

Supplemental Information

VALIDITY OF THE BAYLEY-III SCALES

Instruments were translated into local languages and independently back-translated. Words and pictures were adapted to be culturally appropriate and piloted to guarantee functional equivalence.

Discriminant validity was adequate with statistically significant correlations with wealth, maternal schooling attainment, and child height-for-age at endline for the control group, respectively, of $r = 0.14$, $r = 0.17$, $r = 0.14$ for cognition; $r = 0.22$, $r = 0.24$, $r = 0.19$ for language; and $r = 0.13$, $r = 0.15$, $r = 0.17$ for motor development. In the control group, stability over time was acceptable, with scores from midline significantly correlated with those from endline: $r = 0.32$ for cognition, $r = 0.53$ for language, and $r = 0.34$ for the motor scales (all $P < .01$).

INTERVENTION DETAILS

Intervention Staffing

Pratham recruited 141 female intervention facilitators from local communities. They were on average 25 years old, 39% had bachelor's degrees, 54% had completed secondary schooling, and 5% had not finished secondary school. Initial training lasted 3 weeks, followed by 3 short refresher trainings spread over the intervention period. Facilitators were trained and supervised weekly by 28 mentors hired by Pratham, who had degrees in social sciences and experience working with children. Mentors were trained for 67 days

total over the course of the intervention. Mentors were trained and supervised monthly by 3 so-called super-mentors, who had degrees in social sciences and had participated in a previous study in Cuttack, which only investigated home visits.¹⁹ Super-mentors were retrained for 28 days, and most of the training revolved around the group curriculum and how to run group sessions, which was new to the super-mentors.

HNSL

A basic HNSL service was provided by Pratham district coordinators in each of the 192 study villages, including the control group. The service consisted of a one-off one-day visit (over the course of the 2 years of the project) of 1 district coordinator to each village, where she mobilized child caregivers and village officials and discussed the availability and importance of public services (other than our intervention activities) available in the community, such as growth monitoring and food supplementation provided by Anganwadi workers. The purpose of the HNSL service was to create an environment where the baseline services available to households were well understood.

Nutritional Education

The nutritional education curriculum used in this study is the Knowing and Engaging for Young child food and feeding curriculum, developed by Pratham. The curriculum was designed as non-text-heavy simple

information booklets, which were used to orient the mentoring teams. In addition, facilitators of the home visits and group sessions used visual engagement formats to make the sessions as interactive as possible (eg, story cards, recipe assessment cards, recipe audio recordings, games and activity cards). They aimed to create an interface for assessment as well as action around child nutrition at the household level to produce positive changes in food choice, preparation and storage, and child health care practice. We expected the mothers to learn the importance of feeding a nutritious diet to the child and to learn ways to prepare low-cost nutritious recipes at home for young children and to apply other healthy practices in their daily lives. The intention was to transform the caregivers from being beneficiaries of governmental provisions to becoming active stakeholders, thereby creating bottom-up traction and demand for services.

The key idea was to frequently involve the caregivers in looking at their young children's food and feeding, following the concept of responsive feeding, along with other important domains such as immunization, growth monitoring, and diarrhea, water, and hygiene, by using simple measurable and actionable indicators. These domains were chosen to be addressed through this intervention package for specific reasons. Food and feeding was one of the major domains covered and was required to be followed-up on a regular basis because young

children go through various developmental milestones and thus require rapid transitions in terms of feeding patterns and intake over a short span of time. The other domains were chosen because it would be incomplete to talk about children's health and wellbeing without tracking their growth trajectories, immunization status, and the practices followed in and around the home with respect to water, hygiene, and sanitation.

This was achieved through (1) weekly 10-minute follow-up sessions organized by facilitators at the homes of the children and (2) bimonthly focus nutrition sessions. The weekly follow-up session was intended to sensitize child caregivers so that they understood (1) the dangers of child undernutrition, (2) the sorts of corrective action they could take at the household level, and (3) how to reach out to government services. The content of the follow-up sessions remained broadly similar for the 3 treatment arms; however, there were more stories and recipe recordings in the nutritional education treatment arm. The rationale for doing so was to make the nutritional education home visits fun for the mother or primary caregiver. In addition to the weekly follow-up visits, bimonthly focus nutrition sessions (organized as individual home visits for the home visiting and nutritional education treatment arms and organized in group sessions for the group sessions treatment arm) demonstrated regionally adapted, low-cost nutritious recipes for children, their quality assessment, and other relevant discussions around important young child nutritional and health concepts.

Home Visiting

The home visiting program evaluated in this study was based on the Reach-Up and Learn curriculum, which was further developed and adapted for use in rural Odisha by the

Institute for Fiscal Studies and CECED. The core of the program was supporting mothers to promote their children's development. This was done by using a structured curriculum of play and other developmental activities that the home visitor followed every week when she visited the target children and their primary caregivers (usually their mothers). Such developmental activities included stacking blocks, doing puzzles, and looking at picture books together. The facilitator demonstrated the activities to the mothers and then helped them to do them with their children giving feedback. The facilitator then left the materials used in the visit with the mothers and encouraged them to continue the activities during the following week, before the next visit. At each visit the materials were exchanged for different play materials. Mothers were encouraged to improve the quality of interactions with their children and use everyday routine activities to teach them new words and concepts. For example, mothers were given ideas about games they could play with their children during washing or preparing food. In addition, most of the toys used during home visits were made with locally available materials or other low-cost materials, often discarded objects such as empty plastic bottles (where available).

The original curriculum was developed for a different cultural context. In addition to translation, it needed significant adaptations to make it as relevant as possible for poor rural households in Odisha. All the books were redrawn to reflect the local environment, and local games and songs were included.

Some activities were included to increase the socioemotional and gross motor content of the curriculum and to improve the mapping of the activities against current early learning standards for India.

Group Sessions

Group sessions and home visiting exhibited the same key features and aims (eg, structured curriculum, play, and other developmental activities based on locally available or low-cost materials, focus on interaction between mothers and their children, and supporting mothers to promote their children's development), and most activities were conducted in both delivery models. However, they differed in the mode of delivery: the group sessions curriculum developed by IFS and CECED took advantage of the group dynamics, interactions with other caregivers, and shared knowledge and experiences of child-rearing. In contrast, the home visiting intervention delivery relied on the interaction between the home visitor, the caregiver, and the child. Therefore, home visiting and group sessions required somewhat different implementation guidelines and used differently structured curricula. More specifically, the group sessions started with free play to allow children to explore the play materials and to allow time for all mothers to join the group. They also facilitated the conducting of certain socioemotional activities such as sharing and taking turns. But, importantly, the curriculum had to accommodate material suitable for children of different ages. Unlike the one-on-one individual home visits, each group session consisted of 5 to 8 children, making it infeasible to tailor the activities to the exact age of each child. Instead, the curriculum presented activities for 2 separate age groups: a "younger group" (children aged 7–12 months at the start of intervention) and an "older group" (children aged 13–18 months at the start of the intervention). If in a particular village a group included both "younger" and "older" children, the group was split into 2 subgroups and the facilitator managed both simultaneously.

SUPPLEMENTAL TABLE 4 Bayley-III Composite Score Means and SDs by Treatment Arm at Endline and Midline

	Cognition	Language	Motor
Midline (<i>n</i> = 1331)			
Control	82.26 (7.87)	92.06 (11.58)	90.19 (8.72)
Nutritional education	81.41 (7.36)	93.21 (10.61)	90.17 (7.71)
Group sessions plus nutritional education	84.80 (8.32)	95.90 (11.94)	90.59 (8.72)
Home visits plus nutritional education	84.72 (8.18)	94.56 (12.2)	89.90 (8.81)
Endline (<i>n</i> = 1298)			
Control	81.58 (5.54)	91.95 (9.36)	89.91 (8.4)
Nutritional education	82.01 (5.31)	93.62 (8.41)	90.97 (7.92)
Group sessions plus nutritional education	83.37 (5.07)	95.13 (8.23)	91.45 (8.15)
Home visits plus nutritional education	83.63 (4.73)	94.80 (8.2)	90.72 (7.59)

Data in table are presented as mean (SD).

The role of the group facilitators was, therefore, different from that of the home visitors for several reasons. First, they had to manage larger numbers of children who had disparate ages. Related, they also were required to manage group dynamics, such as encouraging all mothers to participate in group activities while preventing anyone from dominating the session. A large amount of emphasis was placed on these soft skills during training. Last, they were responsible for finding a venue for each session that could accommodate up to 8 caregivers and their children.

COSTS DETAILS

The weekly home visits salaries were paid for 48 home visitors who treated 375 children while working half-time (20 hours a week). In the cost calculation below, we assume each home visitor or group facilitator works full-time at 40 hours a week (and of course is paid twice the amount). In this scenario, each home visitor can treat 15 children per week, totaling 720 children for the 48 home visitors. The group facilitators can run 8 groups in a week with 8 children in each group (64 children per group facilitator), totaling 3072 children for the corresponding 48 group facilitators. In Supplemental Table 10, we present the detailed costs for the home visiting and group sessions arms. Some costs are identical across arms because they

are proportional to the personnel. For example, mentoring and training costs depend on the number of people to be mentored and trained and not on the number of children. However, material costs depend on the number of children, and consequently, there is no economy in that item per child for the group sessions mode in comparison with the home visiting mode.

Allowing for all overhead, training, materials, and personnel salaries, home visiting cost \$135 per child per year (pCpY), as shown in Supplemental Table 10, given that each home visitor performs 15 visits per week. Group sessions cost \$38 pCpY given that each facilitator runs 8 groups per week with 8 children per group.

These results, and most importantly the relative position of groups to home visits, are not particularly sensitive to reasonable alternative assumptions. For example, if we allow for 1 day lost a week (20% increase in salaries), the costs become home visiting \$150, group sessions \$42 pCpY. Group Sessions are still just 27.9% of the cost. If the cost of materials increases by 20% because of loss, then home visiting become \$137 pCpY, group sessions become \$40 pCpY, and the relative costs of group sessions is still 29.3% of home visiting. If we consider that material wastage is larger for group sessions (say because mothers forget to bring them back), increasing the material

cost of groups by 20%, then the group sessions costs increases to \$40 pCpY, representing 29.7% of the cost of home visiting.

ATTENDANCE DETAILS

In Supplemental Table 11, we show the percentage of all eligible children who dropped out of the intervention by treatment arm. A child is classified as having dropped out if either (1) the child attended no sessions or (2) the mother informed intervention staff they no longer wished to be part of the intervention for any reason.

In Supplemental Table 12, we show the number of intervention sessions attended by treatment arm for the psychosocial intervention arms, group sessions, and home visiting of children who were part of the analysis sample in Table 2 of the main text.

SUPPLEMENTAL TABLE 5 Robustness of Imputed Values: Treatment Effects in SDs on Bayley-III Composite Scores at Midline and Endline for Children With all Covariates Only

Bayley-III Composite Scores	Point Estimate	Lower Bound	Upper Bound	<i>P</i> (Unadjusted)	<i>P</i> (Adjusted)	<i>n</i>
Baseline to midline						
Nutritional education						
Cognitive	-0.166	-0.346	0.013	.069	.218	1259
Language	0.011	-0.170	0.192	.903	.971	1259
Motor	-0.046	-0.234	0.141	.627	.952	1259
Group sessions and nutritional education						
Cognitive	0.288	0.094	0.483	.004	.014	1259
Language	0.277	0.078	0.475	.007	.006	1259
Motor	0.022	-0.197	0.242	.841	.971	1259
Home visits and nutritional education						
Cognitive	0.300	0.118	0.481	.001	.003	1259
Language	0.133	-0.076	0.342	.211	.445	1259
Motor	-0.052	-0.255	0.150	.610	.952	1259
Baseline to endline						
Nutritional education						
Cognitive	0.040	-0.125	0.205	.636	.938	1285
Language	0.084	-0.048	0.216	.209	.554	1285
Motor	0.001	-0.140	0.143	.985	.989	1285
Group sessions and nutritional education						
Cognitive	0.287	0.123	0.452	.001	.003	1285
Language	0.283	0.153	0.413	.001	.001	1285
Motor	0.120	-0.039	0.278	.138	.428	1285
Home visits and nutritional education						
Cognitive	0.321	0.172	0.471	.001	.001	1285
Language	0.225	0.086	0.363	.002	.009	1285
Motor	-0.008	-0.151	0.135	.913	.989	1285

Sample size includes all target children who completed the relevant subscales of the Bayley-III at endline and midline for panel 1, and at endline for panel 2, and had all data on all covariates. Estimates in both panels controlled for baseline ASQ-3 problem solving, communication, fine motor, gross motor, and personal-social scales, as well as child sex, maternal education, and parity with a dummy for first child. Estimated coefficients are expressed in SDs of the control group. Stepdown *P* values are two-tailed *P* values corrected for multiple hypothesis testing using the Romano–Wolf stepdown procedure (5000 replications). CIs are based on the asymptotic *P* values. The multiple hypothesis testing is applied within each panel. All replications are done within district as defined by the preprogram variables used in the randomization protocol and corrected for cluster effects at the village level.

SUPPLEMENTAL TABLE 6 Treatment Effects on Anthropometrics: Wt-For-Age and Height-For-Age Z Scores

	Point Estimate	Lower Bound	Upper Bound	<i>P</i> (Unadjusted)	<i>n</i>
Panel 1: Baseline to midline					
Nutritional education					
Wt-for-age	−0.048	−0.266	0.171	.669	1267
Height-for-age	−0.039	−0.243	0.165	.708	1267
Group sessions and nutritional education					
Wt-for-age	0.033	−0.212	0.278	.791	1267
Height-for-age	0.012	−0.223	0.246	.923	1267
Home visits and nutritional education					
Wt-for-age	0.061	−0.183	0.305	.621	1267
Height-for-age	−0.017	−0.251	0.217	.887	1267
Panel 2: baseline to endline					
Nutritional education					
Wt-for-age	−0.013	−0.218	0.193	.903	1281
Height-for-age	0.036	−0.166	0.238	.727	1281
Group Sessions and nutritional education					
Wt-for-age	0.033	−0.190	0.256	.772	1281
Height-for-age	−0.003	−0.226	0.219	.976	1281
Home visits and nutritional education					
Wt-for-age	0.077	−0.149	0.303	.502	1281
Height-for-age	0.036	−0.198	0.270	.761	1281

Sample size includes all target children who completed height and wt measurement at endline and midline for panel 1 and at endline for panel 2. All estimates were calculated by using the WHO Stata program igrowup. Estimates in both panels controlled for baseline ASQ-3 problem solving, communication, fine motor, gross motor, and personal-social scales, as well as child sex, maternal education, and parity with a dummy for first child. CIs are based on the unadjusted *P* values.

SUPPLEMENTAL TABLE 7 Morbidity Prevalence Over 1 Week at Midline and Endline

	Point Estimate	Lower Bound	Upper Bound	<i>P</i> (Unadjusted)	<i>P</i> (Adjusted)	<i>n</i>
Panel 1: midline						
Nutritional education						
Fever	-0.118	-0.190	-0.045	.001	.008	1290
Cough	0.012	-0.082	0.105	.803	.803	1290
Diarrhea	-0.042	-0.083	-0.001	.036	.200	1290
Group sessions and nutritional education						
Fever	-0.053	-0.127	0.021	.139	.526	1290
Cough	0.040	-0.052	0.131	.372	.712	1290
Diarrhea	-0.022	-0.066	0.023	.308	.712	1290
Home visits and nutritional education						
Fever	-0.071	-0.146	0.003	.045	.243	1290
Cough	-0.036	-0.128	0.055	.428	.712	1290
Diarrhea	-0.027	-0.072	0.017	.195	.604	1290
Panel 2: Endline						
Nutritional education						
Fever	-0.050	-0.124	0.025	.148	.512	1297
Cough	-0.074	-0.159	0.011	.081	.352	1297
Diarrhea	0.005	-0.025	0.036	.719	.974	1297
Group sessions and nutritional education						
Fever	-0.097	-0.168	-0.027	.003	.030	1297
Cough	-0.087	-0.173	-0.001	.043	.234	1297
Diarrhea	-0.006	-0.030	0.018	.613	.974	1297
Home visits and nutritional education						
Fever	-0.071	-0.152	0.009	.065	.345	1297
Cough	-0.021	-0.109	0.068	.618	.974	1297
Diarrhea	-0.003	-0.028	0.022	.789	.974	1297

Sample size includes all target children who completed morbidity modules at endline and midline for panel 1 and at endline for panel 2. Estimates in both panels were controlled for baseline the internally standardized scores of the ASQ-3 problem solving, communication, and fine motor, gross motor, and personal-social scales as well as child sex, maternal education, and parity with a dummy for first child. CIs are based on the unadjusted *P* values. The *P* values are two-tailed *P* values calculated by using the T-bootstrap method (5000 replications) to account for the finite sample and for maximum comparability with the stepdown *P* values. Stepdown *P* values are two-tailed *P* values corrected for multiple hypothesis testing by using the Romano-Wolf stepdown procedure (5000 replications). The multiple hypothesis testing is applied to all intermediate outcomes in the table.

SUPPLEMENTAL TABLE 8 Estimated Treatment Effects on Child Development, by Sex

	Female (n = 636)				Male (n = 662)				Difference in Treatment Effect <i>P</i>
	Point Estimate	Lower Bound	Upper Bound	<i>P</i>	Point Estimate	Lower Bound	Upper Bound	<i>P</i>	
Nutritional education									
Cognition	0.019	-0.220	0.258	.873	0.053	-0.186	0.292	.662	.831
Language	0.101	-0.110	0.312	.346	0.149	-0.068	0.367	.177	.727
Motor	0.042	-0.189	0.274	.720	0.104	-0.094	0.302	.301	.664
Group sessions									
Cognition	0.281	0.060	0.503	.013	0.284	0.024	0.544	.032	.988
Language	0.325	0.104	0.545	.004	0.286	0.063	0.508	.012	.793
Motor	0.233	-0.028	0.495	.080	0.067	-0.148	0.282	.539	.294
Home visits									
Cognition	0.294	0.086	0.501	.006	0.354	0.124	0.585	.003	.656
Language	0.240	0.026	0.454	.028	0.236	0.022	0.450	.031	.973
Motor	0.077	-0.166	0.321	.532	0.035	-0.156	0.226	.719	.773

Sample size included all target children who completed the relevant subscales of the Bayley-III at endline. Estimates based on a standard conditional average treatment effect regression model. Estimates in all panels were controlled for baseline internally standardized scores of the ASQ-3 problem solving, communication, and fine motor, gross motor, and personal-social scales as well as child sex, maternal education, and parity with a dummy for first child. Estimated coefficients are expressed in SDs of the control group. CIs are based on the unadjusted *P* values. The multiple hypothesis testing is applied within panel.

SUPPLEMENTAL TABLE 9 Estimated Treatment Effects on Child Development, by Maternal Education

	Less Than Eighth Standard (<i>n</i> = 490)				More Than Eighth Standard (<i>n</i> = 808)				Difference in Treatment Effect <i>P</i>
	Point Estimate	Lower Bound	Upper Bound	<i>P</i>	Point Estimate	Lower Bound	Upper Bound	<i>P</i>	
Nutritional education									
Cognition	0.110	−0.166	0.386	.432	0.000	−0.208	0.208	.997	.487
Language	0.153	−0.155	0.462	.328	0.111	−0.048	0.270	.172	.790
Motor	0.136	−0.111	0.382	.278	0.044	−0.147	0.235	.647	.527
Group sessions									
Cognition	0.354	0.055	0.653	.021	0.244	0.059	0.429	.010	.479
Language	0.419	0.140	0.698	.003	0.236	0.052	0.421	.010	.250
Motor	0.054	−0.227	0.335	.705	0.201	0.003	0.400	.047	.337
Home visits									
Cognition	0.342	0.083	0.600	.010	0.323	0.123	0.523	.002	.900
Language	0.244	−0.045	0.532	.097	0.238	0.058	0.419	.010	.972
Motor	−0.040	−0.284	0.203	.744	0.123	−0.059	0.305	.183	.215

Sample size included all target children who completed the relevant subscales of the Bayley-III at endline. Estimates based on a standard conditional average treatment effect regression model. Estimates in all panels were controlled for baseline internally standardized scores of the ASQ-3 problem solving, communication, and fine motor, gross motor, and personal-social scales as well as child sex, maternal education, and parity with a dummy for first child. Estimated coefficients are expressed in SDs of the control group. CIs are based on the unadjusted *P* values. The multiple hypothesis testing is applied within panel.

SUPPLEMENTAL TABLE 10 Intervention Costs

	Home Visiting Arm, 48 Home Visitors, \$	Group Sessions Arm, 48 Group Facilitators, \$
Costs proportional to personnel working full-time (40 h per week 5 d a week)		
Salaries (48 home visitors or group facilitators)	53 040.00	53 040.00
Supervision and administration		
Project management (1)	1453.83	1453.83
Super mentor (1)	3017.33	3017.33
District leader (1)	1910.03	1910.03
Mentors (12)	16 328.80	16 328.80
Project support costs including rent, travel, recruitment, etc	6619.73	6619.73
Administrative costs	4115.35	4115.35
Training	4607.36	4607.36
Costs proportional to the No. children		
Toys and learning material	6322.77	26 977.17
Estimated total cost	97 415.19	118 069.59
Estimated total cost per child	135 ^a	38 ^b

Costs are in US dollars. The numbers in parenthesis show the number of personnel in each category. The project manager links the intervention with the central administrative unit running the program. The super-mentor trains mentors and home visitors or group facilitators and supervises the mentors monthly. The district leader is responsible for the implementation of the program. Mentors train home visitors or group facilitators and supervise the home visitors or group facilitators monthly during the implementation of the program. Training times are provided in Supplemental Information.

^a 720 children.

^b 3072 children.

SUPPLEMENTAL TABLE 11 Dropout by Treatment Arm

	Percent
Nutritional education	11.2
Group sessions plus nutritional education	25.5
Home visiting plus nutritional education	14.1

SUPPLEMENTAL TABLE 12 Attendance by Psychosocial Treatment Arm

Sessions attended	Group Sessions Plus Nutritional Education		Home Visiting Plus Nutritional Education	
	<i>n</i>	%	<i>n</i>	%
0–9	56	17.34	19	5.72
10–19	18	5.57	1	0.3
20–29	19	5.88	4	1.2
30–39	16	4.95	3	0.9
40–49	26	8.05	6	1.81
50–59	39	12.07	12	3.61
60–69	59	18.27	42	12.65
70–79	61	18.89	119	35.84
≥80	29	8.98	126	37.95