EDUCATIONIS MOMENTUM

Vol. 11, n.° 2, 2025, pp. 161-207, ISSN (online): 2517-9853

https://doi.org/10.36901/em.v11i2.1825

Impact evaluation of Centers for Childhood Development and Community-Based Monitoring on child development and health

Evaluación de impacto de los Centros de Promoción y Vigilancia Comunal sobre el desarrollo y la salud infantil

Juan León

Pontificia Universidad Católica del Perú, Lima, Perú

leon.jjm@pucp.edu.pe

https://orcid.org/0000-0003-3068-6720

Martín Benavides

UNESCO, París, Francia

https://orcid.org/0000-0003-1609-6951

Fernando Alarcón D.

Pontificia Universidad Católica del Perú, Lima, Perú

https://orcid.org/0009-0000-8818-0920

Recibido: 2025.11.26

Aceptado: 2026.02.04

Abstract

In Peru, the implementation of Community-Based Monitoring (CBM) programs focusing on early childhood development outcomes particularly in rural areas is a phenomenon relatively unexplored. Using home visits for improving and strengthening health care practices and interactions of positive parenting in adults with children under the age of three, the goal of the CBM program is to improve different dimensions of child development. The study uses a quasi-experimental design with children aged 6-36 months from four districts of Maynas, province in the Amazon area of Peru. Data were collected at baseline (2016) and follow-up (2017). To estimate causal effects, we used Propensity Score Matching (PSM) to construct comparable treatment and control groups, followed by a Difference-in-Differences (DiD) approach to control for time-invariant unobserved factors. Results show positive and statistically significant effects on overall early childhood development, particularly in fine motor skills and language development. The program also reduced chronic malnutrition, although no significant effects were found on acute malnutrition or morbidity indicators. Impacts were stronger in rural areas, where program implementation was more established. The study concludes that CBM programs with home visits can improve developmental outcomes and reduce inequalities, highlighting the importance of implementation quality and suggesting potential for scaling in rural contexts.

Keywords: child development, home visiting, impact evaluation, Peru

Resumen

En el Perú, la implementación de Centros de Promoción y Vigilancia Comunal (CPVC) centrados en resultados del desarrollo infantil temprano, particularmente en áreas rurales, es un fenómeno relativamente poco explorado. Mediante visitas domiciliarias orientadas a mejorar y fortalecer las prácticas de cuidado de la salud y las interacciones de crianza positiva de adultos con niños menores de tres años, el programa CPVC tiene como objetivo mejorar diversas dimensiones del desarrollo infantil. El estudio utiliza un diseño cuasiexperimental con niños de 6 a 36 meses de edad provenientes de cuatro distritos de la provincia de Maynas, en la región de Loreto. Los datos fueron recolectados para la línea de base el 2016 y para la línea de seguimiento el 2017. Para estimar efectos causales, se empleó Propensity Score Matching (PSM) para construir grupos de tratamiento y control comparables, seguido de un enfoque de Diferencia-en-Diferencias (DiD) para controlar factores no observados invariantes en el tiempo. Se encuentran efectos positivos y estadísticamente significativos en el desarrollo infantil temprano global, particularmente en habilidades motoras finas y desarrollo del lenguaje. El programa también redujo la desnutrición crónica; sin embargo, no se encontraron efectos significativos en la desnutrición aguda ni en indicadores de morbilidad infantil. Los impactos fueron más fuertes en las zonas rurales, donde la implementación del programa estaba más consolidada. Dado los resultados, los CPVC mediante su estrategia de visitas domiciliarias pueden mejorar los resultados del desarrollo y reducir desigualdades, destacando la importancia de la calidad de la implementación y sugiriendo su potencial de escalamiento en contextos rurales dispersos.

Keywords: desarrollo infantil, visitas domiciliarias, evaluación de impacto, Perú

Introduction

There is broad consensus that investing in early childhood is critical to mitigating individual and social risks. In response, early childhood development (ECD) programs have expanded and become increasingly prevalent in both developing and developed countries. Over time, these interventions have proven effective in preventing risk factors that may compromise children's development (Concha-Eastman, 2016; Ministerio de Economía y Finanzas [MEF], 2016; Ministerio de Desarrollo e Inclusión Social [MIDIS], 2017; Castro et al., 2022).

Globally, one prominent trend within ECD programming is the expansion of community-based monitoring (CBM) initiatives as preventive strategies, particularly in early childhood. These approaches have gained attention as promising mechanisms for improving outcomes such as nutritional status and anthropometric growth (Bhutta et al., 2005; Björkman & Svensson, 2009; Rockers et al., 2016; Lazaretti & Becker, 2023).

Peru is no exception, as the availability of early childhood programs has increased over time. Guerrero and Demarini (2016) show that access to ECD programs for children under three years of age rose from 4 % in 2001 to 11 % in 2014.

Several programs currently operate within the Peruvian early childhood development system, including CPVC, EduCuna, and Cuna Más. These interventions share the objective of promoting early childhood development through stimulation, caregiver guidance, and intersectoral coordination. However, CPVC differ by placing stronger emphasis on maternal and child health promotion and community-based monitoring, including growth surveillance, pregnancy follow-up, and early risk detection, in close articulation with health services. In contrast, Cuna Más prioritizes direct childcare and the improvement of parenting practices among vulnerable households, while EduCuna provides care and stimulation aimed at supporting student parents' educational continuity. Thus, despite overlapping age groups, these programs differ in mechanisms and primary pathways of impact.

The expansion of ECD programs has led to the development of social policies aimed at improving children's environments, particularly in low-income

settings. Although multiple government agencies have implemented strategies to enhance children's future opportunities, these efforts have historically been concentrated at the national level. Given the strong relationship between child development and environmental factors—especially nutrition, parenting practices, early stimulation, and the quality of caregiver-child interactions (Young, 2002)—local governments in Peru have more recently implemented CBM initiatives such as the Centros de Promoción y Vigilancia Comunal (CPVC).

In 2016, the Innova Network Association, with support from the Bernard van Leer Foundation, strengthened the implementation of CPVC by local governments in small towns within their jurisdictions (districts of Amazonas, Indiana, Mazán, and Napo in Maynas province, Loreto region). This study aims to contribute to the evidence base by providing insights into the role of CBM strategies in promoting early childhood development in Latin American contexts.

The intervention

Initially started in 2012 in all the regions of the country,[1] the purpose of this intervention is to provide training for expectant mothers and parents of children under three years of age in the CPVC communal facilities set up in the different communities. The program aims to improve maternal and child health by reducing anemia and chronic malnutrition, it operates as a community-based space for guidance and monitoring, providing educational sessions, home visits, and follow-up on the development of children under 36 months and pregnant women. To achieve this, this initiative has a community approach that involves different actors: mothers and fathers of children, health promoters, community leaders, health personnel, local authorities and other social actors. Finally, the program has a component of home visits but only in the case of children with nutritional problems. These visits are maintained until the child improves their nutritional status.

The CPVC has three areas of work established by the Ministry of Health (Ministerio de Salud [MINSA], 2014): i) training on healthy practices, ii)

1 In 2012, Lima region was not considered but in 2013 provinces of Lima joined to the intervention.

community surveillance and iii) decision-making. The first line of work consists of sharing knowledge regarding healthy child-rearing practices (e.g., preparing balanced meals) to parents of children under three years of age in community centers. The educational component starts with demonstration and teaching sessions that include play sessions with children and mothers. In those, the dialogue between families and health promoters is prompted, promoting knowledge acquisition, while respecting family beliefs and customs. The work on community surveillance involves caring for and observing what happens regarding the conditions that involve pregnant women and childcare (e.g., child vaccination). Community surveillance is carried out by health promoters, who record information on the growth and development of children during each visit (e.g., height and weight). The final area of work, decision-making, consists of monthly meetings where promoters, health personnel, community leaders and families review and evaluate community monitoring information to generate feedback on the work and prepare specific actions for the intervention.

CPVC is of particular interest given its emphasis on the promotion of knowledge acquisition of healthy child-rearing practices via home visits. Unlike other ECD programs, the CPVC encouraged more frequent home visits with monthly visits to monitor each child's development. Secondly, Innova Network Association supported for more training for health promoters who work in the CPVC and those who conducted the household visits.

Currently, the CPVC continues operating and is working in 23 % of districts nationwide (MINSA, 2023). However, during the COVID-19 pandemic many centers suspended activities or temporarily closed due to health restrictions, operational limitations, and difficulties in maintaining face-to-face community work with families and health promoters.

The rationale for the implementation of home visits as the main driver for the CBM is predicated on the importance placed on the role primary caregivers have on the early experiences of children (Wachs, 1993; Bronfenbrenner & Ceci, 1993; Shore, 1997; Grantham-McGregor et al., 2007) and its effectiveness in Early Childhood Development (ECD) programs. Many efforts have been focused on Early Childhood Development (ECD) through programs aimed at children in their first years of life and their main caregivers (Maggi et al., 2005), and variation in care and early childhood experiences has been

demonstrated to be an important determinant of health outcomes (Grantham-McGregor et al., 2007). Further, ECD programs have begun implementing home visits as a form of intervention in order to enhance the child-parent relationship and promote healthy child-rearing practices. Other bodies of literature show that implementing home visits in ECDs have provided an overall positive impact on child development (Caldera et al., 2007), particularly in cognitive (Peacock et al., 2013; Attanasio et al., 2014); anthropometric (Tomlinson et al., 2016); health (Peacock et al., 2013); and nutritional outcomes (Aracena et al., 2009). In the cases where there were no significant impacts, it was mainly explained by the infrequency or low involvement of home visits (Janssens & Rosemberg, 2014; Jungmann et al., 2015).

Although most of the studies previously mentioned could have different models, for example, some ones focus on early stimulation and others more on health-related topics, most of them have similar strategies. Encouraging sensitive caregiving, increasing parent knowledge on development and providing information about ways to support physical health such as the importance of nutritious meals are recurrent subjects in home visiting service (Avellar & Supple, 2013).

In the context of Peru, Josephson et al. (2017) have found Cuna Más, a large-scale ECD program supported by the national government and especially one of its services, Sistema de Acompañamiento Familiar (SAF), focusing on home visits in rural districts with high incidence of poverty and chronic child undernourishment, had a positive impact on children's cognitive, linguistic, physical, and socioemotional development.

Study objectives

While the impact of ECD programs at the national level have been thoroughly discussed in Peru, a conversation about the impact of ECD programs when empowered through the local government and community has yet to occur. Therefore, the main objective of this study is to examine the impact of the CPVC program, a bottom-up policy strategy, on the early childhood development of children under three years old in four districts of the province of Maynas in the Loreto region. We are taking advantage of the fact that the intervention has just begun in these districts to propose a quasi-experimental

study with two measurements over time, which will later allow us to ensure more accurate comparisons to assess the program's effect.

The specific objectives are: i) evaluate the impact of CPVC in different dimensions of child development, ii) evaluate the impact of CPVC on the nutritional status, iii) evaluate the impact of CPVC on the morbidity of children, and iv) assess the heterogeneity of the effects by geographical area. This last objective is geared towards seeing if when the program is scaled up, whether the effects will be similar or different by place of residence. Through this study, the aim is to begin a conversation about the efficacy of CBMs for early childhood development in Latin American countries where ECD related CBMs are beginning to develop.

Methods

Since the characteristics of the intervention does not allow for a random selection of individual and/or community participation in the program, in order to investigate the impact of CPVC, a quasi-experimental design was used to evaluate the program. However, in order to increase the internal validity of the study, we have two time points or baseline (first post-intervention time point) and a subsequent evaluation (follow-up line) in both the treatment and comparison groups. This last aspect of the study, increases the robustness of our findings since we are able to control for unobservable that do not change over time.

The area of intervention for the CPVC is the whole community where the program is located; therefore, we selected communities for the comparison group within the four districts (Amazonas, Indiana, Mazan, and Napo) of the Maynas province. These comparison communities have similar characteristics with the intervention ones, in terms of i) poverty, ii) access to basic services, and iii) prevalence of child malnutrition (chronic and acute) in the community.

Then, the unit of analysis for this impact assessment is children between six and thirty-six months of age living in small towns within four districts in the province of Maynas (Indiana, Mazan, Las Amazonas, and Napo). Among these regions, a sample of children participating and not participating in the CPVC since 2016 was collected. In 2017, we re-evaluated

the same cohort of children assessed in 2016. Additionally, children born during the previous year and those who could not be evaluated in 2016 (e.g., due to travel) but were present during the 2017 fieldwork were also included in the assessment.

Thus, a total of 34 communities in the Maynas province were visited, where 636 children were evaluated during the baseline between February and March 2016, and 736 children were evaluated during the follow-up between February and March 2017. In addition, other social programs such as the *Creciendo Juntos* program (see appendix 1) in place have been considered or controlled for when selecting families in the comparison and treatment groups.

Household surveys were administered to parents or the main caregivers of participating children.[2] In addition, the Nelson Ortiz Scale was applied to measure multiple dimensions of early childhood development. The household survey lasted about ninety minutes, while the child assessment took approximately twenty to thirty minutes.[3] Finally, informed consent was obtained from all participating families prior to data collection. Each parent or main caregiver was fully informed about the objectives of the study as well as the purpose and procedures of the child development assessments before providing a signed consent. During the early childhood development (ECD) assessments, at least one parent or main caregiver was present with the child, helping ensure that the assessment took place in a familiar and supportive environment while adhering to established ethical standards for research involving young children.

Measures

To evaluate the impact of the CPVC program, different indicators of early childhood development, anthropometric indicators and child morbidity were used, which are detailed below:

2 Further details on the fieldwork and the instruments administered are available upon request.

3 The instruments and administration protocols are available upon request.

a. Nelson-Ortiz Abbreviated Early Child Development Scale: This scale evaluates the areas of a) gross motor skills (number of items: 27, internal consistency: 0.92), b) fine motor skills (number of items: 27, internal consistency: 0.90), c) hearing and language (number of items: 27, internal consistency: 0.91) and d) social personal skills (number of items: 28, internal consistency: 0.92). To get the total score, we add the score obtained for each child in the four areas assessed.

b. Anthropometric measures: Weight and height were evaluated for the children's age using the OMS Child Growth Standards for the calculus of the standardized (z) scores of height for age and weight for height. Then, we dummy coded the z-scores in i) chronic malnutrition (1 = below -2 SD height for age, 0 = otherwise), and ii) acute malnutrition (1 = below -2 SD weight for height, 0 = otherwise).

c. Child morbidity: The impact of the program on morbidity indicators commonly used in health surveys at the local and international level was evaluated, such as: a) acute respiratory infections, and b) diarrheal episodes in the last two weeks.

The main independent variable was the participation in the CPVC program, a dichotomous variable that takes the value of one if the boy or girl participates in the Center for Promotion and Community Surveillance (CPVC) program and zero otherwise.

The control variables used in the statistical analysis are: i) sex: dichotomous variable that takes the value of one if the child is a girl and zero otherwise; ii) child´s age (months); iii) mother's tongue: dichotomous variable that takes the value of one if the child's mother reported having an indigenous mother tongue and zero otherwise; iv) mother's age (years); v) mother's education: dichotomous variable that takes the value of one if the child's mother reports having incomplete secondary or more and zero otherwise; vi) hours worked by the mother: number of hours that the child's mother reports working per week; vii) mother's emotional stability: composite score estimated using a principal component analysis—the variables used to construct the factorial score are: a) mother is easily scared, b) mother feels sad, c) mother feels nervous, tense or worried, d) mother cannot think clearly, e) mother cries more than usual, f) mother finds it difficult to make decisions, g) mother does not

like what she does during the day, and h) mother gets tired easily, this explained variance = 0.46; viii) mother is married or cohabitating; dichotomous variable that takes the value of one in case the mother of the child reports being married or living with her partner and zero otherwise; ix) household socioeconomic status: factor score estimated using an exploratory factor analysis—this score was created using the following information: 1) house roof built with good materials, 2) basic household utilities (water, sewage and electricity), 3) household overcrowding, 4) fuel used for cooking, and 5) household assets, this explained variance = 0.38); x) Cuna Más program: dichotomous variable that takes the value of one if child participates in Cuna Más program and zero otherwise; xi) Vaso de Leche program: dichotomous variable that takes the value of one if the child is part of the program and zero otherwise.

Statistical analysis

To study the effect of the CPVC, we used a Difference-in-Differences (DiD) model combined with propensity score matching (PSM) in the initial stage (Card & Krueger, 1994) to ensure that the individuals being compared were as similar as possible. These techniques were necessary because most social programs do not rely on random assignment, as focalization rules are commonly used to reach populations most in need. In this study, propensity score matching was applied at baseline to construct comparable treatment and control groups, improving the plausibility of the parallel trends assumption required for Difference-in-Differences estimation. A similar approach is used by Chinen and Bonilla (2016) in evaluating pedagogical support programs in Peru. Then, the risk of spillover effects is minimal in this study. The program was implemented in towns located in the Amazon region, where communities are geographically distant and transportation between them is limited. This spatial separation reduces the likelihood that program activities or information could influence comparison groups in other towns.

The first step for the statistical analyses is the matching analysis, which allows us to improve the degree of comparability between the treatment group and the comparison group, making both groups as similar as possible in the initial period (February 2016). This nonparametric method consists of estimating the probability of participating in the program based on the characteristics

of each child, which are variables that encompass the individual, family and contextual spheres (see appendix 2 for details).

Once the Probit model is estimated, the propensity score will be predicted, a score by which the matching of the individuals of the treatment group and the comparison group will be performed. However, the validity of the matching method lies in the extent to which both the individuals in the treatment group and the comparison group show similar trends, which can be guaranteed if we match individuals from similar geographical contexts. That is why, to guarantee the comparability of the children in the treatment groups with their respective matches in the comparison group, this propensity score is scaled using the information of the area in which the children live (rural or urban). It follows then that the scaled propensity score would be:[4]

$$Prop_{esc} = Prop + 2 * Área$$

Where:

Prop: Original propensity score.

Área: Dichotomous variable that takes the value of 1 in the case that the child resides in an urban context and 0 otherwise.

$Prop_{esc}$: Scaled propensity score.

Finally, the children were matched using the Kernel score distribution pairing, where a maximum distance (c = 0.01) between the propensity scores of the children participating in the study and their respective controls was pre-specified to ensure the comparability of them. This last point will allow us to establish a common support or groups of children in treatment or not that, according to the observable variables considered, will not show average differences.

Thus, once the common support is fixed, we proceed to use the Difference-in-Differences model (DiD). This method consists of evaluating the variation

4 A similar procedure was used in the impact evaluation of the Cuna Más program (MIDIS, 2017), with the objective of ensuring that the comparison pairs come from the same contextual environment.

in the variable of interest experienced by the individuals intervened by the program (treatment) and those not intervened (comparison) within a given time horizon (baseline and follow-up).

In particular, the following equation is estimated:

$$Y_{i,j} = \beta_0 + \beta_1(CPVC) + \beta_2(trend) + \beta_3(CPVC\ x\ trend) + \varepsilon_{i,j}$$

Where:

$Y_{i,j}$: Variable of interest (ECD or anthropomorphic measure) of the child «i» in period «j».

$CPVC$: Dichotomous variable that takes the value of one in the case that the child participates in the CPVC program and zero otherwise.

Trend : Dichotomous variable that takes the value of one in case the information collected from the child corresponds to the 2017 period and zero in the case that said information corresponds to the 2016 period.

Regarding the coefficients to be estimated:

a. Result related to ECD or average anthropometric measurement of the comparison group in 2016.

$$\beta_0 = E[Y|CPVC = 0, tend = 0]$$

b. Result related to ECD or average anthropometric measurement of the treatment group in 2016.

$$\beta_0 + \beta_1 = E[Y|CPVC = 1, tend = 0]$$

c. Result related to ECD or average anthropometric measurement of the comparison group in 2017.

$$\beta_0 + \beta_2 = E[Y|CPVC = 0, tend = 1]$$

d. Result related to ECD or average anthropometric measurement of the treatment group in 2017.

$$\beta_0 + \beta_1 + \beta_2 + \beta_3 = E[Y|CPVC = 1, tend = 1]$$

With which the effect of the program would be:

$$Effect\ of\ program = [(\beta_0 + \beta_1 + \beta_2 + \beta_3) - (\beta_0 + \beta_1)] - [(\beta_0 + \beta_2) - \beta_0)] = \beta_3$$

Thus, using propensity score matching (PSM) and difference and difference (DiD) techniques, we will be able to find robust estimates of the impact of CPVC programs on the child development variables considered for the present study.

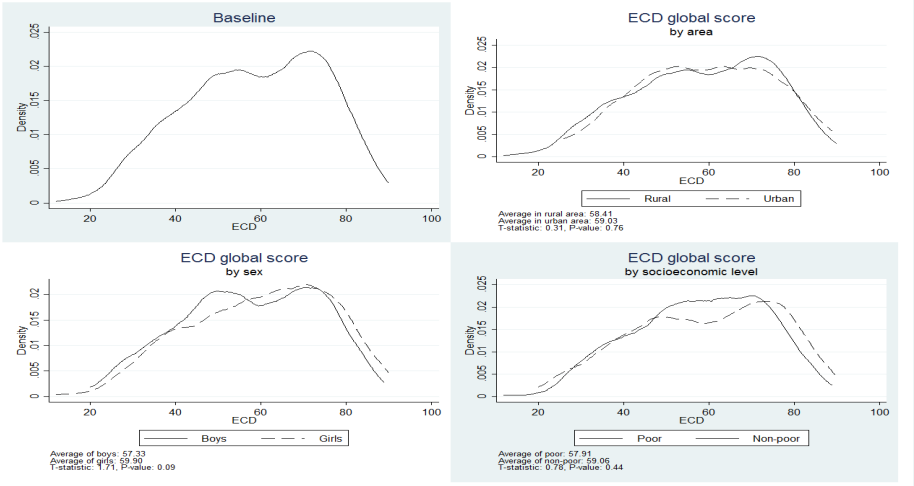
Results

To evaluate the impact of CPVC on different dimensions of child development, nutritional status, and the morbidity of children, descriptive and multivariate analyses were first carried out using the data collected in the baseline (2016) and the follow-up (2017) in order to provide context and to test whether any factors differed between the treatment and comparison group in the sample population.

Figure 1 provides the distribution of the overall score obtained by children on the Nelson Ortiz Scale was used, allowing for a breakdown into four areas: i) gross motor skills, ii) fine motor skills, iii) hearing and language, and iv) social personal skills. The overall score was calculated by totaling the results obtained in each area from the Nelson Ortiz Scale and was used as a measure of early childhood development before the intervention (baseline), as well as the distribution of the score by area (rural/urban), sex (male/female), and socioeconomic status (poor/non-poor). Based on the density of the distribution, it was found that there are no major differences in the distribution of the scores for any of the groups considered. In other words, within the baseline sample, there was no statistically significant differences between those coming from rural or urban areas; those who were female or male; and those who were considered poor or non-poor.

Figure 1

Score distribution on Early Childhood Development (ECD) by area, sex, and socioeconomic status



Source: Baseline 2016. Prepared by authors

Further, when analyzing the difference in early childhood development scores between the treatment group and the comparison group of both the baseline and follow up sample, there were no statistically significant differences found (table 1). The lack of differences between the different areas of early childhood development indicates that the two groups prior to the intervention are equivalent or similar. Results from both analyses suggest the difference in early childhood development scores is not the cause of the observed results. When performing the impact evaluation, this provides a good counterfactual and allows for robust results.

Table 1

Differences between the treatment group and comparison group in ECD before the intervention

Early Childhood Development - Nelson Ortiz	Treatment	Comparison	t-statistic	p-value
Area 1: Gross motor skills	15.80	15.17	1.36	0.17
Area 2: Fine motor skills	14.83	14.30	1.18	0.24
Area 3: Hearing and language	12.69	12.43	0.64	0.52
Area 4: Personal social skills	16.47	16.19	0.49	0.63
Total score	59.79	58.10	0.97	0.33

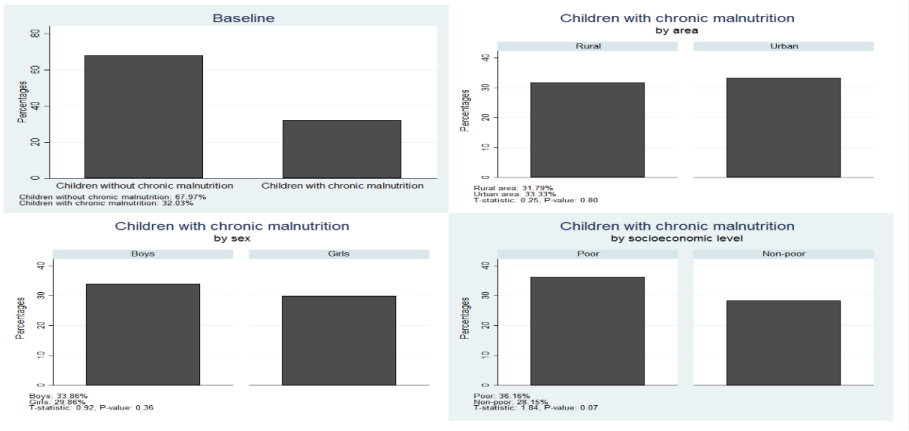
Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Note: No statistically significant differences were found between the treatment and comparison groups at 5 %.

When examining the nutritional status of the sample, anthropometric measures (age-standardized height and weight scores) were used to create indicators for chronic malnutrition (< -2 SD for height for age) and acute malnutrition (< -2 SD weight for age). Again, the distribution of children (via percentages) with chronic malnutitrtion (figure 2) and acute malnutrition (figure 3) within the baseline sample were examined by sex, area, and socioeconomic status.

Figure 2

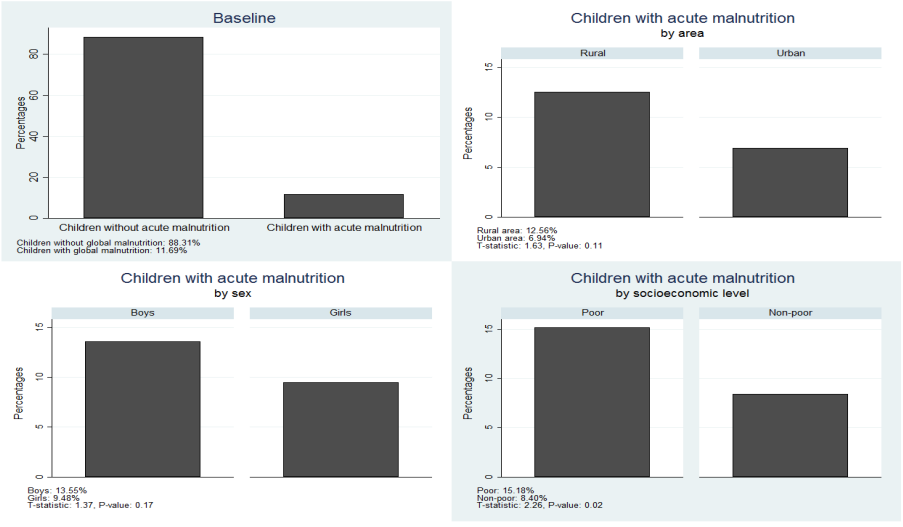
Percentage of children with chronic malnutrition by area, sex, and socioeconomic status



Source: Baseline 2016. Prepared by authors.

Figure 3

Percentage of children with acute malnutrition by area, sex, and socioeconomic status



Source: Baseline 2016. Prepared by authors.

Results indicate that approximately one-third (32 %) of the children in the baseline sample were found to have chronic malnutrition. This percentage is far above the national average (14 %) or the regional average (23 %) reported for 2015. Regarding acute malnutrition, approximately 11 % of the baseline sample were found to have acute malnutrition. Finally, the only statistically significant difference between healthy and malnourished (acute or chronic malnutrition) children were insocioeconomic level. This suggests that socioeconomic status is related to chronic and acute malnutrition measures. In addition, mean comparisons of the anthropometric results between treatment and comparison groups prior to the intervention of the CPVC program were analyzed (table 2). Results denote no statistically significant differences were found in the prevalence of chronic or acute malnutrition.

Table 2

Differences between the treatment group and comparison group in the prevalence of chronic and acute malnutrition in the baseline

	Treatment	Comparison	t-statistic	p-value
Children with chronic malnutrition (%)	36.28	29.58	1.31	0.19
Children with acute malnutrition (%)	14.16	9.95	1.16	0.25

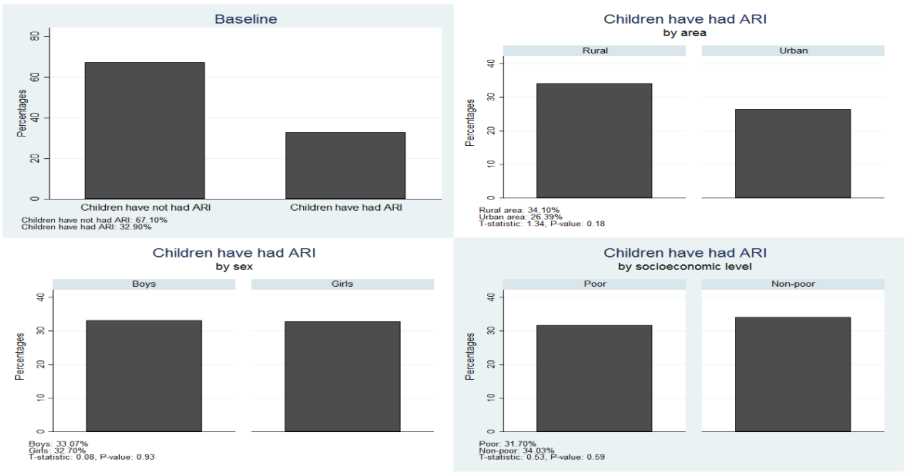
Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Note: No statistically significant differences were found between the treatment and comparison groups at 5 %.

Another aspect of child health that was explored is child morbidity. As a proxy to child morbidity, information related to Acute Respiratory Infections (ARIs) and diarrheal episodes experienced by children in the last two weeks prior to the survey were analyzed. From the baseline sample, approximately 32 % of children were found to have suffered from a respiratory infection (figure 4) and approximately one-third (34 %) of the baseline sample had suffered a stomach infection (figure 5). When both sub-population disbursements were differentiated by area, sex, and socio-economic level, no statistically significant differences could be found.

Figure 4

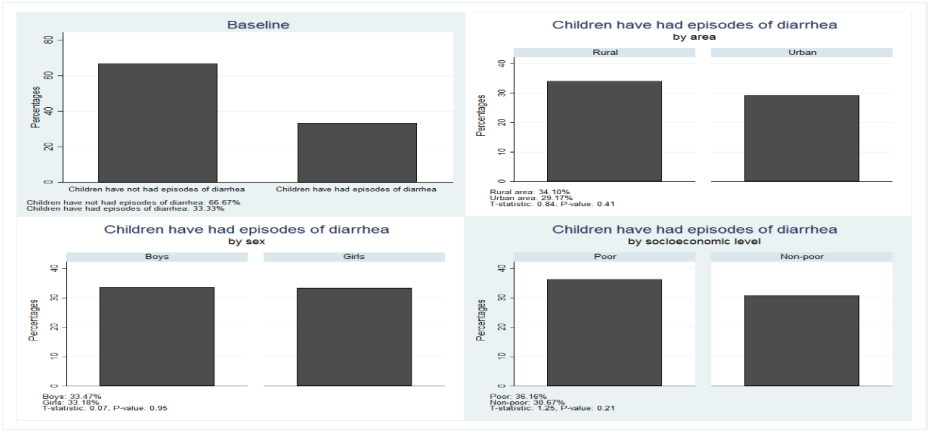
Percentage of children with acute respiratory infections by area, sex and socioeconomic level



Source: Baseline 2016. Prepared by authors.

Figure 5

Percentage of children who have had diarrheal episodes by area, sex and socioeconomic level



Source: Baseline 2016. Prepared by authors.

Finally, the percentage of children with ARIs or a diarrheal episode by group (treatment/comparison) were compared. Table 3 illustrates that no

statistically significant differences were found in the prevalence of ARIs or diarrheal episodes between the treatment and comparison group, indicating that the proportion of children who have experienced some kind of illness is similar in both groups.

Table 3
Differences in treatment and comparison groups by type of infection that the child experienced

	Treatment	Comparison	t-statistic	p-value
Children with acute respiratory infections (%)	29.09	34.09	0.99	0.32
Children with diarrheal episodes (%)	27.27	35.23	1.60	0.11

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Based on the initial examination of the descriptive and test statistic, we were able to verify that the samples used (treatment and comparison group) were similar enough to be used for impact evaluation analysis.

A comparison group for the CPVC children

First, we need to find an adequate counterfactual or comparison group in order to estimate the program impact. Thus, the probability of the child's participation based on individual, family and contextual characteristics (see variables in appendix 2) using the baseline data (2016) were estimated. In order to maintain comparability of results, the estimated probability or propensity score by area of residence (rural and urban) was scaled to ensure that the children in the treatment and comparison group within their respective areas were matched.

One way to verify that the pairing has been done correctly is to verify that no statistically significant differences are found between the treatment and comparison group in terms of the variables used to calculate the propensity score. Thus, the balance between the different variables used for both study groups is presented in the following table. As observed in table 4, no statistically significant differences were found between the treatment group and the comparison group in the different individual, family and contextual

variables on which the pairing was made. This allows saying that both groups are comparable in observable variables.

Table 4
Comparison of means of the variables used when building the propensity score (baseline)

	Treatment [n = 110]	Comparison [n = 352]	t-statistic	p-value
Sex (woman - %)	45.46	43.65	0.27	0.79
Child's age (in months)	21.31	21.83	-0.45	0.65
Height for age	-1.47	-1.48	0.05	0.96
Weight for age	-0.86	-0.89	0.20	0.84
Mother's age (in years)	27.72	28.28	-0.57	0.57
Mothers with incomplete or more secondary education (%)	53.64	52.86	0.12	0.91
Hours worked by the mother	12.26	11.84	0.20	0.84
Mother's emotional stability	-0.05	-0.07	0.14	0.89
Married or co-habiting mother (%)	89.09	91.98	-0.73	0.47
Household socioeconomic status	0.20	0.17	0.22	0.83

Source: Baseline 2016 and follow-up 2017. Prepared by authors.
Note: The description of variables is provided in appendix 2.

Finally, the individuals belonging to the common support (similar propensity scores) of the treated group and the comparison group were selected to estimate the impact of the program using the Differences in Differences (DiD) model (see tables 2 and 3 in appendix 2).

Results on the impact of the CPVC program

To evaluate the impact of the CPVC program, four specifications were estimated, ranging from the least robust model (M1) to the most robust (M4) model. The first specification (M1) is a model that does not perform a matching at the baseline and does not use covariates when estimating the effect of the CPVC program. The second specification (M2) also does not perform a matching at the initial stage; however, covariates are used at the time of estimation. The third specification (M3) uses a pairing in the first stage, but does not control for covariates when estimating. Finally, the fourth specification (M4) takes

into account the selection in the initial stage (matching) and the covariates at the time of estimation (the robust model).

In addition to the variables containing information on the participation of children and their families in the different social programs (these additional variables were included in order to control for any possible bias related to their participation in other programs), the control variables when estimating the effect of the CPVC program on different ECD variables were the same ones used when estimating the propensity measure plus variables containing information on the participation of children and their families in the different social programs. The Nelson Ortiz Scale were converted into standardized scores in order to interpret the results; therefore, scores should be read in standard deviations. To address the CPVC's impact on ARIs, episodes of diarrhea, chronic and acute malnutrition, results should be interpreted as percentage variations.

The following table (table 5) presents the results of the different regression analyses performed to estimate the impact of the CPVC program for the entire study sample (Urban and Rural). When specifically examining the impact of CPVC on the different dimensions of child development, the results indicate that there is a positive and significant effect on the overall Early Childhood Development score (0.13 SD) and in two areas of child development—fine motor skills (0.16 SD) and hearing and language (0.17 SD) when the model is robust. In other words, these findings point to the impact that results from the work that has been carried out with mothers or primary caregivers of children under three. Based on the results, it is suggested that CPVC, a ECD-focused CBM centered around home visitations do provide assistance in increasing child development skills, particularly in fine motor ability and linguistic development. The positive results in the areas of fine motor development, hearing, and language may be due to the Ministry of Health's (MINSA) criteria (2014), which were reinforced with the support of the Innova Network Association. The intervention seems to have provided a means for mothers to engage in early intervention activities with their children, which is reflected in the results of the child development test. In the CPVC, health promoters carried out educational sessions on child care practices and play sessions with children and mothers. These activities encourage the manipulation of toys (e.g., cubes) that reinforce fine motor

skills and incorporation of better communication strategies by the mother resulting in their children's language development.

The second objective of the study was to evaluate the impact CPVC had on a child's nutritional status. Using age-standardized height and weight scores as proxies for nutritional status, only a negative and significant effect on chronic malnutrition of approximately eight percentage points was found. No statistically significant effect on acute malnutrition was observed. These results show that CPVC is helping to reduce the prevalence of stunting in the treatment group over time.

The third objective was to examine impact the CPVC program had on child morbidity. Using ARIs and diarrheal episodes as indicators, the results indicate that the CPVC did not have any impact on morbidity. This finding is encouraging given that it would be a sign that the work done with the mothers so far, both in the demonstration classes at the CPVC center and the instructions given during the home visits, would be having a positive effect. Finding an effect at 10 % on chronic malnutrition may be due to the fact that it is much more difficult to improve this indicator in the span of one year, which is why the second follow-up will shed more light on the effects on this indicator and the robustness of its effect.

Table 5

Effects of the CPVC program on Early Childhood Development, anthropomorphic indicators and presence of acute respiratory infections or diarrheal episodes (whole sample population)

Dependent variables	Standardized Effect			
	Total sample		Common support	
Early Childhood Development (Nelson Ortiz)	M1	M2	M3	M4
Area 1: Gross motor skills	0.06	0.03	0.10	0.09
Area 2: Fine motor skills	0.08	0.05	0.16+	0.16*
Area 3: Hearing and language	0.06	0.05	0.16*	0.17*
Area 4: Personal social skills	0.01	0.00	0.08+	0.07
Total score	0.06	0.03	0.13	0.13*
Variations in the percentage of children with short stature for their age (chronic malnutrition)	-3.28	-5.46	-5.80	-7.99*
Variations in the percentage of children with low weight for their age (acute malnutrition)	2.53	1.19	2.25	0.77
Variations in the percentage of children with Acute Respiratory Infections (ARIs)	10.32*	8.78*	7.50	5.95
Variations in the percentage of children with diarrheal episodes.	9.54	8.72	6.07	5.32
Control variables were included	No	Yes	No	Yes
Number of observations	1020		768	

Note: The control variables used in models M2 and M4 are: i) sex, ii) child's age, iii) mother's age, iv) mother has secondary education or more, v) hours worked by the mother, vi) mother's emotional stability, vii) married or cohabitating mother, viii) household socioeconomic status, ix) participation in Cuna M*ás* program, x) participation in Vaso de Leche program.

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

$$+p<0.10, *p<0.05, **p<0.01, ***p<0.001.$$

Lastly, to assess the heterogeneity of the effects by geographical area, differential estimates were made by area of residence (rural and urban) to assess whether, when scaling the program, effect sizes were similar or different

by area of residence (see appendix 4 for the balance test). The results from table 6 illustrate the impact of CPVC in rural areas.

Table 6

Effects of the CPVC program on Early Childhood Development, anthropomorphic indicators and presence of acute respiratory infections or diarrheal episodes in the rural context

	Standardized Effect			
	Total sample		Common Support	
Early Childhood Development (Nelson Ortiz)	M1	M2	M3	M4
Area 1: Gross motor skills	0.10	0.07	0.13	0.11
Area 2: Fine motor skills	0.13+	0.11	0.19*	0.18*
Area 3: Hearing and language	0.18*	0.19*	0.18*	0.20**
Area 4: Personal social skills	0.10	0.09	0.11	0.11
Total score	0.14*	0.12*	0.16*	0.16**
Variations in the percentage of children with short stature for their age	-2.38	-8.36+	-3.84	-8.59+
Variations in the percentage of children with low weight for their age	-6.5*	-8.39**	-5.38+	-6.83*
Variations in the percentage of children with Acute Respiratory Infections (ARIs)	11.45*	9.99	12.36*	11.49
Variations in the percentage of children with diarrheal episodes	15.66**	14.35**	10.91+	10.74+
Control variables were included	No	Yes	No	Yes
Number of observations	846		682	

Note: The control variables used in models M2 and M4 are: i) sex, ii) child's age, iii) mother's age, iv) mother has secondary education or more, v) hours worked by the mother, vi) mother´s emotional stability, vii) married or cohabitating mother, viii) household socioeconomic status, ix) participation in Cuna Más program, x) participation in Vaso de Leche program.

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

+p<0.10, *p<0.05, **p<0.01, ***p<0.001.

Similar to when examining the whole population (regardless of area), the findings showed a positive and significant effect on the overall score of child development (0.16 SD) and two areas of development—fine motor skills (0.18 SD) and hearing and language (0.20 DE) of the total sample. Also, results show there is a significant effect in the reduction of acute and chronic malnutrition; that is, chronic malnutrition was reduced by nine percentage points between the baseline and follow-up, and acute malnutrition decreased by seven percentage points, which shows the short and long-term effects of the intervention and a positive effect of the feeding practices that parents would be learning in the CPVC. In the case of childhood morbidity, there is a higher incidence of diarrheal episodes in children in the treatment group than in the comparison group; however, this may partly be due to the children in the treatment group now spending more time with other children. This interaction may increase the likelihood of acquiring the diseases. According to the literature (Bernal et al., 2009), care centers become a breeding ground for diseases since children spend time in care centers and share time with other children.

Analysis on the urban sample was conducted as well (table 7), and results show that there are no statistically significant variables observed in any of the outcome variables. The results from tables 6 and 7 may suggest that the lack of impact in the urban area is due to the length of time CPVC was established in the area. Unlike the rural areas (Amazonas, Indiana, and Mazan districts) where local governments had done work with CPVC for a longer period of time (since 2013) and had already established itself, the urban area may not have had time to integrate itself fully enough into the community to cause an impact.

Table 7

Effects of the CPVC program on Early Childhood Development, anthropomorphic indicators and presence of acute respiratory infections or diarrheal episodes in the urban context

	Standardized Effect			
	Total sample		Common support	
Early Childhood Development (Nelson Ortiz)	M1	M2	M3	M4
Area 1: Gross motor skills	-0.20	0.03	-0.12	0.11
Area 2: Fine motor skills	-0.17	0.05	-0.21	0.04
Area 3: Hearing and language	-0.48	-0.24	-0.57	-0.29
Area 4: Personal social skills	-0.62*	-0.37	-0.61+	-0.34
Total score	-0.39	-0.14	-0.39	-0.12
Variations in the percentage of children with short stature for their age	25.16	20.84	21.43	14.45
Variations in the percentage of children with low weight for their age	-10.60	-14.91	-14.43	-13.22
Variations in the percentage of children with Acute Respiratory Infections (ARIs) Respiratory Infections (ARIs)	0.88	5.43	-2.76	1.34
Variations in the percentage of children with diarrhea episodes	24.94*	24.40*	18.39	17.78
Control variables were included	No	Yes	No	Yes
Number of observations	174		136	

Note: The control variables used in models M2 and M4 are: i) sex, ii) child's age, iii) mother's age, iv) mother has secondary education or more, v) hours worked by the mother, vi) mother´s emotional stability, vii) married or cohabitating mother, viii) household socioeconomic status, ix) participation in Cuna Más program, x) participation in Vaso de Leche program.

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

+p<0.10, *p<0.05, **p<0.01, ***p<0.001.

Discussion

The analysis indicates that children's participation in the CPVC program has a positive impact on early childhood development and health outcomes. Although most estimated effects are modest—generally below one fifth of a standard deviation—these magnitudes are consistent with those reported in

impact evaluations of comparable early childhood development programs in the region (Bernal et al., 2009). An implementation evaluation conducted by Benavides et al. (2016) provides insights into potential explanations for these relatively small effect sizes. In particular, three factors appear relevant. First, health promoters and the program's technical staff may have lacked clear guidance regarding quality standards and expected content coverage during home visits and center-based activities, resulting in heterogeneous implementation.

Second, the intensity of home visits appears to have been limited. Despite program guidelines recommending visits of approximately 45 minutes and the availability of local government support, field evidence suggests that sessions often lasted only 15-20 minutes. This reduced duration likely constrained the breadth and depth of topics addressed during each interaction. Third, structural quality constraints—including limitations in infrastructure, didactic materials, and human resources—may have hindered effective program delivery across both urban and rural implementation areas.

Fourth, the program demonstrates measurable impacts in geographically remote settings, suggesting potential scalability to underserved rural areas. Nevertheless, further research is required to examine the sustainability of impacts over time and to assess whether program effects differ between recently implemented locations and areas with longer program exposure.

From a policy perspective, the documented improvements in language development and fine motor skills underscore the relevance of caregiver guidance and stimulation practices delivered through community and home-visiting modalities. Policymakers should therefore prioritize the expansion of structured home-visiting programs that strengthen caregiver-child interaction and early stimulation practices. Such expansion should be accompanied by supervision mechanisms, continuous training, and systematic monitoring to enhance process quality and reduce heterogeneity in service delivery, thereby promoting more equitable developmental opportunities.

Additionally, the observed developmental and nutritional gains highlight the importance of strengthening monitoring systems for early childhood outcomes. Governments should institutionalize periodic measurement of early childhood indicators, potentially through specialized surveys or

integrated modules within existing national data systems. Strengthened monitoring would enable policymakers to identify service gaps, track equity in developmental outcomes, and support adaptive improvements in early childhood services, ultimately enhancing the effectiveness and sustainability of investments targeting vulnerable populations.

Finally, a limitation of the study relates to causal identification and potential selection bias. Although the evaluation employs propensity score matching combined with a Difference-in-Differences approach and incorporates extensive covariate adjustment to improve comparability between treated and comparison children, participation in community-based interventions is not randomly assigned. Participating households may differ in unobserved characteristics—such as parental motivation, time availability, health-seeking behavior, or caregiving practices—that are associated with child development outcomes and could bias impact estimates upward. While the empirical strategy mitigates observable differences and accounts for time-invariant unobserved heterogeneity, it cannot fully eliminate bias arising from time-varying unobserved household factors.

References

Attanasio, O. P., Di Maro, V., & Vera-Hernández, M. (2012). Community Nurseries and Nutritional Status of Poor Children. Evidence from Colombia.

Attanasio, O. P., Fernández, C., Fitzsimons, E., Grantham-McGregor, S. M., Meghir, C., & Rubio-Cordina, M. (2014). Using the infrastructure of a conditional cash transfer program to deliver a scalable integrated early child development program in Colombia: cluster randomized controlled trial. *British Medical Journal,* 349:g5785.

Aracena, M., Krause, M., Pérez, C., Méndez, J., Salvatierra, L., Soto, M., Pandoja, T., Navarro, S., & Salinas, A. (2009). A cost-effectiveness evaluation of a home visit program for adolescent mothers. *Journal of Health Psychology, 14(7),* 878-887.

Avellar, S. A., & Supplee, L. H. (2013). Effectiveness of Home Visiting in Improving Child Health and Reducing Child Maltreatment. *Pediatrics*, 132 (Suppl. 2), 90-99. DOI: https://doi.org/10.1542/peds.2013-1021G

Banco Interamericano del Desarrollo (2016). Resultados de la evaluación de impacto del Servicio de Acompañamiento a Familias del Programa Nacional Cuna Más. Documento sin publicar.

Benavides, M., Garcia, S., & J. Stuart (2016). Evaluación de Procesos del Programa «Creciendo Juntos» en La Provincia de Maynas - Loreto. Documento sin publicar.

Behrman, J. R., Cheng, Y., & Todd, P. E. (2004). Evaluating Preschool Programs when Length of Exposure to the Program Varies: A Nonparametric Approach.

Bernal, R., Fernández, C., Flórez, C. E., & Gaviria, A. (2009). Evaluación de impacto del Programa Hogares Comunitarios de Bienestar del ICBF (No. 005854). Universidad de los Andes-CEDE.

Bernal, R., & Fernández, C. (2013). Subsidized childcare and child development in Colombia: Effects of Hogares Comunitarios de Bienestar as a function of timing and length of exposure. *Social, Science & Medicine,* 97(2013), 241-249.

Bhutta, Z. A., Darmstadt, G. L., Hasan, B. S., & Haws, R. A. (2005). Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. *Pediatrics,* 115(Supplement 2), 519-617.

Blössner, M., & de Onis, M. (2005). Malnutrition: Quantifying the health impact at national and local levels. *World Health Organization. Environmental Burden of Disease Series, No. 12.*

Bronfenbrenner, U., & Ceci, S. J. (1993). Heredity, environment, and the question «How?»: A first approximation.

Caldera, D., Burrell, L., Rodriguez, K., Crowne, S. S., Rohde, C., & Duggan, A. (2007). Impact of a statewide home visiting program on parenting

and on child health and development. *Child Abuse & Neglect,* 31(2007), 829-852.

Card, D., & Krueger, A. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *The American Economic Review, 84*(4), 772-793.

Castro, F., Mantilla, M., Guimet, M., & Miranda, L. (2022). Evaluación de impacto a largo plazo del servicio de Acompañamiento a Familias del Programa Nacional Cuna Más en resultados educativos. Ministerio de Desarrollo e Inclusión Social.

Concha-Eastman, A. (2016). Introduction: Home Visitation as a Primary Prevention Tool for Violence. En: L. Roggman & N. Cardia (2016). Home Visitation Programs Preventing Violence and Promoting Healthy Early Child Development. Springer International Publishing.

Cueto, S., Guerrero, G., Leon, J., Zevallos, A., & Sugimaru, C. (2009). Promoting Early Childhood Development through a Public Programme: Wawa Wasi in Peru. GRADE: Working Paper 51.

Garcia, S., Stuart, J., & Roldan, E. (2016). Evaluación de procesos del programa CPVC en los distritos de Mazán, Indiana y Napo en la provincia de Maynas - Loreto. Documento sin publicar.

Grantham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., Strupp, B., & International Child Development Steering Group (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*, 369, 60-70. DOI:10.1016/S0140-6736(07)60032-4

Guerrero, G., & F. Demarini (2016). Atención y educación de la primera infancia en el Perú: avances y retos pendientes. *Investigación para el desarrollo en el Perú: once balances*. GRADE.

Janssens, W., & Rosemberg, C. (2014). The impact of a Caribbean home-visiting child development program on cognitive skills. *Economics of Education Review,* 39(2014), 22-37.

Josephson, K., & Coddington, C. (2017). Supporting the early childhood workforce at scale: The Cuna Más home visiting program in Peru.

Jungmann, T., Brand, T., Dahne, V., Herrmann, P., Gunay, H., Sandner, M., & Sierau, S. (2015). Comprehensive evaluation of the Pro Kind home visiting program: A summary of results. *Mental Health & Prevention,* 3(2015), 89-97.

Kats, K., Jarret, M. H., El-Mohandes, A., Schneider, S., McNeely-Johnson, D., & Kiely, M. (2011). Effectiveness of a Combined Home Visiting and Group Intervention for Low Income African American Mothers: The Pride in Parenting Program. *Matern Child Health Journal,* 15(2011), 75-84.

Leroy, J. L. (2011). The impact of daycare programs on child health, nutrition and development in developing countries: A systematic review.

Maggi, F., Irwin, G. L., Siddiqi, A., Poureslami, I., Hertzman, E., & Hertzman, C. (2005). International perspectives one early child development. Analytic and Strategic Review Paper prepared by the Knowledge Network for Early Child Development of the Commission on the Social Determinants of Health, Geneva, Switzerland: World Health Organization.

Ministerio de Economía y Finanzas (2016). Evaluación de impacto del Servicio de Acompañamiento a Familias (SAF) del Programa Nacional Cuna Más - Resultados Finales. Informe de evaluación. Elaborado por María Caridad Araujo, Marta Rubio-Codina, Marta Dormal, Lima, Perú.

Ministerio de Desarrollo e Inclusión Social (2017). Evaluación de Impacto del Servicio de Cuidado Diurno del Programa Nacional Cuna Más - Resultados finales. Informe de evaluación. Documento sin publicar.

Nievar, M. A., Van Egeren, L. A., & Pollard, S. (2010). A meta-Analysis of home visiting programs: Moderators of Improvements in Maternal Behavior. *Infant Mental Health Journal,* 31(5), 499-520.

Peacock, S., Konrad, S., Watson, E., Nickel, D., & Muhajarine, N. (2013). Effectiveness of home visiting programs on child outcomes: a systematic review. *BMC Public Health*, 13(17).

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.

Shore, R. (1997). Rethinking the brain: New insights into early development.

Tomlinson, M., Rotheram-Borus, M. J., le Roux, I. M., Youssef, M., Nelson, S. H., Scheffler, A., Weiss, R. E., O'Connor, M., & Worthman, C. M. (2016). Thirty-Six-Month Outcomes of a Generalist Paraprofessional Perinatal Home Visiting Intervention in South Africa on Maternal Health and Child Health and Development. *Society for Prevention Research,* DOI: 10.1007/s11121-016-0676-x

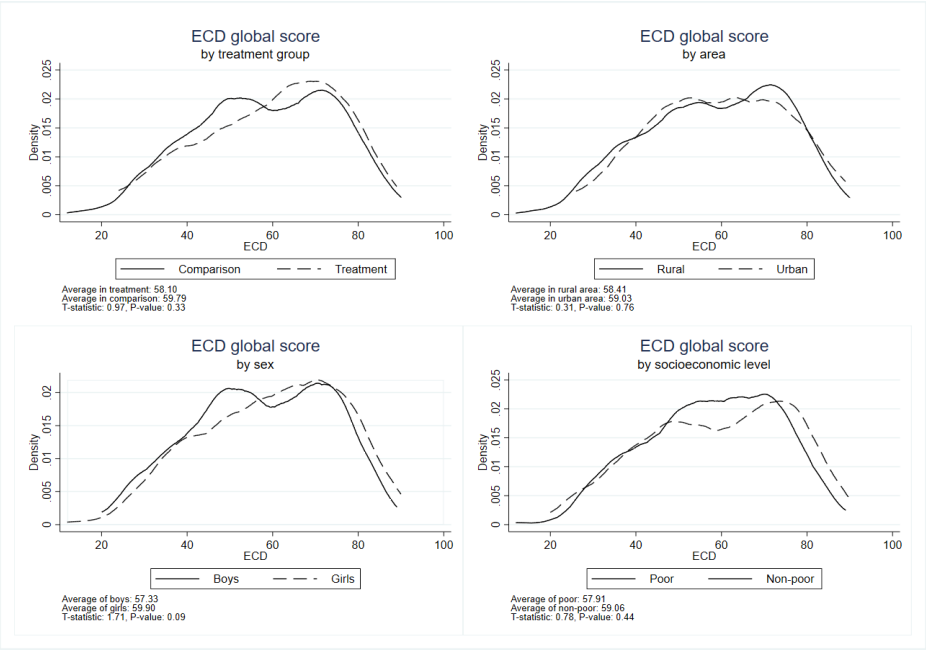
Wachs, T. D. (1993). Going beyond nutrition: nutrition, context, and development. *Monographs of the Society for Research in Child Development*, 58(7), 100-110.

Young, M. E. (Ed.). (2002). *From early child development to human development: Investing in our children's future.* World Bank Publications.

Appendix 1. Participation of children in other social programs (analytical sample)

Figure 1

Differences in ECD measures between treatment and comparison group



Source: Baseline 2016. Prepared by authors.

Table 1

Comparison of means of the children who participate in other social programs according to treatment or comparison group

Parallel social programs in which the children of the analytical sample participate	Treatment	Comparison	t-statistic	p-value
Creciendo Juntos (Growing Together) (%)	49.09	48.01	0.20	0.84
Cuna Más (One More Cradle) (day care - %)	0.00	0.00	-	-
Cuna Más (One More Cradle) (accompanying families - %)	0.00	19.87	9.33	0.00
Qali Warma (National School Nutrition Program) (%)	0.00	0.00	-	-
Vaso de Leche (Glass of Milk) feeding program (%)	72.73	69.60	0.63	0.53
Juguemos (Let's Play) (%)	0.00	0.00	-	-
Aprendiendo Ayudando (Child Development program in districts in the Loreto region) (%)	0.00	0.00	-	-

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 2

Number of children by year of survey and type of group (treatment and comparison)

Year	Comparison	Treatment	Total
2016	449	154	603
2017	306	111	417
Total	755	265	1020

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 3
Number of children of common support by year of survey and type of group (treatment and comparison)

Year	Comparison	Treatment	Total
2016	352	110	462
2017	228	78	306
Total	580	188	768

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 4
Number of children by region, year of survey and type of group (treatment and comparison)

District and year	Comparison	Treatment	Total
Amazonas			
2016	114	39	153
2017	78	33	111
Total	192	72	264
Indiana			
2016	205	34	239
2017	151	24	175
Total	356	58	414
Mazan			
2016	99	1	100
2017	67	1	68
Total	166	2	168
Napo			
2016	31	80	111
2017	10	53	63
Total	41	133	174

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 5

Number of children of common support by region, year of survey and type of group (treatment and comparison)

District and year		Comparison	Treatment	Total
Amazonas				
	2016	88	30	118
	2017	61	22	83
	Total	149	52	201
Indiana				
	2016	171	34	205
	2017	113	24	137
	Total	284	58	342
Mazan				
	2016	66	1	67
	2017	44	1	45
	Total	110	2	112
Napo				
	2016	27	45	72
	2017	10	31	41
	Total	37	76	113

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 6

Number of children from rural areas by region, year of survey and type of group (treatment and comparison)

District and year	Comparison	Treatment	Total
Amazonas			
2016	114	39	153
2017	78	33	111
Total	192	72	264
Indiana			
2016	205	34	239
2017	151	24	175
Total	356	58	414
Mazan			
2016	99	1	100
2017	67	1	68
Total	166	2	168

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 7

Number of children of common support from rural areas by region, year of survey and type of group (treatment and comparison)

District and year	Comparison	Treatment	Total
Amazonas			
2016	90	34	124
2017	63	26	89
Total	153	60	213
Indiana			
2016	169	32	201
2017	117	22	139
Total	286	54	340
Mazan			
2016	75	1	76
2017	52	1	53
Total	127	2	129

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 8

Number of children from urban areas by region, year of survey and type of group (treatment and comparison)

District and year		Comparison	Treatment	Total
Napo				
	2016	31	80	111
	2017	10	53	63
	Total	41	133	174

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 9

Number of children of common support from rural areas by region, year of survey and type of group (treatment and comparison)

District and year		Comparison	Treatment	Total
Napo				
	2016	31	59	90
	2017	10	36	46
	Total	41	95	136

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 10

Mean comparisons for sample attrition

Variables	Whole analytic sample [n = 1020]		Common support [n = 768]	
	Baseline [n = 603]	Follow-up [n = 417]	Baseline [n = 462]	Follow-up [n = 306]
Area 1: Gross motor skills	15.20	15.59	15.32	15.78
	(0.17)	(0.20)	(0.20)	(0.23)
Area 2: Fine motor skills	14.29	14.69	14.43	14.95
	(0.17)	(0.20)	(0.19)	(0.23)
Area 3: Hearing and language	12.47	12.93	12.49	12.94
	(0.16)	(0.18)	(0.18)	(0.21)
Area 4: Personal social skills	16.17	16.76	16.26	16.93
	(0.21)	(0.25)	(0.24)	(0.29)
Total score	58.12	59.97	58.50	60.60
	(0.66)	(0.76)	(0.75)	(0.89)
Variations in the percentage of children with short stature for their age	30.51	32.77	32.03	34.31
	(1.88)	(2.31)	(2.17)	(2.72)
Variations in the percentage of children with low weight for their age	10.28	9.83	11.69	11.76
	(1.24)	(1.46)	(1.50)	(1.84)

Variations in the percentage of children with Acute Respiratory Infections (ARIs)	32.17	31.18	32.90	33.01
	(1.90)	(2.27)	(2.19)	(2.69)
Variations in the percentage of children with diarrhea episodes.	32.67	31.65	33.33	32.68
	(1.91)	(2.28)	(2.20)	(2.69)
Sex (woman - %)	48.59	50.36	45.67	45.75
	(2.04)	(2.45)	(2.32)	(2.85)
Child's age (in months)	20.49	21.36	20.83	21.85
	(0.36)	(0.42)	(0.40)	(0.49)
Mother's age (in years)	28.06	28.53	28.38	28.73
	(0.31)	(0.38)	(0.36)	(0.44)
Mothers with incomplete or more secondary education (%)	42.29	40.29	44.16	42.48
	(2.01)	(2.43)	(2.31)	(2.83)
Hours worked by the mother	12.51	11.51	11.63	11.07
	(0.63)	(0.69)	(0.67)	(0.75)
Mother's emotional stability	0.03	0.03	0.03	0.03
	(0.05)	(0.06)	(0.06)	(0.07)
Married or co-habiting mother (%)	90.88	93.37	90.91	93.46
	(1.17)	(1.24)	(1.34)	(1.42)
Household socioeconomic status	-0.05	-0.09	-0.08	-0.08
	(0.04)	(0.04)	(0.04)	(0.04)
Cuna Más (One More Cradle - %)	14.59	14.15	15.15	14.38
	(1.44)	(1.71)	(1.67)	(2.01)
Vaso de Leche (Glass of Milk) feeding program (%)	69.32	73.86	70.35	74.51
	(1.88)	(2.15)	(2.13)	(2.50)
Participate in Juntos (%)	46.60	51.56	48.27	52.61
	(2.03)	(2.45)	(2.33)	(2.86)
Participate in CPVC (%)	25.54	26.62	23.81	25.49
	(1.78)	(2.17)	(1.98)	(2.50)

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 11

Number of children from rural context by sample and type of group (treatment and comparison)

	Comparison	Treatment	Total
Whole analytic sample	714	132	846
Common Support	566	116	682

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 12

Number of children from urban context by sample and type of group (treatment and comparison)

	Comparison	Treatment	Total
Whole analytic sample	41	133	174
Common Support	41	95	136

Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Appendix 2. Variables used to calculate the propensity score

Dependent variable

Participation in the CPVC program

Dichotomous variable that takes the value of one if the boy or girl participates in the Center for Promotion and Community Surveillance (CPVC) program and zero otherwise.

Independent variables:

Sex (female). Dichotomous variable that takes the value one if the person surveyed is a girl and zero in another case.

Child's age. Age of the boy or girl in months.

Indigenous mother tongue. Dichotomous variable that takes the value of one if the child's mother reported having an indigenous mother tongue and zero otherwise.

Height for age. Standardized score that indicates whether the child's height is appropriate for their age group and sex according to World Health Organization standards.

Weight for age. Standardized score that indicates whether the child's weight is appropriate for their age group and sex according to World Health Organization standards.

Mother's age. Age of the mother in years.

Mother's has secondary education or more. Dichotomous variable that takes the value of one if the child's mother reports having complete or incomplete secondary education level and zero otherwise.

Hours worked by the mother. Number of hours that the child's mother reports working per week.

Mother´s emotional stability. Factorial score based on the following information: i) mother is easily scared, ii) mother feels sad, iii) mother feels nervous, tense or worried, iv) mother cannot think clearly, v) mother cries more than usual, vi) mother finds it difficult to make decisions, vii) mother does not like what she does during the day and viii) mother gets tired easily.

Married or cohabitating mother. Dichotomous variable that takes the value of one in case the mother of the child reports being married or living with her partner and zero otherwise.

Household socioeconomic status. Factorial score that reflects the household's socioeconomic status. This score was created using the following information: i) house roof built with good materials, ii) basic household utilities (water, sewage and electricity), iii) household overcrowding, iv) fuel used for cooking, v) household assets.

Appendix 3. Probabilistic model for attendance to a CPCV

Table 1

Probabilistic model for participation in CPCVs including variables related to other social programs

Pr (participate in CPVC program)	Urban sample		Rural sample		Urban-rural sample	
Sex (woman - %)	-0.40		-0.02		-0.14	
	(0.29)		(0.15)		(0.12)	
Child's age (in months)	-0.01		0.01		0.00	
	(0.02)		(0.01)		(0.01)	
Age-standardized height	-0.15		-0.04		-0.05	
	(0.22)		(0.09)		(0.07)	
Age-standardized weight	0.06		-0.17	+	-0.10	
	(0.22)		(0.09)		(0.07)	
Mother's age (in years)	-0.01		-0.01		0.00	
	(0.02)		(0.01)		(0.01)	
Mothers with incomplete or more secondary education (%)	0.17		0.31	+	0.32	**
	(0.30)		(0.16)		(0.12)	
Hours worked by the mother	0.00		-0.01	*	0.00	
	(0.01)		(0.01)		(0.00)	
Mothers with mental health	0.02		0.03		-0.01	
	(0.13)		(0.06)		(0.05)	
Married or co-habiting mother (%)	0.43		0.42		0.08	
	(0.41)		(0.31)		(0.21)	
Household socioeconomic status	0.17		0.63	***	0.48	***
	(0.13)		(0.10)		(0.06)	
Creciendo Juntos (Growing Together)	0.06		0.37	*	0.03	
	(0.31)		(0.17)		(0.13)	
Vaso de leche (Glass of Milk) feeding program	1.03	***	-0.14		0.23	+
	(0.33)		(0.17)		(0.14)	
Constant	0.13		-1.69	***	-1.26	***
	(0.79)		(0.44)		(0.32)	
N	111		492		603	

Pseudo-R2	0.11	0.18	0.12

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, +$p < 0.10$.
Standard errors in parentheses. Prepared by authors.

Appendix 4. Comparison of means of the variables used to create the *propensity score* (baseline) for the rural and urban samples

Table 1

Comparison of means of the variables used to create the propensity score in the rural context (baseline)

	Treatment [n = 67]	Comparison [n = 334]	t-statistic	p-value
Sex (woman - %)	46.27	44.30	0.23	0.82
Child's age (in months)	21.43	22.53	0.75	0.46
Height for age	-1.46	-1.62	0.79	0.43
Weight for age	-1.02	-1.16	0.75	0.46
Mother's age (in years)	26.96	27.23	0.22	0.83
Mothers with incomplete or more secondary education (%)	56.72	63.37	0.78	0.44
Hours worked by the mother	9.51	9.00	0.20	0.85
Mother´s emotional stability	0.03	0.00	0.14	0.89
Married or co-habiting mother (%)	94.03	94.32	0.07	0.94
Household socioeconomic status	0.33	0.23	0.86	0.39

Note: Statistically significant differences at the 5 % level were not found.
Source: Baseline 2016 and follow-up 2017. Prepared by authors.

Table 2

Comparison of means of the variables used to create the propensity score in the urban context (baseline)

	Treatment [n = 59]	Comparison [n = 31]	t-statistic	p-value
Sex (woman - %)	52.54	58.10	0.60	0.55
Child's age (in months)	20.36	20.41	0.03	0.98
Height for age	-1.27	-1.30	0.18	0.86
Weight for age	-0.61	-0.57	0.21	0.83
Mother's age (in years)	27.83	27.17	0.50	0.62
Mothers with incomplete or more secondary education (%)	49.15	57.74	0.93	0.35
Hours worked by the mother	15.64	17.27	0.47	0.64
Mother´s emotional stability	-0.21	-0.22	0.03	0.98
Married or co-habiting mother (%)	84.75	85.11	0.06	0.96
Household socioeconomic status	0.50	0.87	1.37	0.17

Note: Statistically significant differences at the 5% level were not found.

Source: Baseline 2016 and follow-up 2017.