum standards have the greatest long-term impact on early child development. Furthermore, improving existing services may be a more cost-effective approach for improving child development outcomes than building new infrastructure. For these reasons, the randomized evaluation of quality improvements to the CAIPs in Panama will fill an important gap in the child care literature.

## **2. Intervention**

With the goal of reducing poverty and increasing accumulation of human capital, the IDB established the Program for Social Inclusion and Development with Panama's Ministry of Social Affairs in 2015. The program aimed to improve the targeting and efficiency of conditional cash transfer (CCT) programs and expand the coverage and quality of early childhood care in Panama through investments in center- and community-based care. The program's focus on early childhood responds to the country's limited coverage and varying quality of child care and early education services for children.

Access to child care and early education services in the country is low. Three out of every four children under five are taken care of by their mother, and in indigenous areas, which have the highest poverty levels in the country, this rate is over 90% (Census, 2010). There are also important gaps by income level in access to early care and education services. The 2013 Multiple Indicator Cluster Survey (MICS) conducted by UNICEF revealed 67% of children in the highest income quintile received these services compared to only 27% of children in the first income quintile.

Child care and early education services in Panama are provided by a host of public and private institutions. MIDES is the largest provider in the country, running 104 CAIPs nationwide that reach approximately 2,400 children under four years old. However, enrollment in child care centers is low, reaching only 2% of children under five in 2015. Enrollment is also highly concentrated in urban areas. In fact, only 6% of children enrolled in child care centers are from indigenous areas.

The objective of a CAIPI is to take care of children and promote their cognitive and social development, including the active participation of their families. CAIPIs are run by an administrator with the support of teachers and assistant teachers or caregivers in the classrooms and staff dedicated to general maintenance and meal preparation. At the time of the program's design, many CAIPIs had poor infrastructure, weak guidelines, and varying standards for infrastructure, equipment, pedagogy, health and nutrition, and family support. They also lacked systematic evaluations of the quality of their child care services and their effects on children's developmental outcomes. Furthermore, funds assigned to the CAIPIs, except for food purchases, were not conditional on enrollment or the delivery of a defined service.

Recognizing the complementary effects of nutritional, cognitive, and physical status of children under five on child development, the Program for Social Inclusion and Development proposed the reform of the established CAIPI model. In coordination with MIDES, the Program designed a comprehensive early child care model that included a homogenous set of quality standards and a pay-for-results financial scheme to support its implementation.<sup>4</sup>

An evaluation of these improvements to CAIPI services, called the quality standards reform package, was designed to measure their effect on the physical, cognitive and socio-emotional development of children as well as changes in the overall quality of the CAIPIs. The RCT evaluation divided the CAIPIs between control (regular quality) and treatment (improved quality) groups. A total of 44 CAIPIs, distributed throughout the country's 10 provinces and 3 comarcas, were assigned to the treatment group, which would receive the quality standards reform package for a period of two years. Children's admission to CAIPIs in the treatment group was also randomized in order to assess the effects of quality improvements on their developmental outcomes.

The quality standards reform package requires CAIPIs in the treatment group to maintain enrollment above 80% and expand services from basic care and nutrition services to a more comprehensive service basket including their civil registration and expedition of their personal identity card, health promotion, early stimulation, early learning, and parenting support. The new and expanded basket of services was in alignment with the country's Comprehensive Early Childhood Care policy that aims to guarantee all children under six their rights to civil registration, health and nutrition, positive parenting practices, and early education<sup>5</sup>.

Quality standards for the new basket of services were also designed, enabling the evaluation of objective and homogeneous dimensions across all CAIPIs. The quality standards for the new services includes nine areas that were adopted by ministerial decree.<sup>6</sup> The areas are:

1. Spaces and furnishings
2. Health and wellbeing
3. Nutritional services
4. Pedagogical processes
5. Human resource planning and management
6. Engaging and meaningful interactions

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<sup>4</sup> The new comprehensive ECD model for CAIPIs was adopted by decree issued by MIDES through Resolution No. 429 of 19 September 2016.

<sup>5</sup> Executive Decrees 201 and 216 of 2009 established the institutional framework for early childhood policy in Panama through the: (i) adoption of a National Early Childhood Policy, coordinated by the Ministry of Social Development, and; (ii) establishment of the National Council on ECD as a public-private entity to supervise the Policy's implementation.

<sup>6</sup> The quality standards were adopted by decree issued by MIDES through Resolution N° 238 of 4 May 2016.

7. Family participation
8. Institutional support and coordination
9. Management and administration

Each of these areas has a set of standards, indicators, and means of verification. The standards were gradually implemented in all CAIPIs over the course of five years, beginning with the treatment group. 15 standards out of a total of 43 and their corresponding indicators were implemented in 2017. In 2018, the standards to be monitored expanded to 30, and by 2020, all standards and their corresponding indicators will be fully implemented in the treatment group. Once the impact evaluation concludes, all CAIPIs in the control group will receive the quality standards reform package.

The Program incentivized CAIPI to comply with the quality standards in each of the 9 areas, and systematically supervised implementation of the quality improvements. Some of these improvements included:

**1. Health and well-being.** The improvements were aimed at establishing a standard menu cycle, training staff in health and nutrition, ensuring all children received immunization and other preventive health services, establishing protocols for referral to health services, and promoting breastfeeding among mothers with infants.

**2. Nutritional services.** CAIPIs provide nutritional services to children in attendance. Improvements to nutritional services in alignment with quality standards consisted of improving sanitary and food safety conditions, food storage conditions, and meal preparation.

**3. Pedagogy.** A national curriculum for children under four years old was designed in 2015 by the Ministry of Education to be implemented in all child care and early education facilities in the country, both public and private. In alignment with this curriculum, CAIPI were incentivized to develop educational plans, design and deploy tools for educational planning, follow guidelines for promoting meaningful experiences for the learning and development of children, and applying tools for evaluating cognitive, motor, language, and social development.

**4. Human resource planning and management.** Professional profiles for CAIPI staff were developed, along with efforts on the part of MIDES to expand human resources to meet established teacher/student ratios and caregiver/student ratios. In order to better qualify existing staff, MIDES implemented an annual staff training program aimed at introducing the new curriculum, quality standards and monitoring system, and the pay-for-results scheme.

**5. Engaging and meaningful interactions.** As of 2019, MIDES implemented a teacher training program to improve outcomes in pedagogical planning, reinforce adult/child meaningful interactions, and support teachers in using resources, tools, spaces, and furnishings for effective early education.

**6. Space and furnishings.** The improvements in space and furnishings consisted of refurbishing and adapting CAIPI buildings in the treatment group to meet safety and structural standards in infrastructure, access to basic services (electricity, water, sanitation), emergency preparedness, accessibility for persons with disabilities, usable floor space (indoor and outdoor) with a required number of square meters per child based on their age group, maintenance plans, and the equipment and furnishings necessary for indoor and outdoor spaces (classrooms, offices, playground, kitchen, cafeteria, bathrooms, infirmary, among others). A total of 11 CAIPI from the treatment group met all these standards as of 2020.



**7. Family participation.** In order to foster greater participation among families in their children's development, teachers and caregivers were incentivized to develop programs aimed at equipping parents with knowledge about child care and positive parenting, as well as a plan for family engagement including the creation of a parent association. In alliance with UNICEF, all CAIPI teachers and caregivers were trained in the Care for Child Development curriculum and provided with a kit and manual for its implementation in centers.

**8. Institutional support and coordination.** The new basket of services aimed at establishing a comprehensive care model in the CAIPIs requires the support of the Ministries of Health and Education and the Civil Registry. In 2015, inter-agency memorandum of understanding were subscribed between MIDES and these institutions to ensure the design and implementation of inter-agency protocols for service provision. CAIPI administrators were incentivized to establish coordination with their local health departments.

**9. Management and administration.** Administrative services were redesigned to provide organization, transparency, and efficiency in human resources and financial management. As a first step, institutional bank accounts for CAIPIs were established so they could receive the financial incentives linked to quality standards compliance. All CAIPIs in the treatment group were provided with guidelines to maintain student records, including enrollment and attendance, inventory lists of equipment and materials, and accounting procedures.

The implementation and fulfillment of quality standards is tied to a pay-per-result scheme. Financial resources provided to each CAIPI consists of: (i) a per-capita fixed payment based on a minimum of 85% enrollment (in relation to maximum capacity), and (ii) a pay-per-results scheme, equivalent to 15% of the total amount of the per-capita payment, for complying with the quality standards set for the comprehensive child care model. In order to be eligible for the pay-for-results scheme, CAIPI administrators, teachers, and staff must guarantee that at least 80% of services in the basket meet quality standards. A quality control system overseen by a trained MIDES team evaluates compliance with the standards. CAIPI receive partial or total access to the incentives established in the financial model based on their progress. The funds from the per-capita and pay-for-results payments are deposited directly to the CAIPIs' institutional bank accounts.

### **3. Empirical Strategy**

The evaluation will measure the effects of provision of comprehensive care to children in the CAIPIs through quality improvements. The key question of the evaluation is: to what extent does the CAIPI quality standards reform package affect the physical, cognitive, and socio-emotional development of children compared to the current CAIPI model?

This project implemented two separate experiments to assess impacts on quality: one at the CAIPI level and another at the child level.

## CAIPI-Level Experiment

CAIPI-level effects will be identified by comparing CAIPIs in the treatment group, assigned to receive the quality standards reform package, to CAIPIs in the control group, which will continue operating under the existing standards of care.

To estimate the causal relationship between the intervention and the outcomes of interest, the study utilizes an experimental design with random assignment of treatment at the CAIPI level. The design takes advantage of the restrictions in the operational capacity of MIDES, which has proposed to expand the standards model gradually until it covers all CAIPIs. Each CAIPI was selected with a known probability of being incorporated into the standards model, allowing for the identification of an ideal counterfactual by comparing CAIPI randomly assigned to the initial stage of the quality standards reform to CAIPI randomly assigned to later stages. In this context, the only expected statistical difference between treatment and control CAIPI is the date of incorporation into the quality standards model. Thus, the average differences in the outcome variables between the two groups (prior to the incorporation of CAIPIs from the control group into the model) can be interpreted as the average causal effects of the intervention on the beneficiary population (treatment on treated effect).

Although randomization minimizes the risk of selection bias at the CAIPI level, in practice, compliance with the original assignment to treatment and control groups could be partial or imperfect. For example, some children from control CAIPIs could migrate to the treatment CAIPIs (especially if the treatment CAIPIs show visibly higher quality through improved infrastructure) or the program may be offered by mistake to a child assigned to a control CAIPI, affecting the results by exposing them to the quality standards treatment.

One solution to potential child level treatment contamination is to choose treatment and control CAIPIs that are far enough away from each other so that migration between them is less likely. However, this is not always possible in programs that are implemented on a large scale. In this case, the question of interest is the same, but randomization only affects the probability that an individual will be exposed to the treatment, rather than the treatment itself. When the effect is measured on the units to which the program has been offered, regardless of whether or not they actually participate, the estimated impact is called the "intention to treat" (ITT) estimator. This is also an interesting and relevant measure of impact, since policy makers and program administrators can only offer the program and cannot force the population to participate.<sup>7</sup>

ITT estimates will be based on the following regression:

$$(1) Y_i = \alpha T_i + \beta X_i + \varepsilon_i$$

Where  $Y_i$  is the outcome of the  $i$ th child at the time of follow-up,  $T$  is the treatment indicator that equals 1 for children randomly assigned to treatment CAIPIs and 0 for children assigned to control CAIPIs.  $X$  is a set of observable exogenous characteristics of individuals, their home, and their local environment (control variables) included in the regression model to improve statistical precision and control for any baseline imbalances,  $\varepsilon$  is an error term that captures unobserved characteristics that also affect the  $Y$  outcome. Equation (1) measures the direct effect of offering the program  $T$  on results  $Y$ .

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<sup>7</sup> If what matters is to know the impact of the program on those who actually enroll and accept the treatment, the impact of the program on all the units that received the treatment can be estimated, an estimator that resembles "treatment on the treated". In order to identify this effect, participation in the program is instrumentalized using the random allocation of the program offer, given that the families of the districts initially assigned to the treatment are more likely to participate in the program. It is important to emphasize that from a technical point of view, it is not desirable for a large part of the control group to enroll in the program, and every effort should be made to ensure that this fraction is minimized.

The control variables  $X$  will include a set of factors that could be related to development outcomes, including age, the malnutrition level of the child (height for age), recurrence of diarrheal and respiratory diseases, iron and vitamin A supplementation, vaccination, and birth characteristics (among them, birth weight and height, APGAR score, and head circumference) measured at baseline, that is, before the implementation of the intervention. In addition, information on variables related to household data and CAIPI quality will be collected. Heterogeneous treatment effects by these characteristics will also be studied in order to identify sub-populations that may have benefited to a greater or lesser extent from the quality standards.

The minimum detectable effect (MDE) can be calculated to estimate the precision of the estimates that will be obtained. For impacts at the child level, the size of the MDE depends on the intracluster correlation (ICC). The ICC, analyzed at the CAIPI level, refers to the proportion of the variation in the dependent variable that is explained by the variability "between" the classes (in this case, among children belonging to different CAIPI) instead of the variation "within" the classes (that is, among children of the same CAIPI). All other things being equal, a higher ICC implies a lower power of evaluation, and therefore a higher MDE. In our sample the ICC is 0.04 for the ASQ cognitive test. We take that number as a reference. We only have 19 CAIPI available in each group (treated and control) that have child-level information. A total of 1900 children were surveyed. Assuming a significance level of 5%, 80% power, 30% of the outcomes explained by the baseline variables, an average of 36 children per center, and a random attrition rate of 20%, the MDE is 0.25 standard deviations. While this is a good level of statistical power, this method assumes that there is no sample selection across centers, which can be very questionable. The child-level experiment described below addresses this concern, but it has a lower statistical power.

For impacts at the center level and using the same assumptions, the MDE would be 0.61 standard deviations. There is no sample selection and we hope that we will not have any attrition in this case.

## **Child-Level Experiment**

A subset of the CAIPIs discussed in the previous section was selected because they had another CAIPI in the sample that was geographically close to them. Pairs of CAIPIs were formed and they were randomized in a separate stratum. One of the centers in each couple was assigned to the treatment group (high quality) and the other was assigned to control (regular quality).

Then, we recruited families in the same geographical area that had a child of the proper age, and that were interested in applying to a preschool center. All families were included on the application lists for the two centers in the pair. For each center, each applicant child received a random priority and slots were offered in that order. That way, each child received a random priority in each of the two centers. Depending on those priorities, the center's number of available slots, and the family's preferences, children could enroll or not in the different centers. A simplified way of thinking about this experiment is that each child could get a slot in the high-quality center or not get it, and each child could get a slot in the regular-quality center or not get it. These two binary variables work as exogenous variation to identify the effects of attending to a center and the effect of attending a high-quality center compared to a regular one. Given that the slots were randomly allocated, all children that applied to the centers had the same probability of obtaining a slot. Thus, the slots will be uncorrelated with individual characteristics of the children. There are three

treatment arms: attending a high-quality center, attending a regular-quality center, and not attending any of them.

We postulate the following augmented model for this section:

$$(2) Y_i = \alpha H_i + \gamma R_i + \beta X_i + \varepsilon_i$$

Where H is an indicator for attending a high-quality center, and R is an indicator for attending a regular-quality center. X, Y and  $\varepsilon$  are defined the same as in the previous model.

Given that we have two instruments, we can estimate the model using instrumental variables. Assuming constant treatment effects, this method corrects for the potential endogeneity of the variables and also for the imperfect compliance to the treatment assignments.

The MDE can be calculated for this methodology without accounting for the ICC, as the experiment was implemented at the child level. A simple way to use the standard treatment effect formulas for a model like this is calculating an MDE for testing between two groups: children attending high quality and all other children. An important problem for our statistical significance is that the difference in participation between children receiving and not receiving slots is not very large: there was heavy non-compliance, because many “treated” children could not be contacted by the ministry to offer their slots. The difference in participation across the groups is close to 30%, which is problematic. Assuming a significance level of 5%, 80% power, 30% of the outcomes explained by the baseline variables, and 20% attrition, the minimum detectable effect is 0.45% of a standard deviation. This is a conservative estimate, because it does not consider that we could use distance to the centers as instruments, which are highly correlated with participation.

## 4. Data

The survey instruments used in the evaluation are intended to measure outcomes related to the improvement in quality of the CAIPs and to characterize the impacts on children. Baseline data are used to assess the balance of characteristics between treatment and control groups, in absence of the intervention. They also provide information to reduce residual variance when estimating program impacts, thus increasing statistical power. A second round of follow-up surveys, with a similar set of indicators, will be collected in late 2020 through 2021, after around three years of exposure to the quality improvements. The endline survey will be used to measure program impacts.

CAIPI quality was assessed using the ITERS-R instrument (Infant and Toddler Environment Rating Scale-Revised). The ITERS-R measures quality along 7 dimensions and is applicable in centers with children from birth to 30 months of age. One of these dimensions focuses on the provision of space and furniture. The other six (personal care routines, listening and talking, activities, interactions, program structure, and parents and staff) relate to processes and emphasize interactions between educator/caregivers and the children. The instrument collects detailed information on infrastructure, health and nutrition protocols, safety factors, availability and access to learning material, the type of activities carried out during the day, etc. (Cryer et al., 2004). The test takes three hours, which are dedicated to observation and qualification. Some of the items are completed through an interview with the caregivers. The qualification is scored on a numerical scale from 1 to 7, where 1 indicates low quality, 3 indicates intermediate quality, 5 indicates good quality, and 7 indicates excellent quality.

In addition to ITERS, the Caregiver Interaction Scale (CIS) instrument was applied to assess the quality of the centers. The CIS instrument measures the quality and frequency of interactions between adults and children. It also collects information about the routines that take place in the centers.

The physical development of children, linked to the implementation of quality standards in health and nutrition, was measured through child anthropometrics including (i) height-for-age z-score; (ii) weight-for-age z-score; and (iii) weight-for-height z-score. Data was collected through different techniques, such as direct questions in the family survey, anthropometric weight and height measurements, and direct observations of the household environment.

Child cognitive and socio-emotional development was assessed using the ASQ-3, a screening instrument that consists of 21 questionnaires designed to be answered by mothers or other primary caregivers (in some cases the father or other relative who has been responsible for raising the child) according to the age of the child (from 1 to 66 months old). The questionnaires collect information on five dimensions of development: (i) communication (children's language skills and comprehension); (ii) gross motor skills (coordinated use of arms and legs when children move and play); (iii) fine motor skills (movement and coordination of hands and fingers); (iv) problem-solving (children's ability to solve situations and how they play with toys); and (v) socio-individual (children's ability to fend for themselves in their interactions with others).

In addition to these outcome measures, the baseline survey gathered information on family member characteristics, including labor market participation, income, and education. It also recorded detailed information on families' child care decisions and their available child care options.

Table 1 summarizes the outcomes of interest and the associated indicators used in the evaluation:

Table 1: Primary Outcomes of interest for the evaluation of quality standards

OUTCOME	DIMENSION	INDICATOR	TYPE OF MEASUREMENT	DATA SOURCE
1. ITERS full Score	Quality of the CAIPI	Quality of CAIPI measured by ITERS-R	Infant / Toddler Environment Rating Scale-Revised	CAIPI Evaluation survey
2. CIS full score	Quality of the CAIPI	Quality of CAIPI measured by CIS	CIS (Caregiver Interaction Scale)	CAIPI Evaluation survey
3. Attendance to Center (%)	Attendance	Attendance to the CAIPI as % of total slots	Administrative data	Administrative data
4. Attendance to the center (N)	Attendance	Total Attendance to the CAIPI	Administrative data	Administrative data
5. Quality of home environment	Home Environment	HOME	Observation/Survey Scale	Child Evaluation Survey
6. Maternal hours worked	Parental Labor	Weekly hours worked by the mother	Household Survey	Child Evaluation Survey
7. Maternal labor participation	Parental Labor	Mother participates in the labor market	Household Survey	Child Evaluation Survey
8. Maternal Wage	Parental Labor	Mother's Wage in the labor market	Household Survey	Child Evaluation Survey
9. Gross motor development	Gross motor	% children who achieve age milestones	Mother's report and observation (ASQ)	Child Evaluation Survey
10. Fine motor development	Fine motor	% children who achieve age milestones	Mother's report and observation (ASQ)	Child Evaluation Survey
11. Language development	Language	% children who achieve age milestones	Mother's report and observation (ASQ Communication), Direct Measurement (TVIP)	Child Evaluation Survey
12. Cognitive development	Cognitive	% children who achieve age milestones	Mother's report and observation (ASQ problem-solving)	Child Evaluation Survey
13. Personal-social development (independence)	Socio-emotional	% children who achieve age milestones	Mother's report and observation (ASQ Personal-Social)	Child Evaluation Survey

Table 1 (continued): Secondary Outcomes of interest for the evaluation of quality standards

OUTCOME	DIMENSION	INDICATOR	TYPE OF MEASUREMENT	DATA SOURCE
Height-for-age	Physical development	Height-for-age z-score	Anthropometric measurements with a wooden or plastic tallimeter, according to international standards recommended by WHO and UNICEF	Child Evaluation Survey
Weight-for-age	Physical development	Weight-for-age z-score	Anthropometric measurements with digital portable scale (+/- 0.01kg) according to international standards recommended by WHO and UNICEF	Child Evaluation Survey
Weight-for-height	Physical development	Weight-for-height z-score	Anthropometric measurements with digital portable scale (+/- 0.01kg) according to international standards recommended by WHO and UNICEF	Child Evaluation Survey
Proper nutrition	Physical development	Feeding practices	Interviews at home and based on the child's consumption of food during the previous day	Child Evaluation Survey
Type of Care	Care	Hours spent with parents	Counting of self-reported hours	Child Evaluation Survey
Fees Payed for Formal and Informal Care	Care	Total yearly fees paid	Self-report	Child Evaluation Survey

## 5. Baseline Results

This section presents descriptive statistics from the baseline survey of the CAIPI evaluation, including indicators at the centers and household levels.

### 5.1 Centers

In total, 84 of the 89 centers that are part of the evaluation were interviewed. It was not possible to interview five centers for various logistical reasons.<sup>8</sup>

<sup>8</sup> The centers not interviewed were Kankintú, San Ramón Nonato, Llano de Piedra, Buenos Aires and Cerro de Plata. The first will be discarded from the evaluation because it is an outlier in population number, and the treatment that is delivered is much less stable than in the other centers. It has a large migrant population and getting to the center requires traveling by boat for hours. San Ramón Nonato is not under the supervision of MIDES. Llano de Piedra and

**CIS**

Figure 1 shows our findings for the routines section of the CIS instrument. As seen, almost all centers provide meals, and very few provide baths, nap times, or diaper changes. This is consistent with what is expected for children between 2 and 4, the range found in most CAIPs. Almost 90% of the centers implement activities to develop gross motor skills. We also see that only about 60% of the centers implement reading activities and outside play. These numbers seem low relative to optimal standards.

Figure 1: Routines in the centers

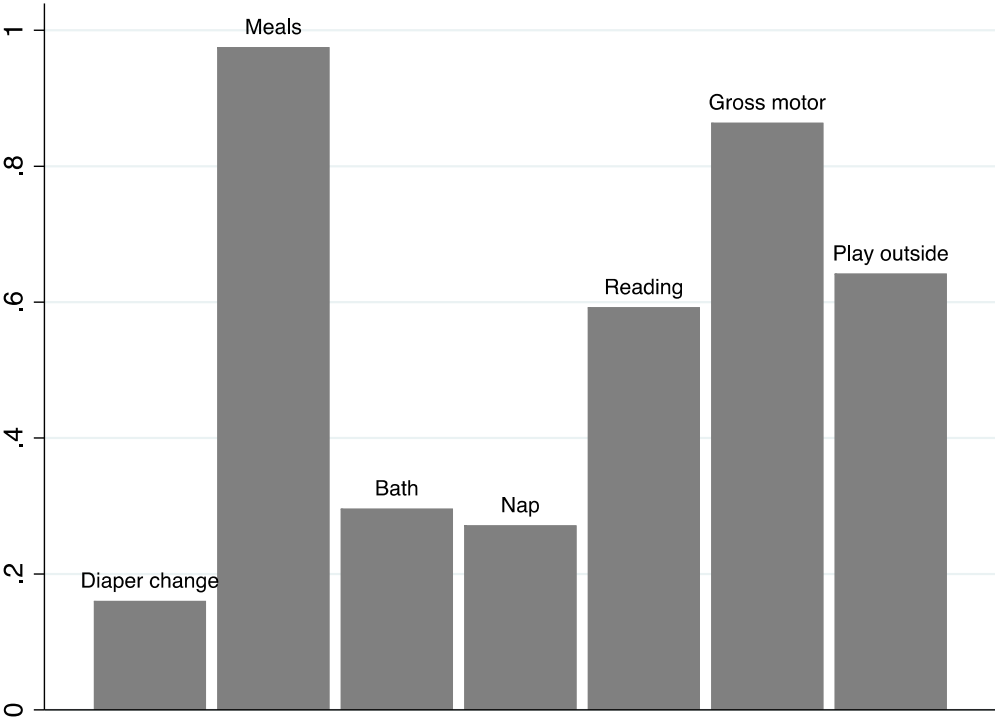


Figure 2 shows the results for each of the items included in the CIS measurement. The scale ranges from 1-4, with higher numbers indicating more positive routines. In general, most of the responses are positive; however, they vary some by item. In particular, educators do not appear to be giving children enough independence and more time than ideal is spent on activities that do not involve adult-child interactions.

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Buenos Aires were in repairs or reconstruction at the time of the survey. Cerro de Plata only had 6 children enrolled, and the times of the visit to conduct the survey had no children present.



Figure 2: CIS Items

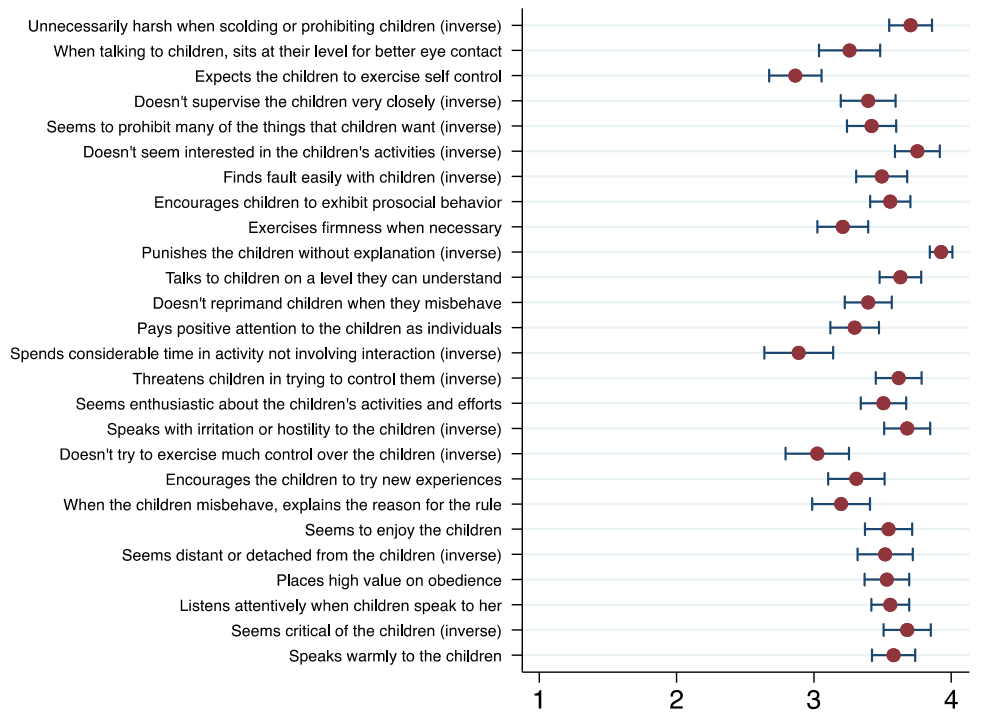
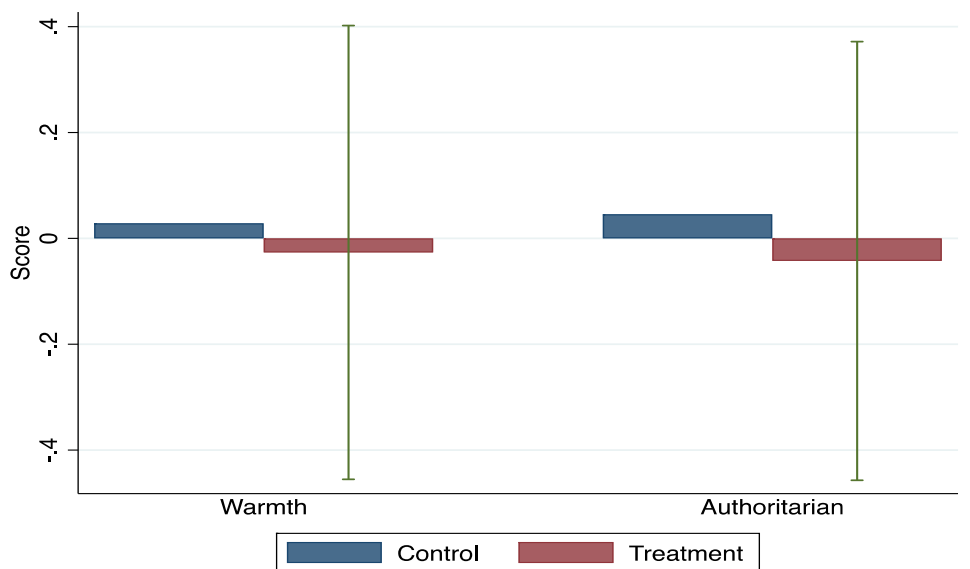


Figure 3 shows the difference in these dimensions between treatment and control centers. Two factors were defined using factory analysis: 1) warmth and 2) authoritarian. The thin green line shows the confidence intervals for when the average value for the controls is statistically different from the average value for the treatment. The differences between treated and control centers are minimal, which suggests that prior to the start of interventions in the treatment group there does not appear to be differences between the two groups along the dimensions measured by CIS.

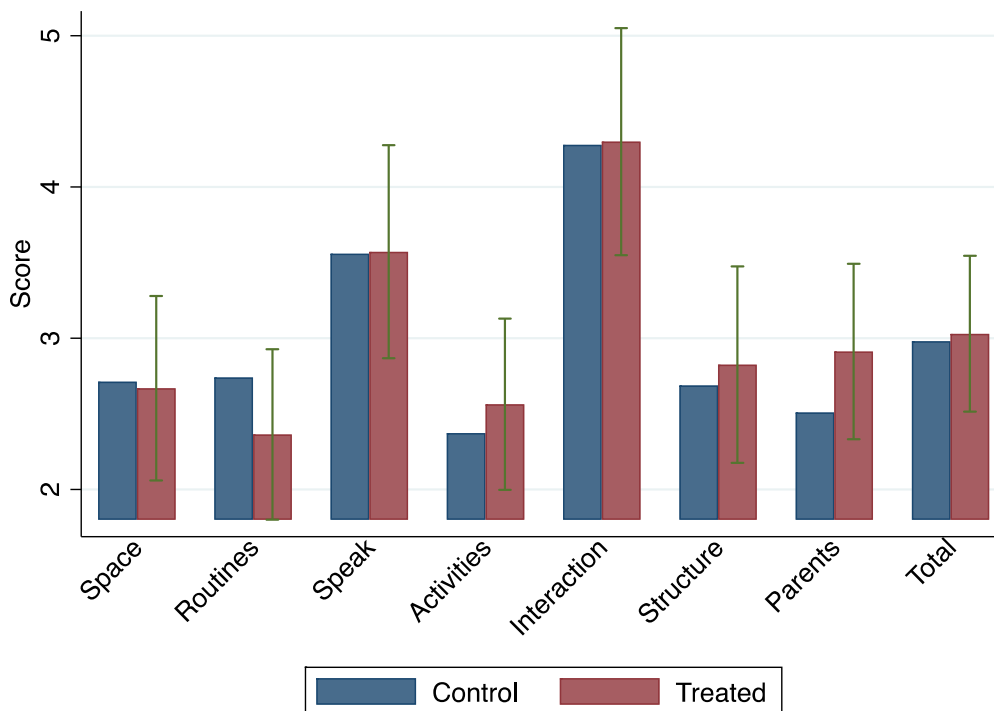
Figure 3: CIS treatment effects



## ITERS

The Infant/Toddler Environment Rating Scale (ITERS) is a commonly applied instrument for quality measurements in children's centers. It consists of 80 items that evaluate seven dimensions: 1) space and furniture, 2) personal care routines, 3) speaking and listening, 4) activities, 5) interaction, 6) program structure, and 7) parents and staff. The maximum score in each of these dimensions is seven points. As can be seen in Figure 4, the average scores in the dimensions range between 2.5 and 4. CAIPs perform relatively well in speaking and listening and interactions, but poorly in the activities dimension. The analysis also shows that there are no significant differences between treated and control centers in any of the dimensions at baseline, lending credibility to the random assignment.

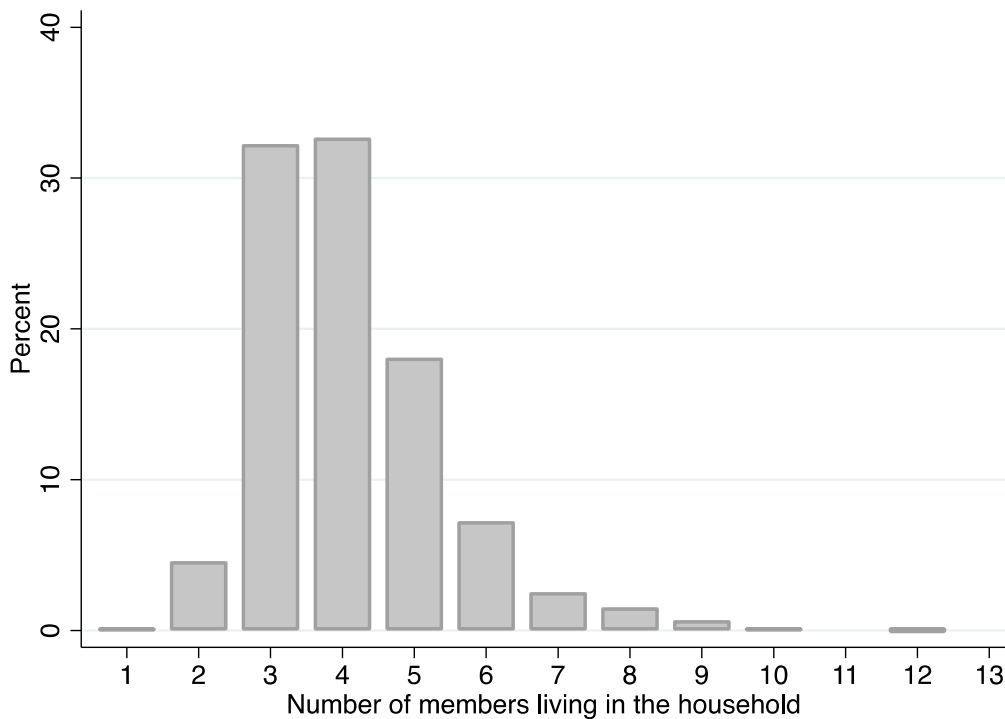
Figure 4: ITERS treatment effects



## 5.2 Households

In this section, we present statistics on household composition for households near the CAIPs that met the inclusion criteria for the survey. In Figure 5 we observe that most households have between three and five members.

Figure 5: Number of members in the household



### ***Relationship between household members***

Figure 6 shows that a little more than one third of households have female heads. It is important to note that there are quite a few female-headed households in which the head of household has a partner, so it is not correct to assume that most female-headed households are single-parent households. Approximately one third of households headed by women have a partner, and about one quarter of households headed by men do not have a partner.

Since many children live in multi-generational family homes, it is important to understand the intra-household composition. Figure 7 confirms that most children reside in households where a parent or grandparent is the head of household, rather than a more distant relative. We see that in more than half of households the head is the child's father, and in almost a quarter the head of household is the mother. The presence of a grandparent as head of household is also substantive, making up around one fourth of all households.

Figure 6: Head of the household: sex and partner

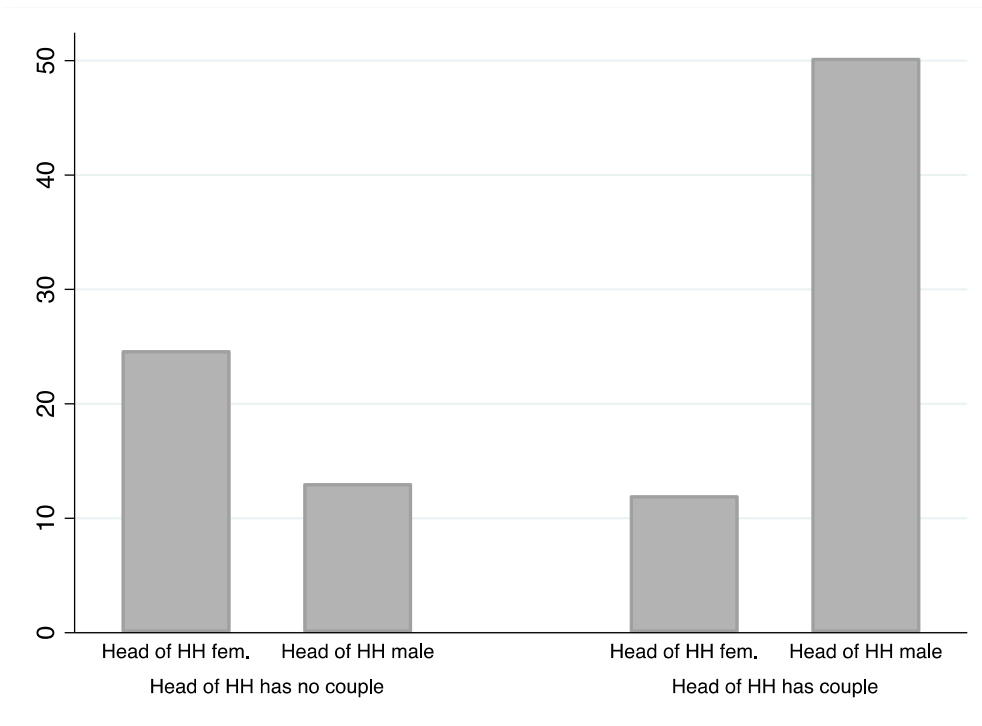
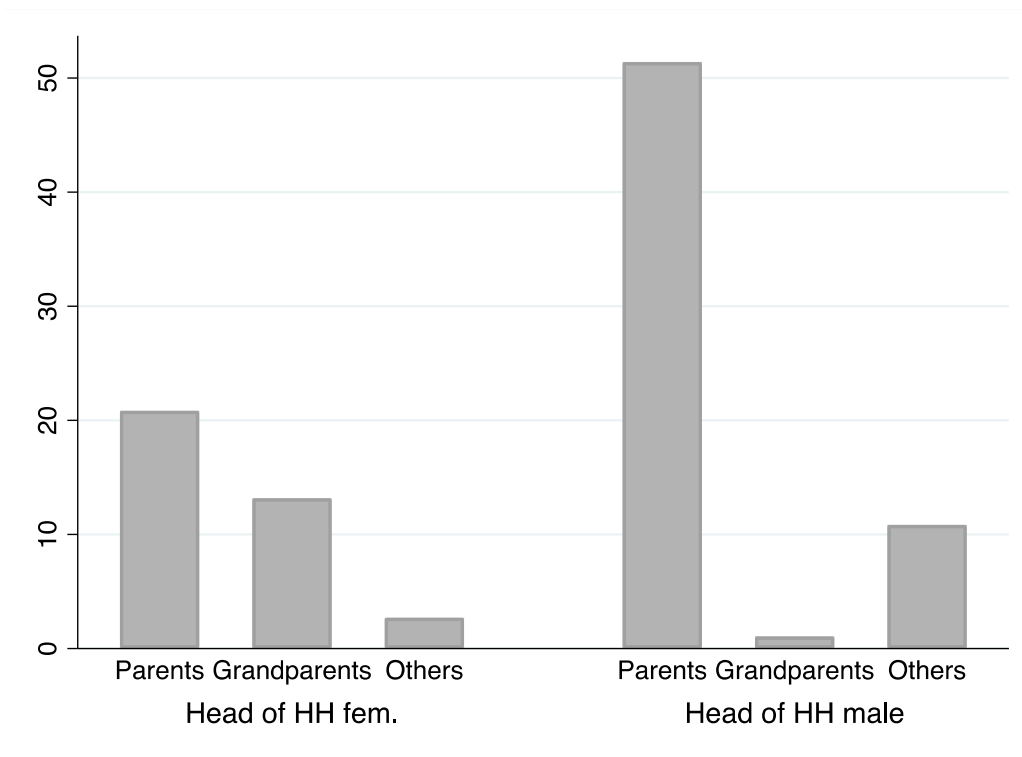


Figure 7: Child's relationship to the household head



Below we show the presence or absence of certain relatives in the household for distinct target children. Consistent with the previous graphs, Figure 8 shows that in almost 100% of households the mother is present, in almost 70% of households the father is present, in more than 30% of households the maternal grandmother is present, and in about 15% of households the paternal grandmother is present.

Figure 8: Presence of household members

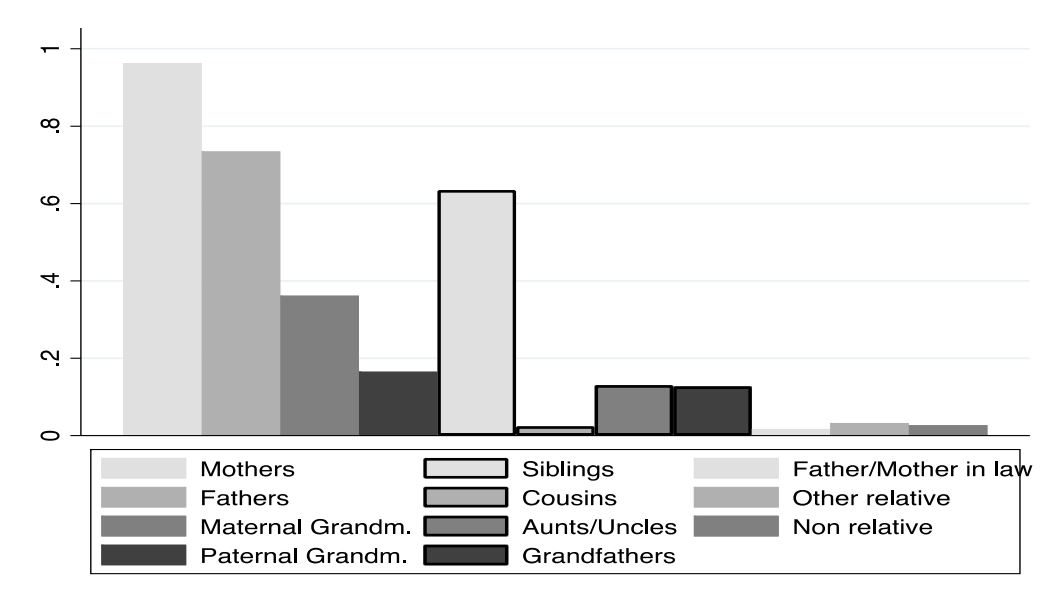
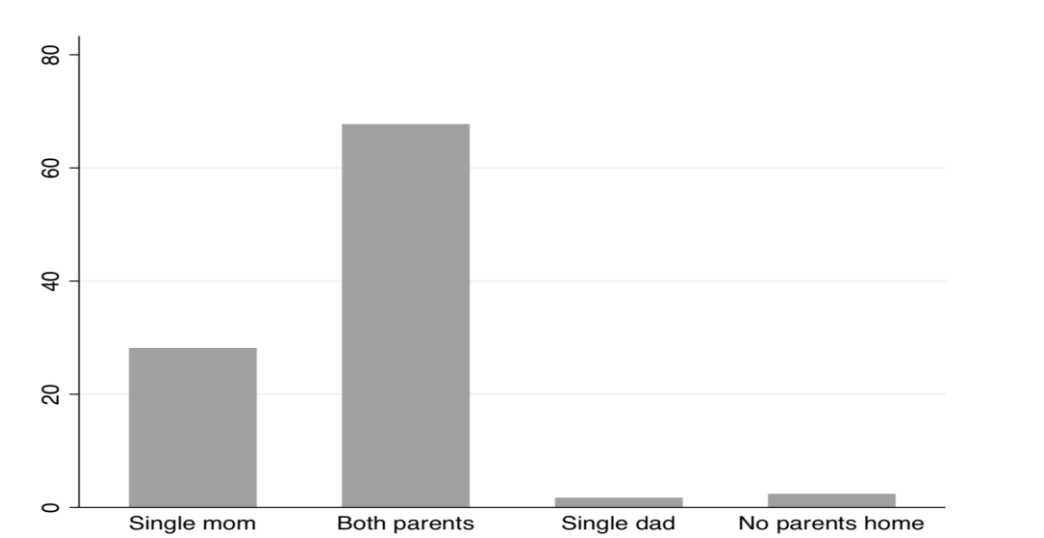


Figure 9 depicts the presence of parents at home. We see that in a fairly high percentage of cases (more than 70%), the child lives with both parents. In about one third of the cases the child lives only with his or her mother. Households with a father but without a mother or those without either parent are quite uncommon.

Figure 9: Parents in the household



**Work hours**

Figure 10 presents the distribution of hours worked per week for all household members over 18 years old. The number of hours was capped to a maximum of 84 hours (12 hours per day, 7 days a week) to account for extreme outliers that were likely to be coding or reporting errors. Approximately half of household members do not work. Among those who do work, a significant number work 8 hours and between 40 and 48 hours.

Figure 10: Hours worked per week for members over 18

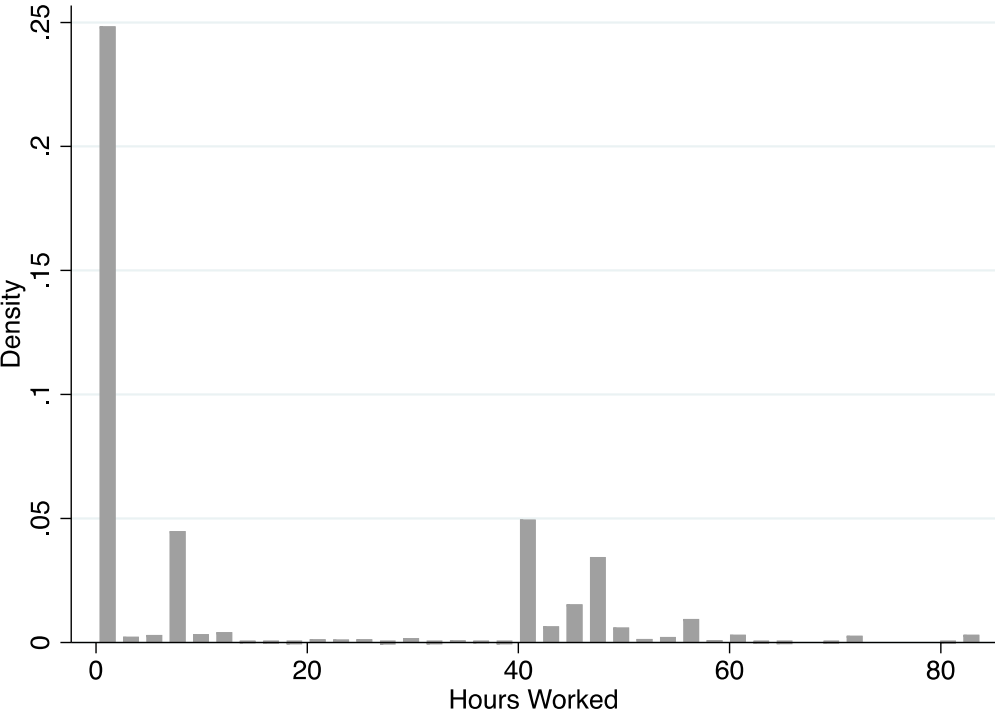


Figure 11 presents the average number of hours worked per week, categorized by the family member's relationship to each target child, whether they live in the same household or not. Those who do not work are included in the figure and assigned a value of 0 hours. We see that fathers work an average of almost 30 hours, while mothers work about 12 hours. Grandmothers work on average about 9 or 10 hours, an amount similar to that of mothers.

Figure 11: Hours worked per week for each individual, by relationship to target child

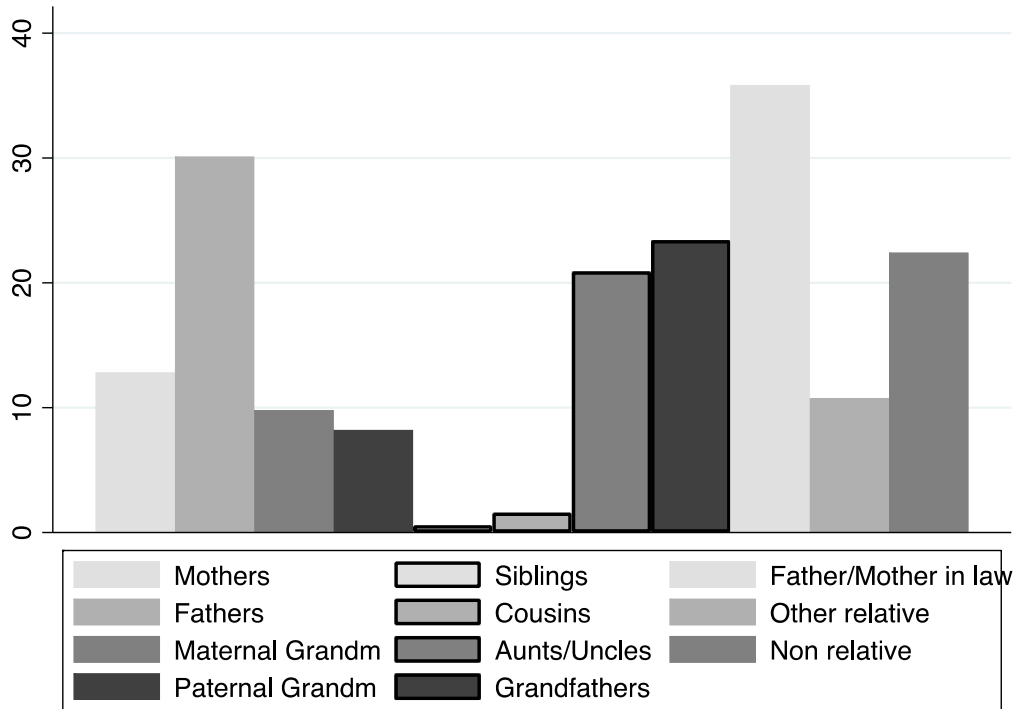
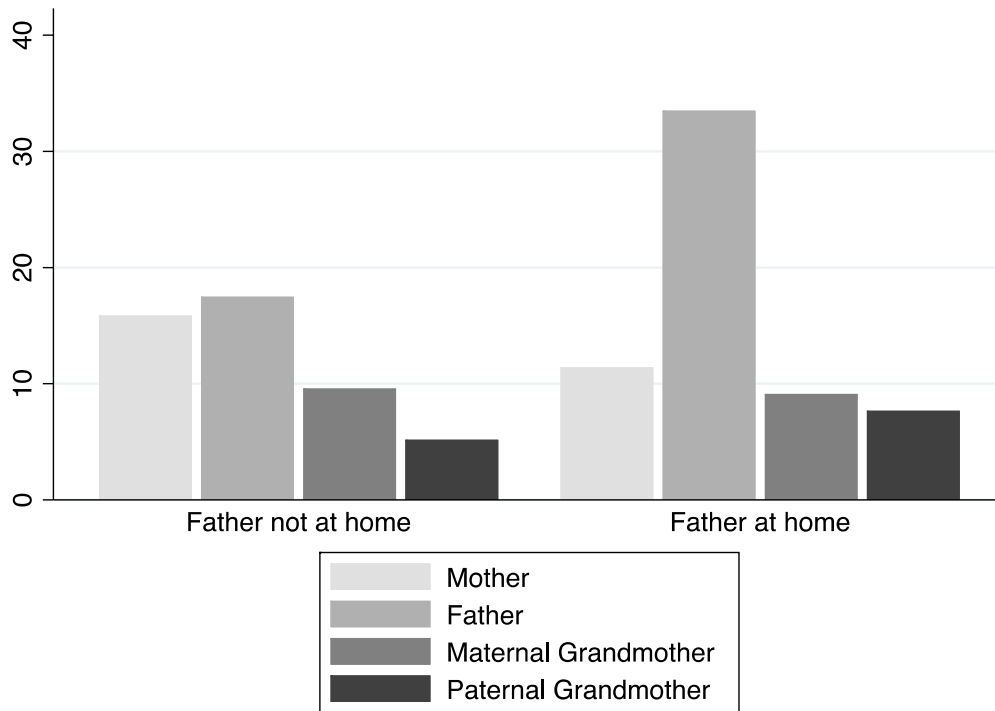


Figure 12 disaggregates this information according to whether or not the father lives in the same household as the target child. The average number of hours worked among fathers who live in the home is over 30, compared to about 20 hours among fathers who do not live in the home. As expected, the number of hours worked by mothers is higher in households where the father does not live at home, at about 15 hours per week on average. The number of hours worked by grandmothers does not vary much between the two groups.

Figure 12: Hours worked per week for each individual, by presence of the father in the home



**Income**

Figure 13 shows the distribution of labor income among all household members who earn income. Income was trimmed at 6000 balboas (Bs) to account for extreme outliers. There were 3 cases of outliers, all of which came from daily payments, so it is likely they are coding or calculation errors. The average income is 660 Bs per month.

Figure 13: Distribution of labor income (Balboas per month)

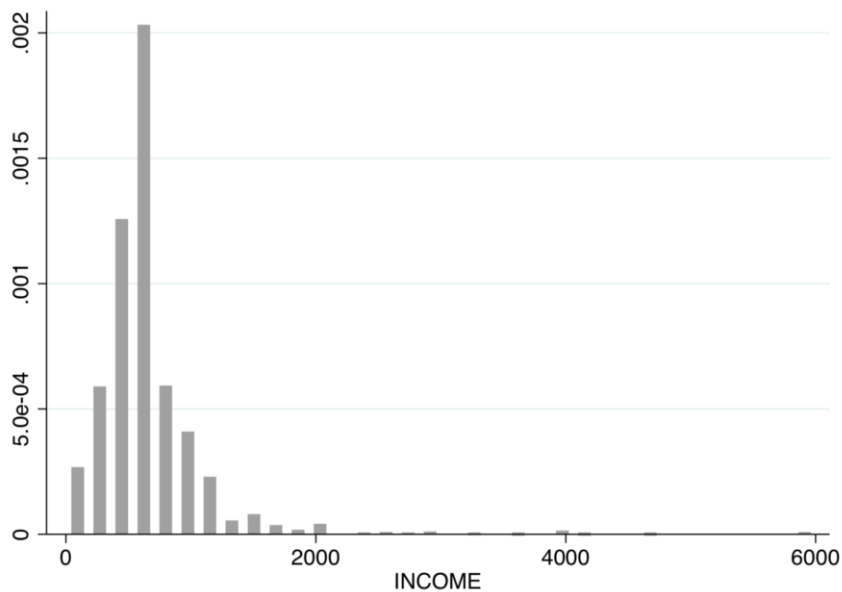




Figure 14 shows the average contribution of each family member to the total household income, by their relationship to the target child. Family members who do not work are included in the figure and assigned a value of 0. We assume that fathers who do not live in the same home as the target child contribute to the total household income. As seen, most of a household's income is earned by fathers, mothers, and grandmothers. For this reason, the rest of the income analysis focuses on parents and grandmothers.

Figure 14: Average contribution of each relative to total household income

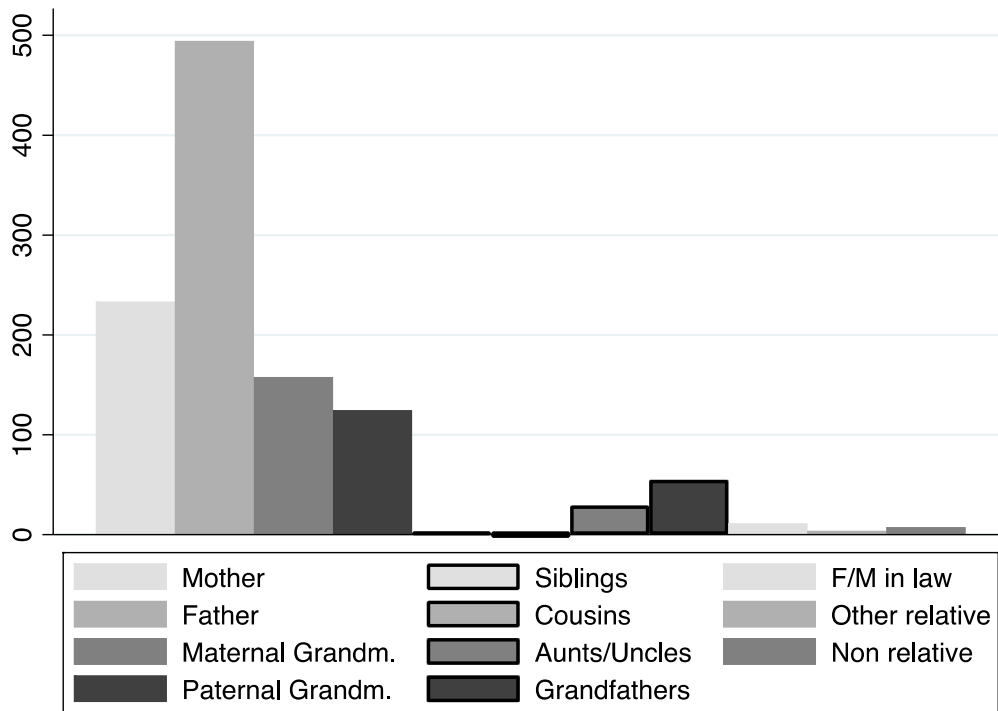


Figure 15 shows the average income for mothers, fathers, and grandmothers separately, among those who work. Income is not adjusted for the number of hours worked. As seen, salary levels are relatively similar among all family members, at around 650 Bs. This amount is similar to what a minimum-wage worker would earn per month in Panama.

Figure 15: Labor income for each income earner, by relative

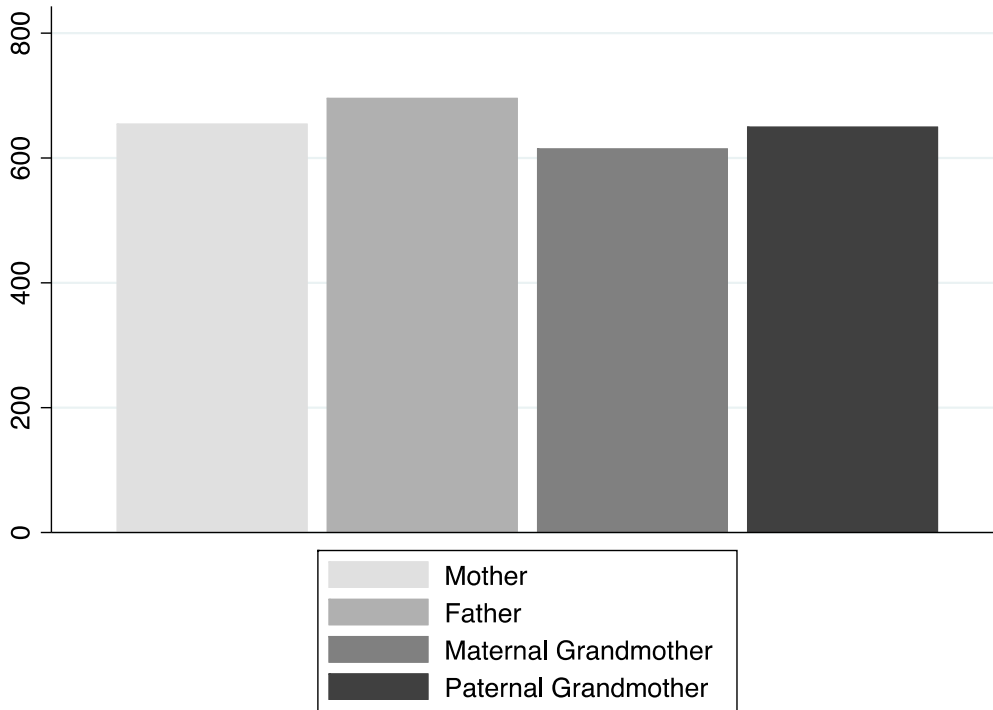
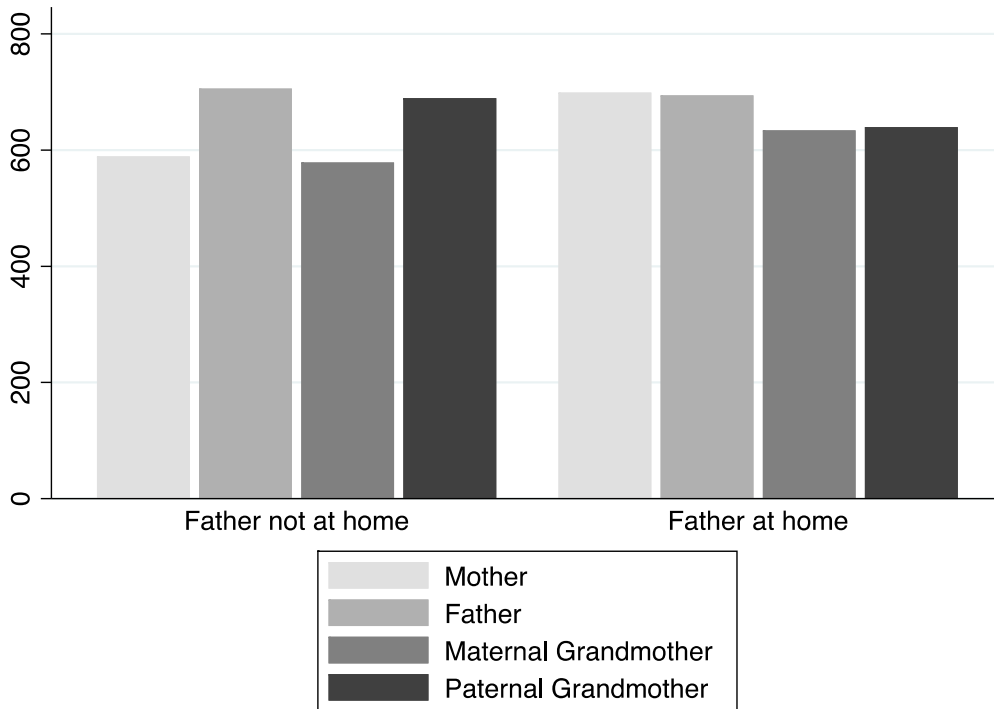


Figure 16 shows the average income of mothers, fathers, and grandmothers, separated by whether or not the father lives in the household. While the number of hours worked is substantially higher for other members when the father is not in the household, this is not the case for income. As seen in Figure 16, income remains relatively similar whether or not the father lives in the household.

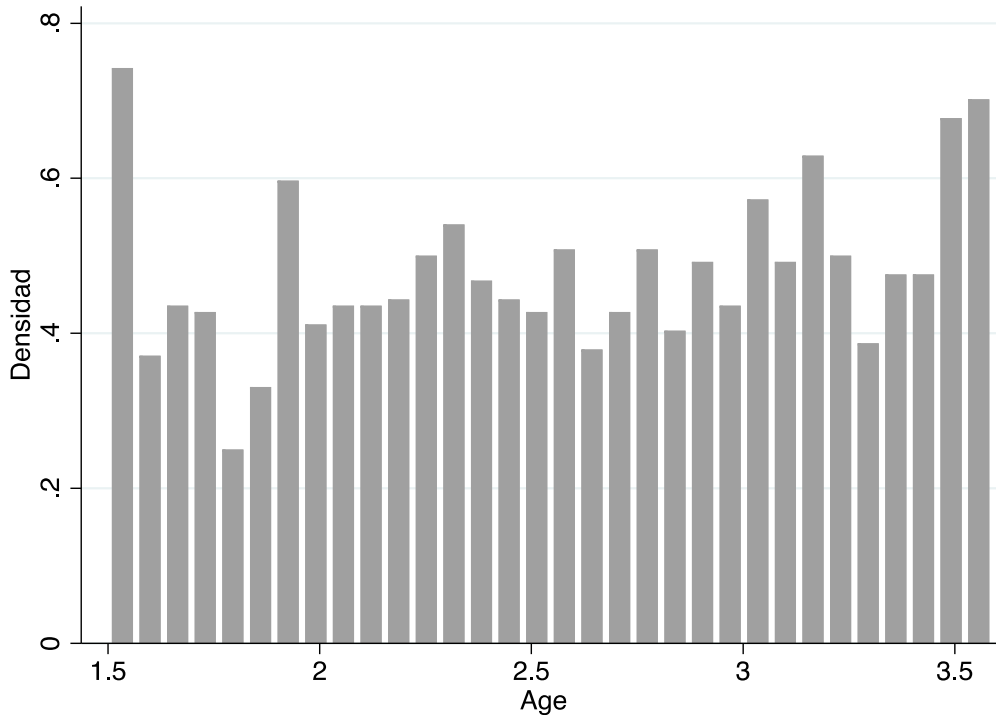
Figure 16: Labor income for each income earner, by relationship to target child and presence of the father at home



### **Child care**

This section presents descriptive statistics related to child care. Since child age is a key determinant of family care decisions, we begin by presenting the age distribution of children in our sample. As seen in Figure 17, child age ranges from 1.5 to 3.5 years and the distribution is relatively uniform.

Figure 17: Child age (years)

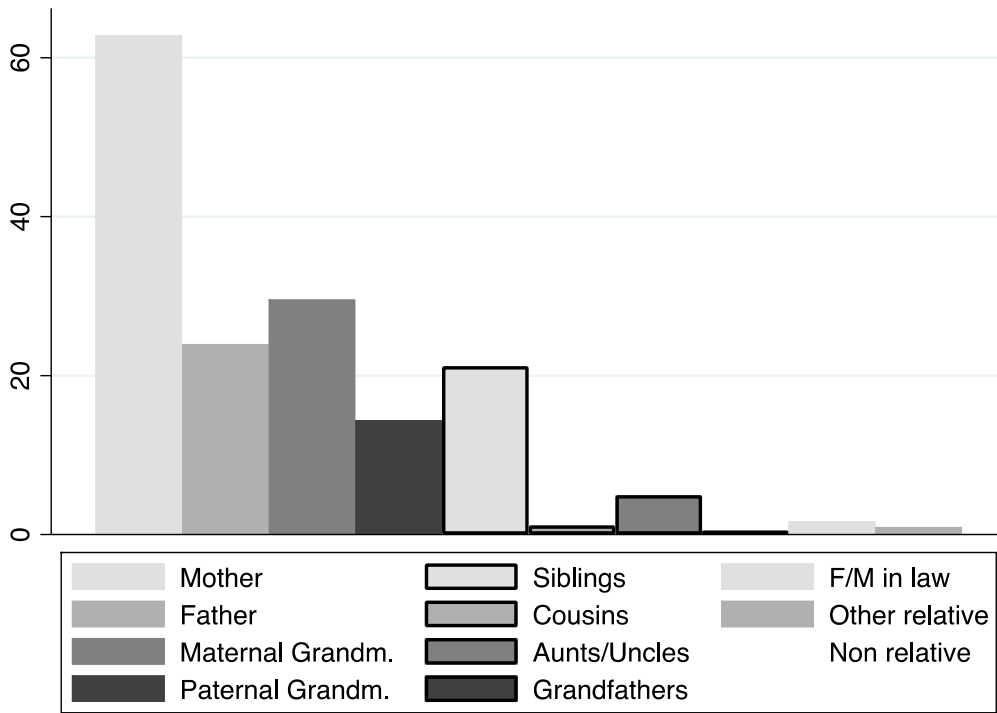


It is important to note that children generally enter the CAIPI in March and most are three years old. Children one and two years old are admitted, but less often. While child age ranges from 1.5 years (18 months) to 3.5 years (42 months) at the time of the survey in November, in March, children were between 10 months and 36 months. Given this, almost all the children in the sample were ineligible for Maternal C (ages 2 to 3) and only half were eligible for Maternal B (ages 1 to 2).

Figure 18 shows the total number of hours spent on child care per week, by relative. Specific types of relatives that are not present in the household are assigned a value of 0. For example, if the target child has no siblings in the household, a value of 0 hours is recorded. Family members who do not contribute to child care are also assigned a value of 0. In addition, if more than one family member contributes in any given category (i.e., two siblings, cousins, etc.) their contribution is summed. The number of hours of child care per week is equal to the number of weekday hours multiplied by five plus the number of hours on a weekend day multiplied by two. As seen in Figure 18, mothers dedicate the most time to child care by far, at over 60 hours per week. Grandmothers, fathers, and siblings also dedicate a substantial amount of time.

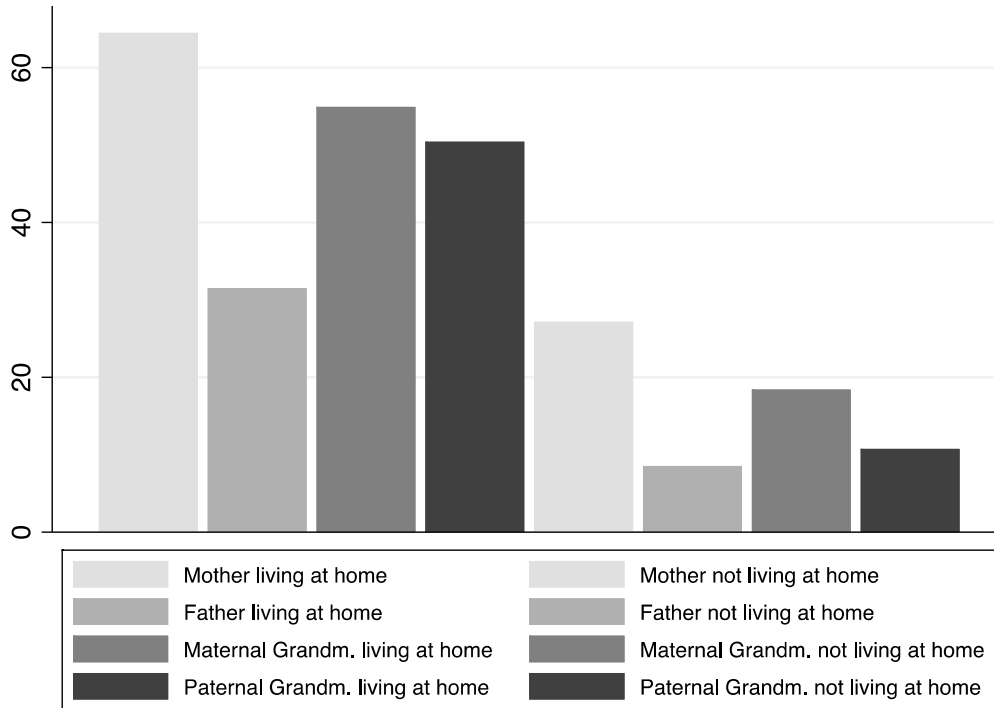
The total amount of time spent on child care is about 140 hours per week, which would mean approximately 20 hours of care seven days a week. Since 2.5-year-old children (average age of our sample) sleep approximately 10 hours a day, there seems to be an overestimation of time dedicated to child care, or it could be that more than one person in the household is taking care of the child at the same time.

Figure 18: Hours spent per week on child care by relative



Since the greatest contributions to child care are from mothers, fathers, and grandmothers, we focus on those groups for the rest of this section. Figure 19 shows the average time spent on child care, separated by whether or not the family member lives at home. As seen, mothers play the central role in child care, but fathers and grandmothers who live at home also spend a very significant numbers of hours on child care.

Figure 19: Hours spent per week on child care by family member presence in the home



### Use of maternal time

This section presents the most important findings surrounding the mother or primary caregiver's (mother, hereinafter) use of time. We show their main activities during the day and the way they combine those activities with child care. These statistics are complementary to the child care statistics previously shown in the people module.

First, Figure 20 shows the total daily time the mother spends without the children (about 14.5 hours a day on average, including sleep hours), the total daily time spent with the children but dedicated to another activity (nearly 1.5 hours), and the total time spent dedicated to children as their main activity (about eight hours). Broadly speaking, mothers spend on average a similar amount of time during the day caring for their children and not caring for them. Of course, these averages conceal an important heterogeneity: there are mothers who spend all available hours of the day on child care, while there are mothers that cannot spend more than an hour per day with their children. The number of hours that mothers report taking care of their children in the people module (8.9 hours of care on a normal day of the week), is roughly consistent with the information in this figure.

Figure 20: Mother's time spent with and without children

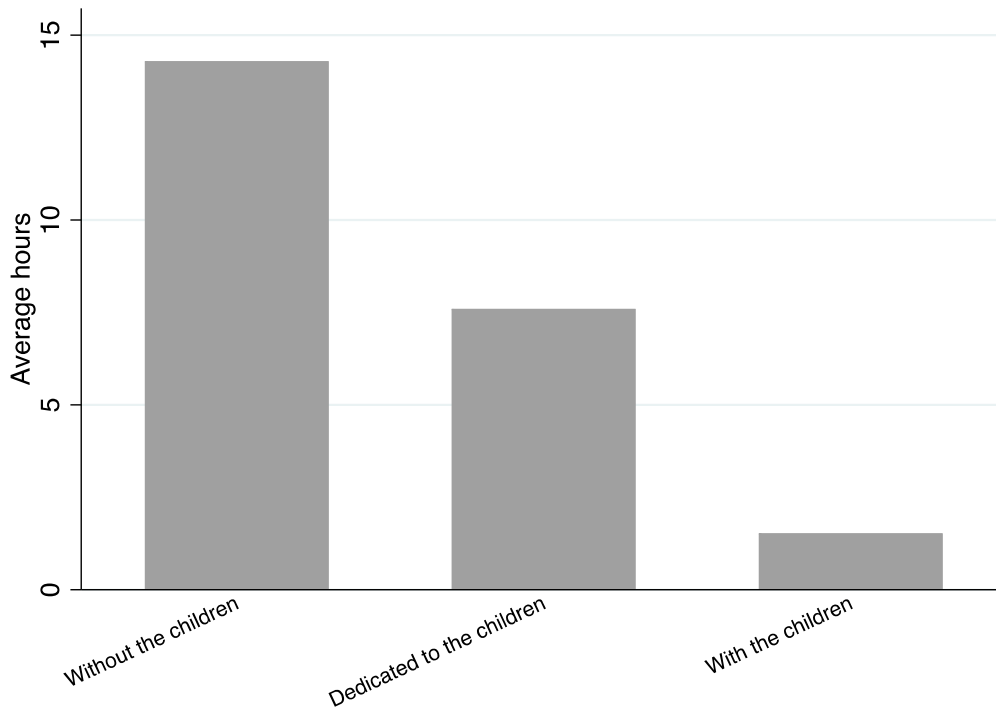


Figure 21 shows a graph of the number of hours mothers spend with or without children. Hour 0 in the diagram is 10:00pm, and each additional hour is reflected as one more hour on the X axis. For example, we can see that mothers begin to dedicate their time to their children at approximately hour 8 on the graph. This corresponds to 6:00am.

Figure 21: Mother's child care schedule

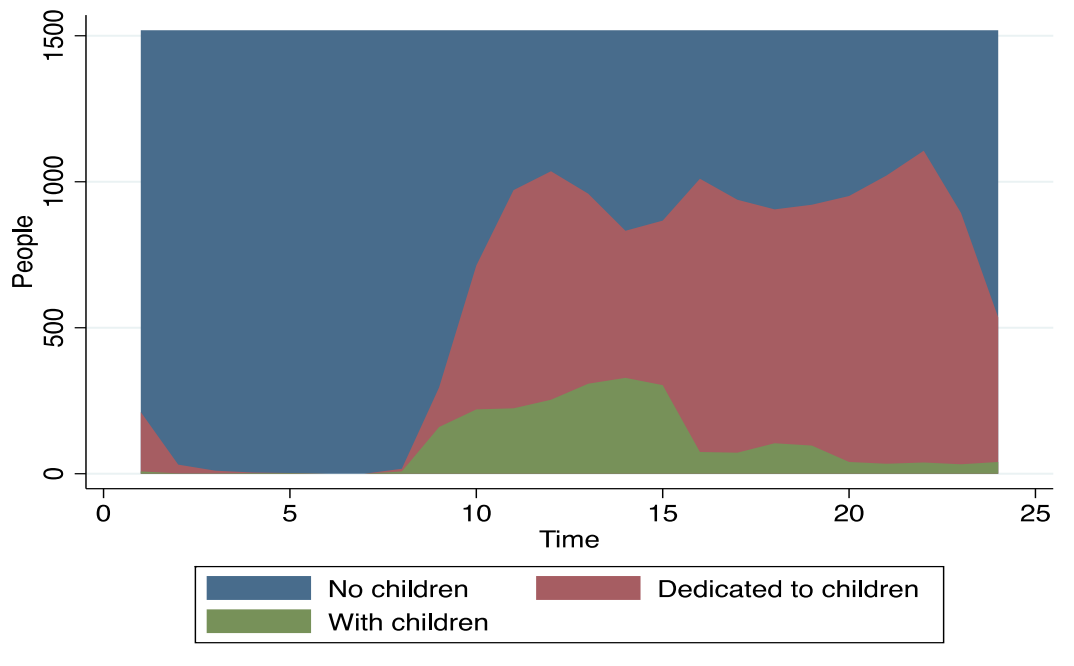


Figure 22 corresponds to the mother's time spent on different activities, regardless of whether or not they are dedicated to children at that time of day. Approximately nine hours of the day are spent sleeping. In addition to that, mothers spend approximately three hours playing or doing educational activities with their children and a little more than two hours on household activities, eating and preparing food, and leisure or personal care. They dedicate a little less than two hours on generic child care (unspecified), and spend a little more than an hour daily working.

Figure 22: Mother's time spent on activities aside from child care

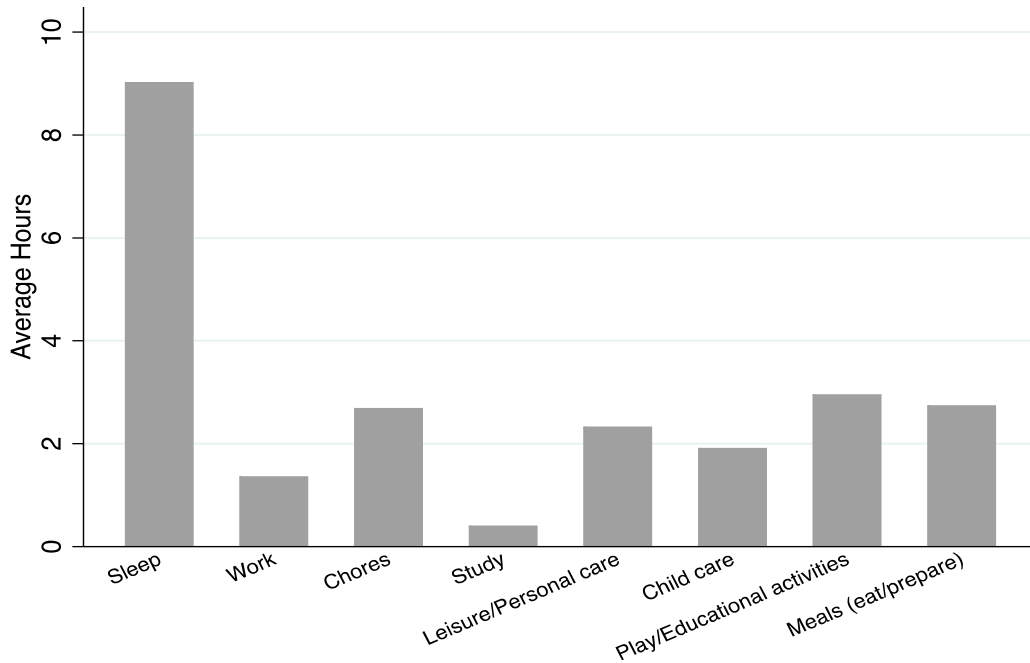
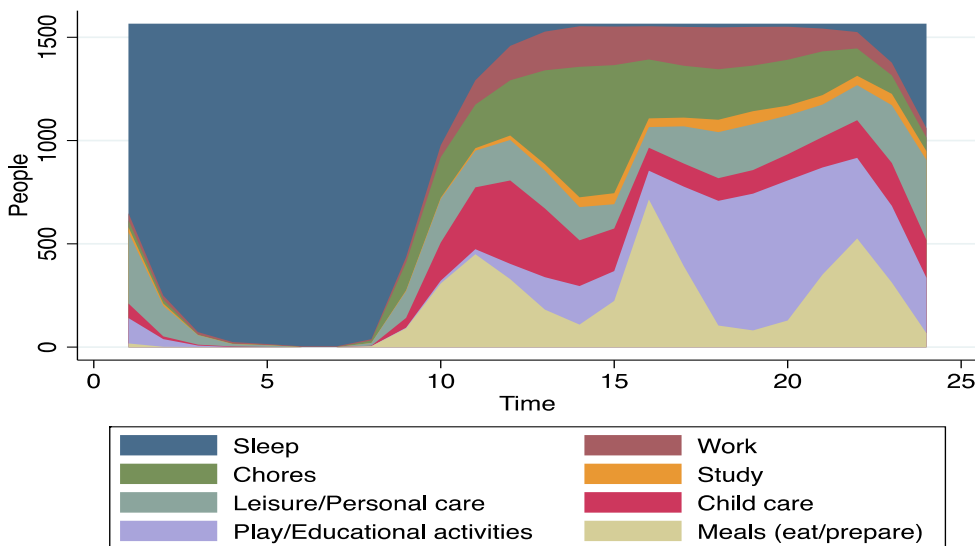


Figure 23 shows time spent on these activities at different times of day. The results are consistent with what was summarized in Figure 22.

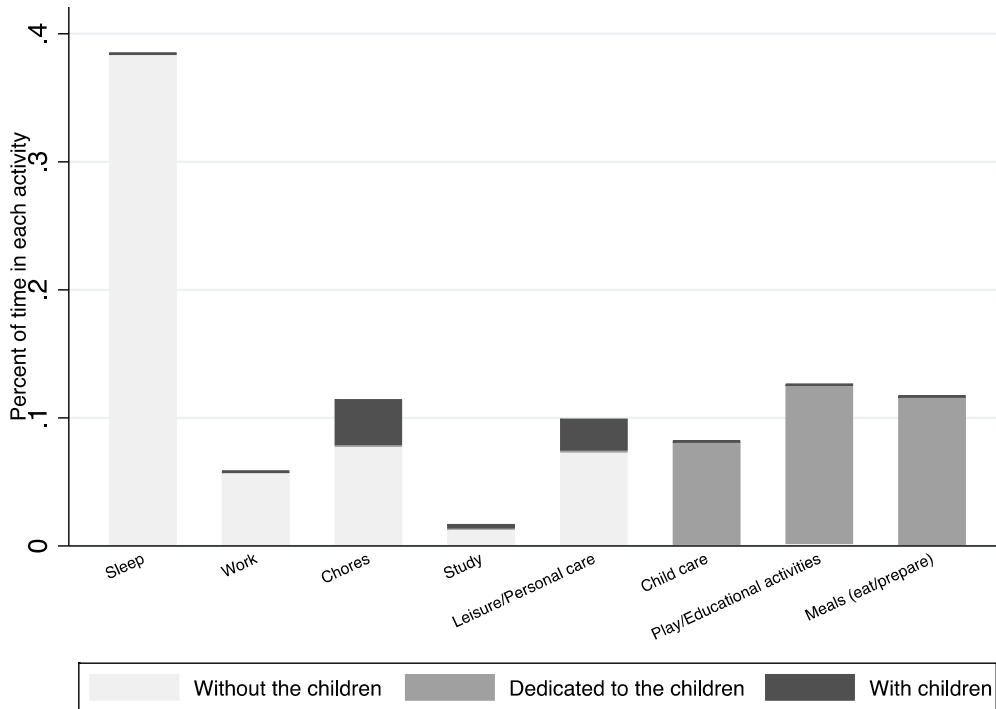
Figure 23: Mother's schedule of activities aside from child care





Finally, in Figure 24, we present time spent on these activities combined with time spent on child care. We see that when mothers eat and prepare food, play, or watch children, they are totally dedicated to their children. They are with their children, but not fully dedicated, when doing housework or spending time on leisure and personal care. When working and studying, mothers are generally not taking care of their children.

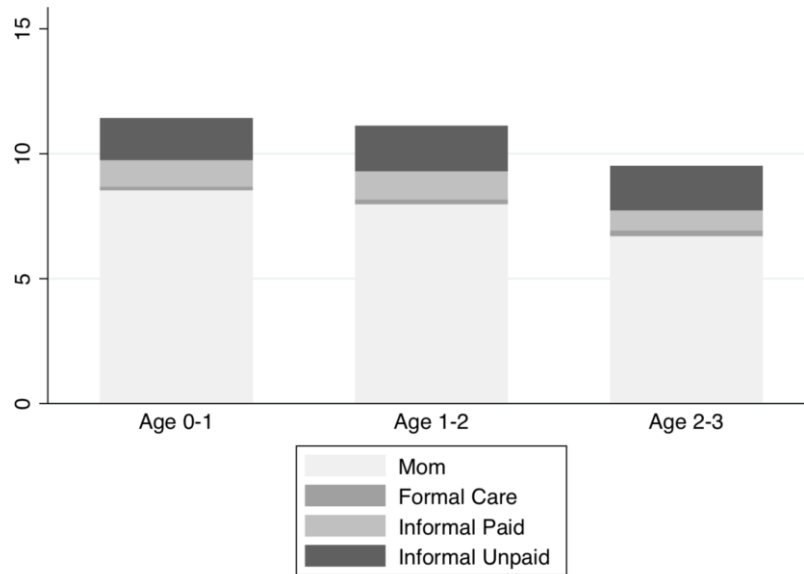
Figure 24: Mother's time spent on activities and child care



### ***Child care inside and outside home***

This section presents the number of hours children spend per day under the supervision of different caregivers, including institutions or caregivers outside the home. Type of care is reported retrospectively by mothers. Figure 25 shows that across all ages, child care is mostly provided by the mother. Non-maternal informal care (not paid and paid) accounted for roughly four hours, but very few children received formal care in centers.

Figure 25: Type of care by child age



### **HOME**

Figure 26 presents results for each question asked in the Home Observation for Measurement of the Environment (HOME) instrument to measure family environment. The questions are coded so that the response is more positive at higher scores. As seen, the only dimension in which relatively poor scores are presented is the frequent use of physical harm against the child.

Figure 27 summarizes the information from the HOME items using factor analysis. Three main factors were defined: (i) warmth; (ii) stimulation and (iii) authoritarianism. The first two are clearly positive, while the third is not obviously positive or negative. Authoritarianism is reverse coded in Figure 27, where a higher score means less authoritarian. The main shortcomings are in warmth, likely driven by frequent use of physical harm.

Figure 26: HOME Items

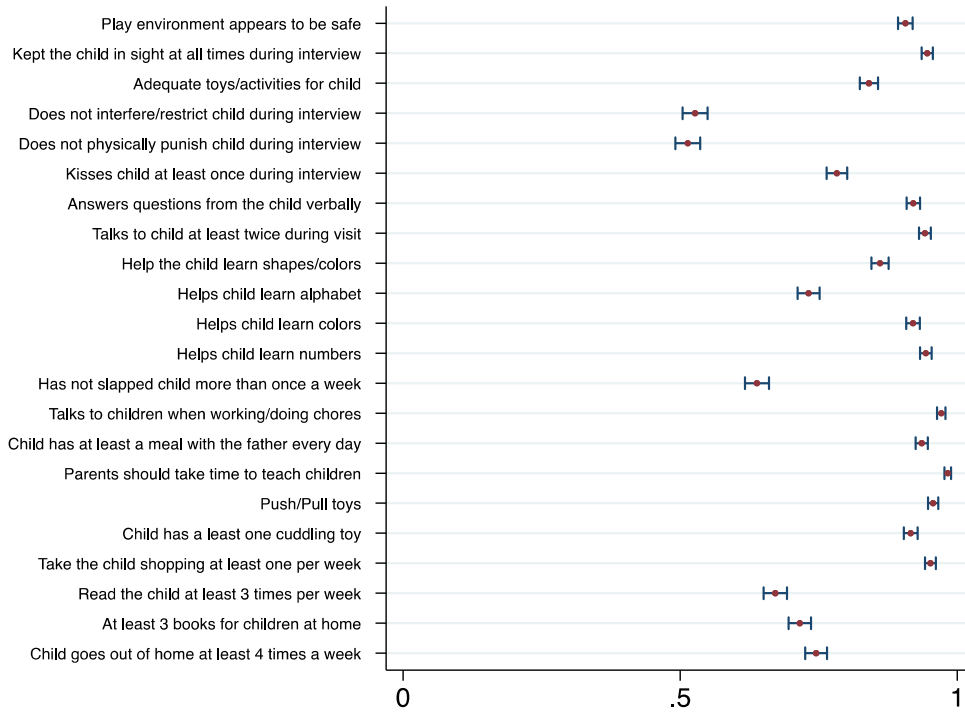
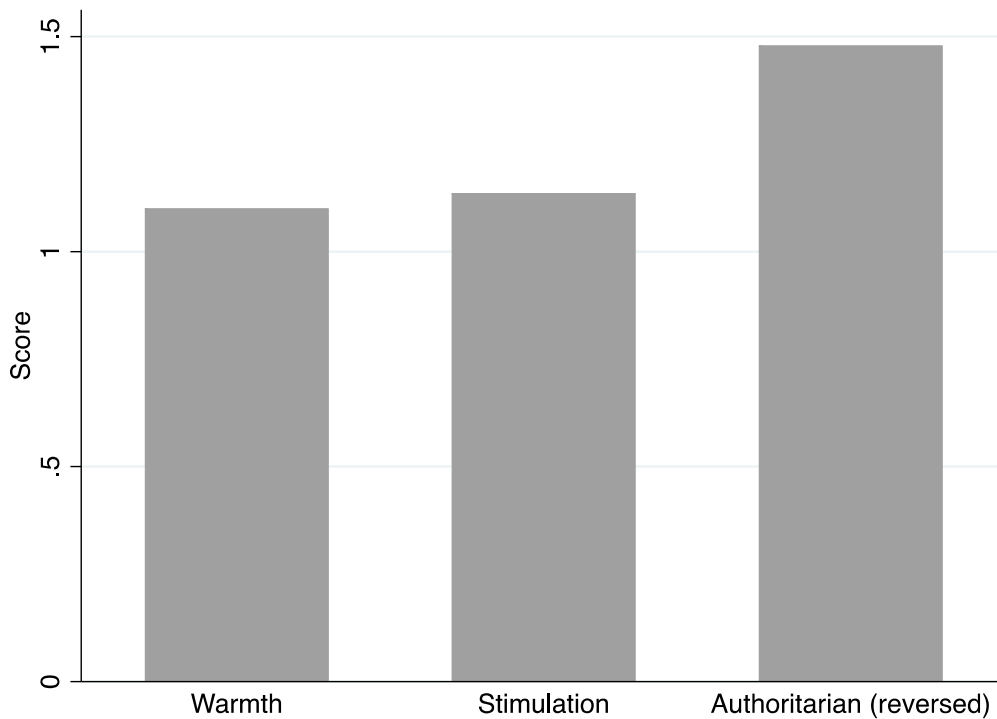


Figure 27: HOME Factors



## Development

This section presents analysis of child development indicators, as measured by the ASQ test. This test includes five dimensions—social, problem solving, fine motor, gross motor, and communication—with approximately six items each, for nine different age groups present in the sample.

Figure 28 shows the average level of each of the five dimensions. There are relatively clear differences between the different dimensions. For example, the score for fine motor skills is about two points lower than the score for gross motor skills. This difference in baseline levels will be useful when analyzing the follow-up data because it will give us a reference point from which to compare children at each age.

Figure 28: Average ASQ scores by dimension

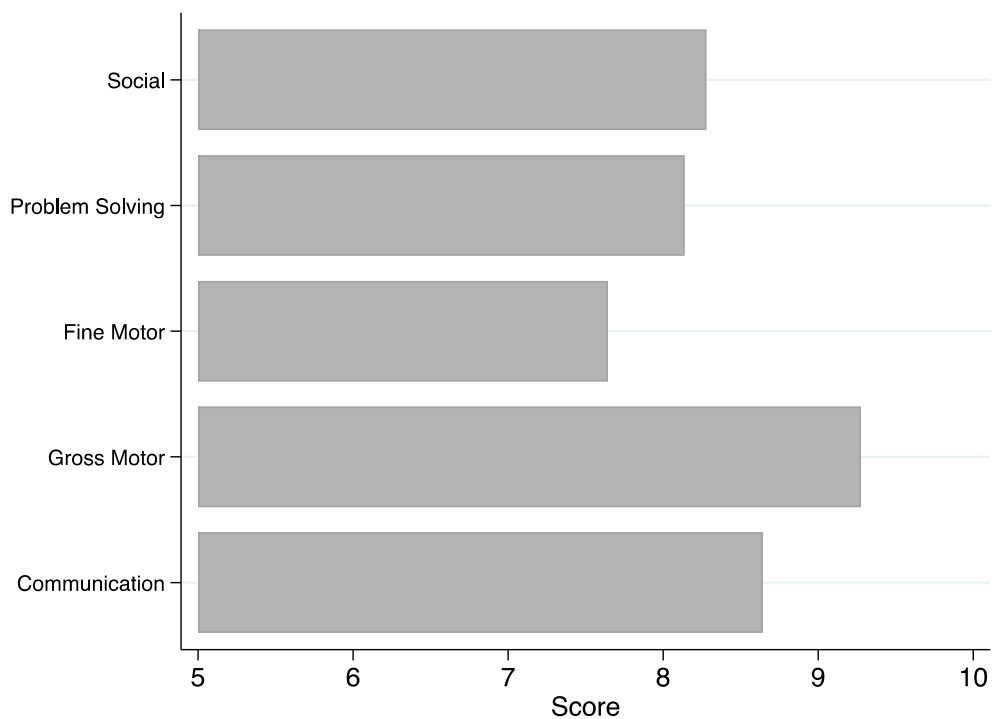


Figure 29 shows the average ASQ scores by dimension as before, but disaggregated by province. We can see that Comarca has clearly lower scores than the other areas. However, the other highly indigenous provinces, Veraguas and Chiriquí, have scores that are relatively good compared with the other provinces. These results are interesting and puzzling, but it is good to note that they could be driven by different field teams across different provinces.

Figure 29: Average ASQ scores by dimension and Province

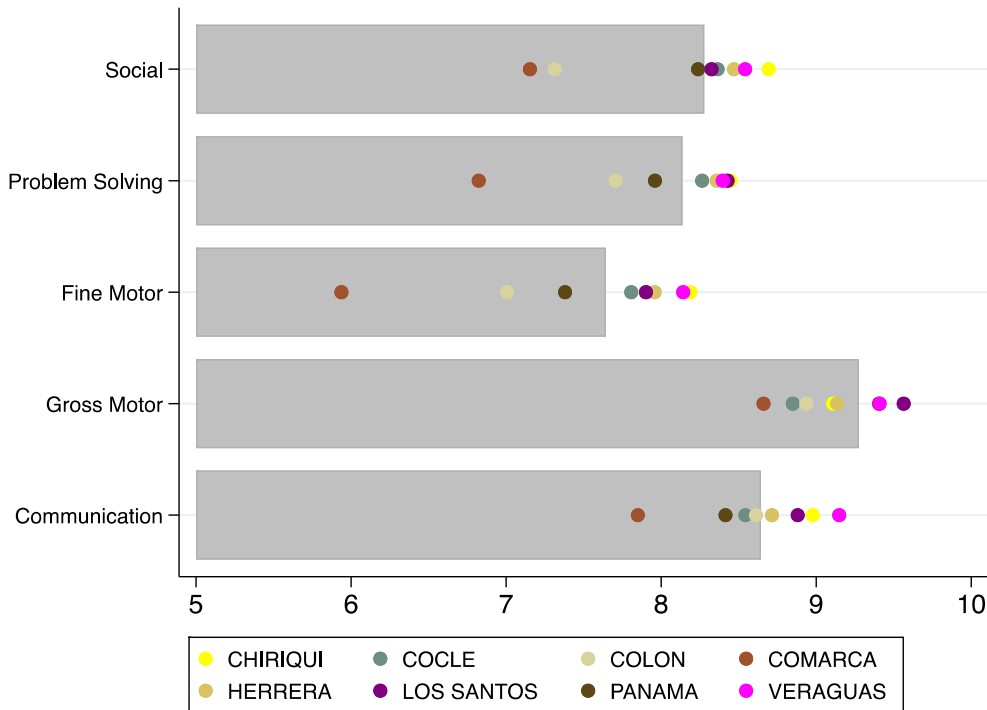


Figure 30 shows the percentage of cases where there is a sign of possible developmental delays. For these purposes, the ASQ instrument considers a score of less than 67% deficient; in general, that means that a child failed to pass three or more of the standard tasks for his age group in one dimension.

Figure 31 presents the findings in ASQ by gender. It is interesting to note that girls score systematically higher than boys in each of the dimensions. Although the magnitude is not very high, the pattern is clear.

**Caregiver**

This section reports some of the outcomes from the interview with the mother or principal caregiver (mother, hereinafter). This includes preferences in types of care, child expenses, and household savings.

Figure 30: Low ASQ

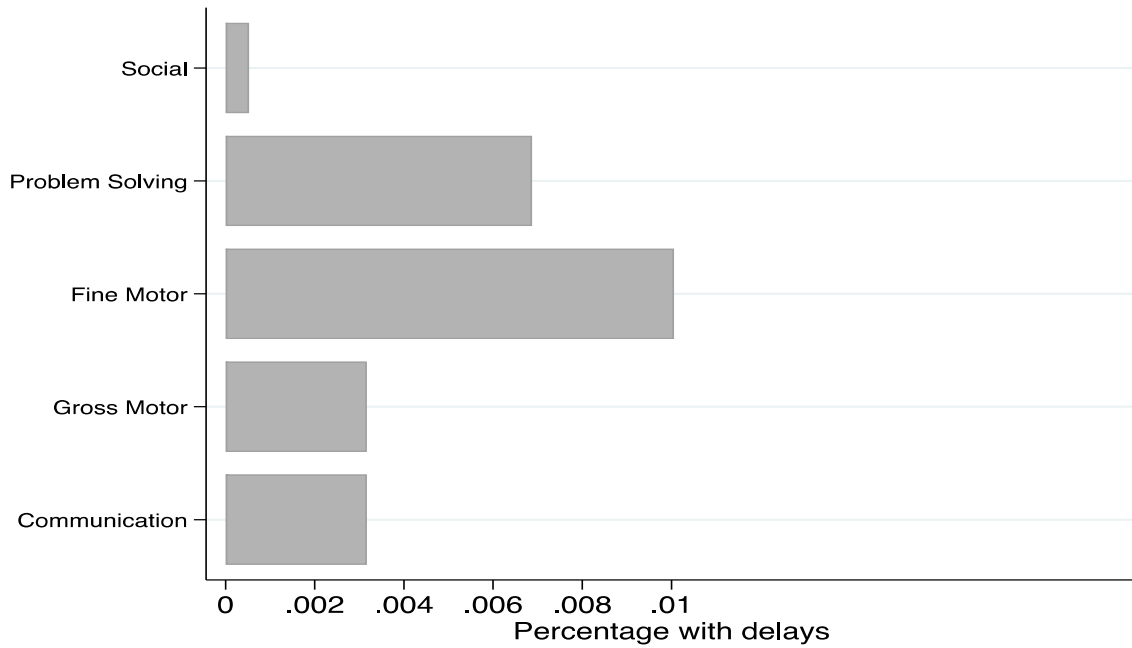


Figure 31: ASQ by sex

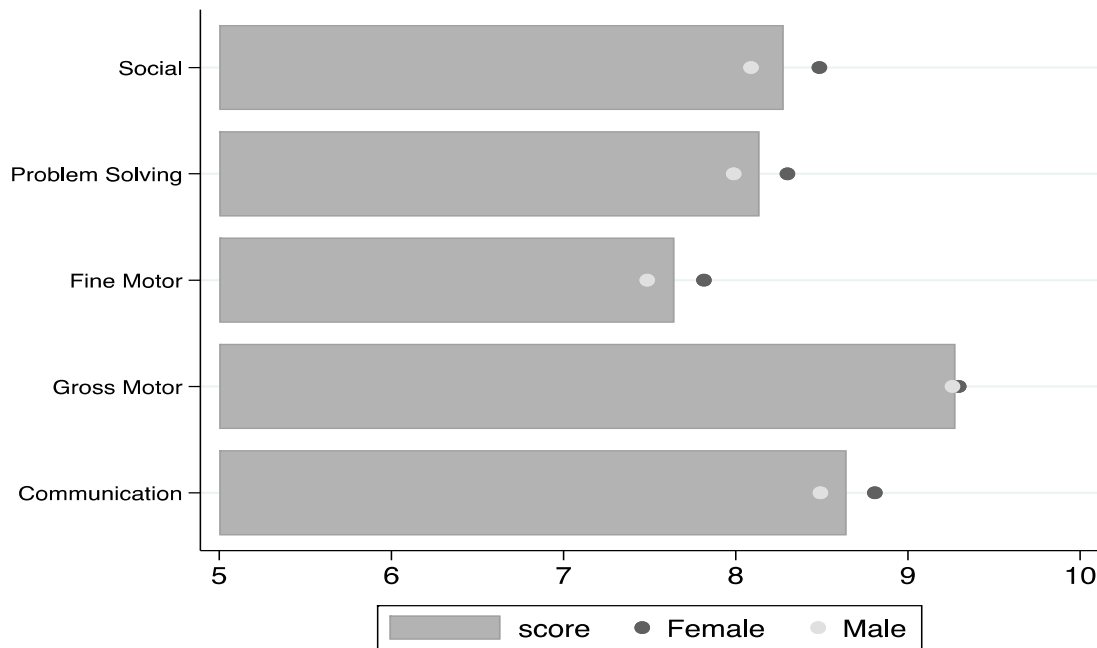


Figure 32 presents mothers' ranking of which alternatives they prefer over others in terms of the well-being of their child. In particular, they were asked to give a score of 1 to 5, where 5 was the highest, about (beyond costs) where they thought their child would be better off. The idea is to approximate the vision mothers have about the role of the various alternatives in promoting child development. The information presented in the figure is very valuable. It shows that mothers prefer care in CAIPs to family care, which helps understand the surprisingly low enrollment rate in CAIPs that we see in the data. It could be that children may still be very young or that the centers may be difficult to access, but the low attendance at CAIPI in the sample is not due to

distrust or caregiver preferences. We also see that mothers highly rank caring for their children themselves. However, the combination of care by the mother and in a CAIPI is the most highly ranked option.

Figure 32: Preferences by type of care

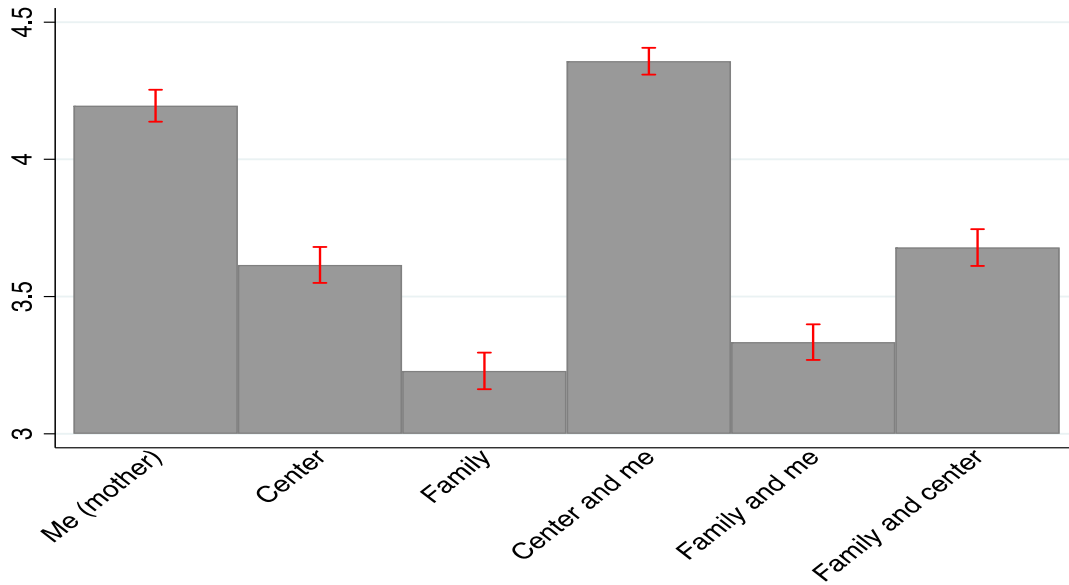
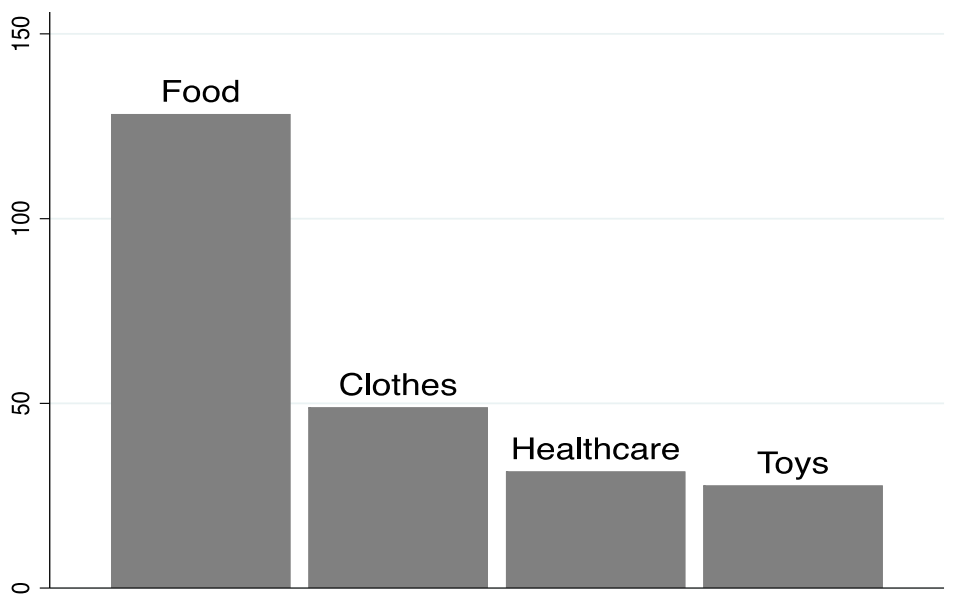


Figure 33 shows the average amount a household spends each month on items exclusively for children. The results show fairly high expenditures on food, of 128 Bs, and rather low but significant expenditures on clothing (48 Bs), health (31 Bs), and toys (27 Bs). In total, the amount spent on these items is 235 Bs.

Figure 33: Expenses



### 5.3 Compliance

Compliance is presented in Table 2. The data analyzed in this section are not directly obtained from the baseline survey, but from administrative data on available spaces and enrollment. Each row in Table 2 corresponds to a pair of CAIPs. The column total is the total number of individuals that were sampled in the zone of the CAIPI pair, which was proportional to the number of available spaces. The columns Supply T and Supply C indicate the number of spaces that were originally offered for the treatment CAIPI and for the control CAIPI, respectively. The DT T1 column indicates what percentage of children enrolled in a treatment CAIPI (D usually indicates participation), among those who had been offered a space in a treatment center. The DT T0 column indicates what percentage of children enrolled in the treatment CAIPI, among those who had been offered a space at a control center. The next two columns, DC C1 and DC C0, are the same, but measuring participation in the control centers.

The table shows that the average participation rate within the group of children who are offered a slot in a treatment center is 37%. The following figure and maps explain some of the possible reasons for why this number is so low. The percentage of children assigned to the control group that ended up attending a treatment CAIPI is close to 9%. These figures are similar for participation in the control CAIPs, although the percentage of children who are offered a slot in a control CAIPI and accept is lower, at 31%.

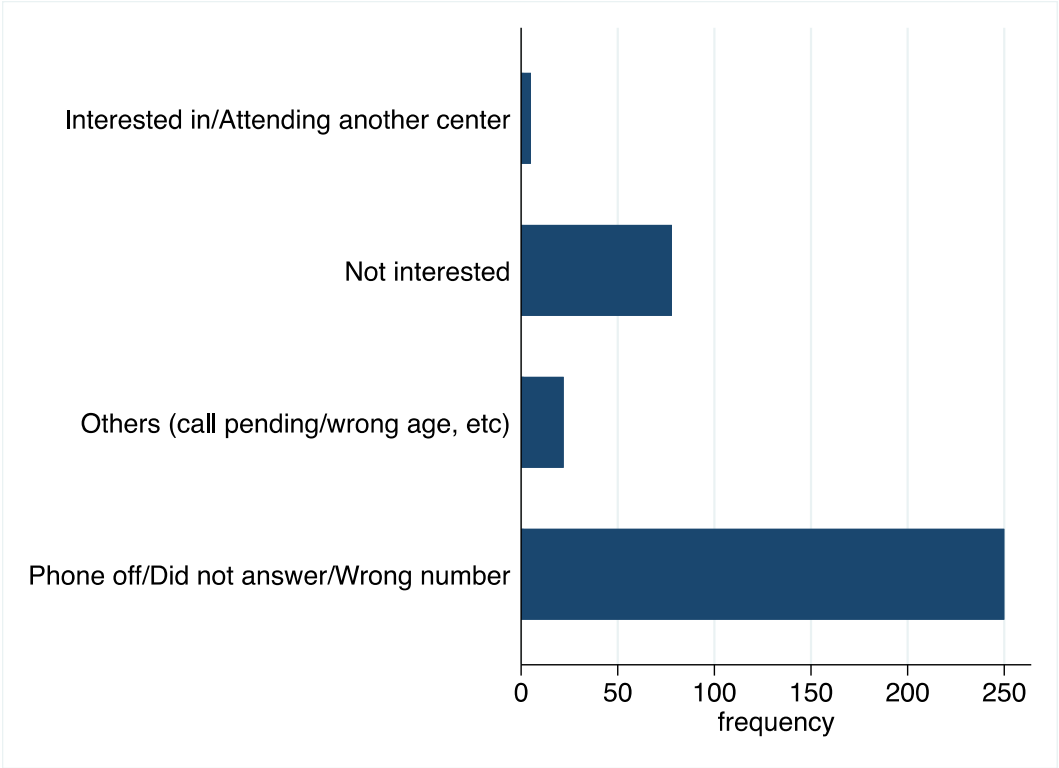
Table 2: Compliance

	Total	Supply T	Supply C	DT T1	DT T0	DC C1	DC C0
Alba Llano	112	48	20	.33	.17	.15	.16
Alegría Felices	89	17	17	.47	.097	.29	.13
Andes Lluvia	59	12	21	.42	.021	.38	.053
Arena Parita	112	41	42	.39	.11	.17	.071
Ascanio Parusia	100	13	24	.38	.069	.33	.11
Boca Monagrillo	92	16	27	.31	.079	.26	.11
Chiru Hato	92	19	16	.37	.11	.5	.11
Estrellita Cristo	48	11	12	.27	.32	.17	.056
Jardin Mariana	98	33	29	.3	.17	.48	.12
Margarita Domingo	136	64	17	.25	.19	0	.042
Monteria Heidi	113	27	43	.56	.012	.3	.071
Pilon Irving	98	18	22	.17	.14	.23	.12
Porvenir Arrullito	102	24	23	.5	.026	.52	.11
Primavera Eduardo	176	28	40	.39	.054	.33	.15
Retorno Amor	90	20	32	.4	.16	.28	.24
Sol Saber	42	19	19	.16	.087	.11	.13
Sueños Luz	60	17	18	1	.023	.72	.14
Tinajas Rios	50	17	17	.18	.091	.41	.18
Triunfo Cedeco	82	10	21	.6	0	.38	.18
	1865	454	460	.37	.087	.31	.11



Figure 34 shows reasons for non-compliance with the treatment assignment. The main reason was inability to get ahold of families primarily due to incorrect phone numbers, missed calls, or phones that had been turned off. This was the case for about 250 of the roughly 300 households that did not accept the offer. The number of people who answered that were not interested was a little more than 50. In the following section, we show how this may be partially explained by the significant geographical distance that exists between some interviewees and the centers.

Figure 34: Reasons for not accepting a space in the CAIPI



**Data collection protocols, geographical localization, and lack of compliance**

An important reason for non-compliance is that the data collection firm collecting the survey seemingly used a data collection protocol that was different from the intended. The original protocol specified that they should have started collecting data from a middle point between the two centers, and then expand the field area from that point. Children living between the centers were most likely to be able to move across the two centers. However, the actual data collected shows that the firm focused on the areas surrounding each center. In those areas, it is more likely that children had strong preferences for participating in the center that was closer to their home. The data collected also show that distance to the center is a very strong determinant of participation.

## 5.4 Balance

In this last section we show that, for some relevant variables, the treatment and control groups seem to be well balanced.

### *Balance in treatment assignment of children*

Since there are two treatments at the child level, we analyze baseline balance for each of them separately. Table 3 shows that children that were offered slots in treatment CAIPs are similar to children who were not. Only one of 11 variables in the table shows significant differences between the groups (ASQ communication), and the sign of the effects do not show a clear bias in the direction of one group or the other. Table 4, which compares the group of households that were offered a slot in a control CAIPI to those that were not, shows similar results. There are no significant differences in any of the variables and no systematic pattern observed. These findings suggest the treatment and control groups are well balanced.

Table 3: Balance - Allocation to Treatment Center

	N	Beta	t	p
HOME-Total	1751	-.00385	-.58	.56
HOME-Warmth	1751	-.031	-.69	.493
HOME-Stimulation	1751	-.0274	-.58	.564
HOME-Authoritarian (reversed)	1751	.0179	.4	.693
ASQ communication	1746	.236	2.3	.0241
ASQ gross motor	1746	.0346	.47	.635
ASQ fine motor	1742	.0505	.38	.702
ASQ problem solving	1744	.148	1.3	.202
ASQ personal-social	1747	.078	.8	.426
Daily hours dedicated exclusively to children (Main Caregiver)	1751	.135	1	.309
Total daily hours with children in charge (Main Caregiver)	1751	.179	1.2	.241
Daily hours of work (Main Caregiver)	1751	-.0595	-.36	.721

Table 4: Balance - Allocation to Control Center

	N	Beta	t	p
HOME-Total	1751	.00552	.85	.395
HOME-Warmth	1751	.0328	.74	.461
HOME-Stimulation	1751	.014	.3	.765
HOME-Authoritarian (reversed)	1751	-.0218	-.49	.623
ASQ communication	1746	.0997	.97	.333
ASQ gross motor	1746	.0675	.94	.347
ASQ fine motor	1742	.00188	.014	.988
ASQ problem solving	1744	.0791	.7	.487
ASQ personal-social	1747	.0634	.66	.51
Daily hours dedicated exclusively to children (Main Caregiver)	1751	-.0152	-.12	.907
Total daily hours with children in charge (Main Caregiver)	1751	.0438	.29	.77
Daily hours of work (Main Caregiver)	1751	.0484	.3	.767

### ***Balance in treatment assignment of CAIPI***

Tables 5 and 6 show adequate balance between the CAIPI assigned to the control group and the CAIPI assigned to the treatment group.

Table 5: Balance ITERS

	mean	sd	min	max	diff T-C	t	p-value
ITERS total	3.04	1.16	1.1	7.0	0.048	-0.185	0.854
Space and furniture	2.72	1.38	1.0	7.0	-0.047	0.149	0.882
Personal care routines	2.57	1.30	1.0	7.0	-0.388	1.342	0.184
Speak and listen	3.62	1.58	1.0	7.0	0.010	-0.029	0.977
Activities	2.49	1.30	1.0	7.0	0.194	-0.665	0.508
Interaction	4.33	1.69	1.0	7.0	0.017	-0.045	0.964
Program structure	2.78	1.49	1.0	7.0	0.139	-0.417	0.678
Parents and staff	2.76	1.33	1.0	7.0	0.410	-1.381	0.171

Table 6: Balance CIS

	mean	sd	min	max	diff T-C	t	p-value
Sensitivity	3.44	0.56	1.7	4.0	-0.016	0.124	0.902
Harshness	3.55	0.42	1.8	4.0	-0.046	0.487	0.628
Detachment	3.39	0.58	1.5	4.0	0.169	-1.314	0.193
Permissiveness	3.21	0.55	1.3	4.0	-0.007	0.059	0.953
Change diapers	0.16	0.37	0.0	1.0	0.013	-0.155	0.877
Meals	0.98	0.16	0.0	1.0	0.051	-1.488	0.141
Bath	0.30	0.46	0.0	1.0	0.077	-0.751	0.455
Nap	0.27	0.45	0.0	1.0	0.029	-0.293	0.770
Reading	0.59	0.49	0.0	1.0	0.203	-1.878	0.064
Gross Motor	0.86	0.34	0.0	1.0	0.084	-1.101	0.274
Play outside	0.64	0.48	0.0	1.0	0.051	-0.476	0.636
Number of children	12.15	4.88	3.0	29.0	-1.148	1.059	0.293
Number of adults	2.59	1.86	0.0	12.0	-0.538	1.311	0.194

## **6. Conclusions**

The quality of child care is central to children's psycho-social and cognitive development and can lead to sustained long-term benefits. Panama's Comprehensive Early Childhood Care Policy aims to promote children's physical, cognitive, language, and social development. With financial and technical support from the IDB's Program for Social Inclusion and Development, the Ministry of Social Development led the design and implementation of a comprehensive early childhood care and education model to expand the coverage and quality of early childhood services in CAIPI.

Beginning in 2016, a host of interventions aimed at improving quality in CAIPI were applied to 44 treatment centers, including the design of a national curriculum, a comprehensive basket of services, quality standards and monitoring systems, a per-capita and pay-for-results scheme tied to enrollment and improvement in quality in nine areas, teacher training, and the implementation of community, institutional, and family engagement strategies. The impact of the quality standards reform package on children's development outcomes and on process quality in CAIPI will be evaluated through a randomized control trial. Though the impact evaluation will conclude in 2021, the results of the baseline survey are valuable in themselves since information for diagnosing the early childhood situation and the quality of early education in centers in Panama is limited.

The main conclusions from the baseline survey are related to the quality of CAIPIs, child development outcomes, and family environment, including child care practices.

## **Quality in Centers**

The average Infant-Toddler Environment Rating Scales (ITERS) mean score for CAIPIs in the treatment group was 3.04 while the mean score for CAIPIs in the control group was 3.00, which is in the range of "minimum" process quality for both. The highest ITERS scores for both treatment and control groups corresponded to the interaction (4.33) and speaking and listening (3.62) dimensions, while the lowest performing process quality areas were related to personal activities (2.49) and personal care routines (2.57). At the time of the baseline survey, there were no significant differences between treatment and control centers, lending credibility to the random assignment.

Results from the Caregiver Interaction Scale (CIS) show that almost 90% of centers implement activities to develop gross motor skills, while only 60% implement reading activities and outside play. The results suggest that the educators are not giving children high levels of independence and more time than ideal is spent in activities that do not involve adult-child interactions.

## **Child Development**

The results for child cognitive and socio-emotional development assessed using the ASQ-3 show that out of all the developmental areas, fine motor skills and problem solving have the highest percentage of children with development delays. Children overall showed higher scores in gross motor skills (coordinated use of arms and legs when children move and play) than in fine motor skills (movement and coordination of hands and fingers). Girls score consistently higher in all dimensions of child development than boys.

The results also reveal gaps in scores between regions in the country, with children in the indigenous areas showing different (some higher and some lower) scores in socioemotional, communication, and problem solving with respect to children in the rest of the country.

## **Child care Practices**

Across all age ranges (0 to 1 year, 1 to 2 years, and 2 to 3 years old), child care is mostly provided by mothers, who spend an average of over 60 hours per week on child care. However, grandmothers, fathers, and siblings also dedicate a significant amount of time to child care. In total, 140 hours are spent on child care per week which translates into roughly 20 hours of care

seven days a week (provided by different caregivers). Of the total time dedicated to different activities in a day, mothers spend approximately three hours daily on playing or performing educational activities with their children, while they dedicate an additional two hours to other child care activities.

Very few children surveyed across all age groups received formal or center-based care. However, when interviewed, the highest preference among mothers and caregivers was for a combination of care by themselves and a center. This reveals that low attendance in CAIPs is not due to distrust or caregiver preference and indicates that there is potential for expanding the availability of center-based care.

## **Family Environment**

The quality of the home environment, as measured by the HOME instrument, reveals favorable results in the dimensions related to warmth and stimulation, including activities related to a safe play environment, helping children in the learning process of shapes, colors, and numbers, maintaining books and cuddly toys at home, and spending time reading books with children. The only dimension in which relatively poor scores are presented is the frequent use of physical harm against the child.

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