

overweight, acute malnutrition and complication after delivery).

The Institutional Review Board at Universidad Peruana Cayetano Heredia reviewed and approved this study.

Results

Descriptive analysis

For the individual-level analysis, we identified 93 564 women and 38 336 children under 6 years of age in the datasets for years 2009–2012. Similarly, for the district-level analysis the dataset contained 141 476 women and 57 629 children under 6 years of age for years 2007–2013. After applying the inclusion criteria for enrolment in Juntos, our individual-level analysis included 7441 women and 21 589 children and our district-level analysis included 38 526 women and 32 515 children. From these samples we excluded observations with missing information on key covariates, resulting in final subsets of 7155 and 17 193 women and children, respectively, for the individual-level analysis and 35 468 and 23 467 women and children, respectively, for the district-level analysis.

Table 1 shows the participants' characteristics for women and children before and after propensity score matching. Throughout the study period, 50.1% (3588/7155) of the mothers interviewed reported participating in Juntos, and 6.1% reported being pregnant for the individual level-analysis (5.5% in the district-level analysis). Before matching, there were imbalances in the distributions of potentially confounding characteristics between the treatment and control groups. For the individual-level analysis subset, women were older, less educated and less literate among Juntos beneficiaries compared to controls. On average, beneficiary mothers had also given birth to more children, both overall and in the past 5 years, compared to controls. At the district level, those living in Juntos districts were poorer, more likely to reside in a rural area and more likely to report a child death in the family. Qualitatively similar differences were observed prior to matching in the district-level subset when we compared women and children living in districts where Juntos was offered to controls in districts where it was not.

Propensity score matching

We matched treated and control observations with a similar propensity for receiving the treatment, which reduced observations in the individual-level subsets from 7155 to 5143 for women and from 17 193 to 5083 for children. More observations were dropped among non-Juntos children because their characteristics did not match those of children enrolled in Juntos, who were the target population the programme. Similarly, the district-level subsets were reduced from 17 193 to 5083 for women and from 23 467 to 10 058 for children. After matching, the distributions of propensity scores for the treated and control groups in the individual-level and district-level (Fig. 1) subsets were similar through restriction to regions of common support. A comparison of the standardized mean differences before and after matching (Table 1) showed that matching on the propensity score nearly eliminated imbalances in the distributions of measured confounders between treated and control women and children in the individual-level and district-level samples (Fig. 2). In the individual-level subset, the standardized mean difference across covariates was reduced after matching from 32.7 to 1.7 for women and from 28.0 to 1.3 for children. In the district-level sample, the standardized mean difference was reduced from 25.9 to 0.5 for women and from 28.4 to 0.8 for children (Table 1).

Main effect estimates

Analyses of the individual-level samples showed that enrolment in Juntos was associated with a lower prevalence of underweight relative to normal weight for women [prevalence ratio (PR)=0.39, 95% confidence interval (CI)=0.18 – 0.85, Table 2] and anaemia for children (PR=0.93, 95%CI=0.86 – 1.00). In the district-level analysis, living in a Juntos district was associated with a lower prevalence of overweight (PR=0.94, 95%CI=0.90 – 0.98) relative to normal weight for women, and acute malnutrition in children (PR=0.49, 95%CI=0.32 – 0.73); however, residence in a Juntos district was associated with a 9% increase in the prevalence of anaemia in children (PR=1.09, 95%CI=1.01 – 1.17). There was no association with complications after delivery in the individual