

Using community health workers to deliver a scalable integrated parenting program in rural China: a cluster-randomized controlled trial

Web appendix

Table A.1: Baseline characteristics of intention-to-treat population

		Control (n=227)	Intervention (n=222)	P-value
Children				
Age (months)		13 (10-16)	13 (10-15)	0.76
Sex				
	Girls	98 (43%)	112 (50%)	0.12
	Boys	129 (57%)	110 (50%)	
Premature				
	Yes	8 (4%)	11 (5%)	0.57
	No	219 (96%)	211 (95%)	
Ethnic minority				
	Yes	47 (21%)	54 (24%)	0.38
	No	180 (79%)	168 (76%)	
First born				
	Yes	96 (42%)	98 (44%)	0.62
	No	131 (58%)	124 (56%)	
Mothers				
Age (years)		28 (25-31)	28 (24-31)	0.28
Mother is currently living at home				
	Yes	203 (89%)	196 (88%)	0.63
	No	24 (11%)	26 (12%)	
Education > 9 years				
	Yes	71 (31%)	55 (25%)	0.23
	No	156 (69%)	167 (75%)	
Households				
Social security household				
	Yes	27 (12%)	29 (13%)	0.78
	No	200 (88%)	193 (87%)	
Household income (in '000 USD/ year)		4.8 (3.5)	5.4 (3.8)	0.06

Data are mean (SD), n (%), or median (IQR). P-values for difference in means across control and intervention group are adjusted for clustering at the village level.

Table A.2: Baseline parenting knowledge and skills

	Control (n=227)	Intervention (n=222)	P-value
Child psychosocial stimulation			
Able to recognize child's need for interactive reading activities	117 (52%)	129 (58%)	0.39
Able to recognize child's need for interactive play activities	167 (74%)	170 (77%)	0.47
Knows how to read to child	127 (56%)	114 (51%)	0.30
Knows how to play with child	150 (66%)	155 (70%)	0.42
Child feeding			
Knows that from 6 months onwards solid foods should be given to infant	134 (59%)	133 (60%)	0.86
Knows that between 6-12 months breastmilk and formula milk are still the main source of energy and nutrition	180 (79%)	163 (73%)	0.11
Knows that a diet for 6-12 month olds is more balanced if the child eats fruit, vegetables or flesh foods in addition to breastmilk/formula milk and staple foods.	81 (36%)	76 (34%)	0.63
Knows that a micronutrient deficiency affects infant health	212 (93%)	190 (86%)	0.09
Knows that a micronutrient deficiency affects infant cognitive development	183 (81%)	166 (75%)	0.20
Lower responsiveness of the child is a sign of a micronutrient deficiency	138 (61%)	135 (61%)	0.85
Acknowledges the importance of giving trace or vitamin supplements to infant in case of a deficiency	173 (76%)	166 (75%)	0.99

Data are n (%). P-values for difference in means across control and intervention group are adjusted for clustering at the village level.

Table A.3: Baseline parenting practices

		Control (n=227)	Intervention (n=222)	P-value
Stimulating parenting practices				
Caregiver used toys to play with child over past 2 days	Yes	130 (57%)	136 (61%)	0.31
	No	97 (43%)	86 (39%)	
Caregiver sang song to child over past 2 days	Yes	88 (39%)	74 (33%)	0.48
	No	139 (61%)	148 (67%)	
Caregiver told story to child over past 2 days	Yes	33 (15%)	29 (13%)	0.83
	No	194 (85%)	193 (87%)	
Caregiver read book to child over past 2 days	Yes	13 (6%)	12 (5%)	0.94
	No	214 (94%)	210 (95%)	
No. of children's books in household		2.0 (4.8)	1.8 (7.3)	0.94
Feeding practices				
Has ever been breastfed	Yes	206 (92%)	212 (96%)	0.14
	No	21 (8%)	9 (4%)	
Initiation of breastfeeding within 1 hour after birth	Yes	35 (16%)	22 (10%)	0.15
	No	191 (84%)	200 (90%)	
Continued breastfeeding after 6 months	Yes	190 (84%)	190 (86%)	0.80
	No	37 (16%)	32 (14%)	
Has ever eaten formula milk	Yes	146 (65%)	152 (68%)	0.36
	No	80 (35%)	70 (32%)	
How many months exclusively breastfed?		1.6 (2.6)	1.2 (2.3)	0.05
How many months exclusively fed formula milk?		4.2 (5.0)	4.9 (5.3)	0.11
At what age (months) complementary feeding started?		6.3 (1.7)	5.9 (1.4)	0.01
Minimum dietary diversity*	Yes	135 (60%)	123 (55%)	0.49
	No	91 (40%)	99 (45%)	
Minimum meal frequency	Yes	64 (28%)	64 (29%)	0.86
	No	162 (72%)	158 (71%)	

Data are mean (SD), n (%), or median (IQR). P-values for difference in means across control and intervention group are adjusted for clustering at the village level.

In line with the WHO, 'minimum dietary diversity' = 1 if the child received foods from 4 or more food groups on the previous day. This minimum dietary diversity indicator was calculated based on the consumption of at least four out of the following seven food groups: (1) grains, roots and tubers; (2) legumes and nuts; (3) dairy products; (4) flesh foods; (5) eggs; (6) vitamin A-rich fruits and vegetables; and (7) other fruits and vegetables. 'Minimum meal frequency' = 1 for breastfed children age 6-8 months fed more than twice on the previous day, for breastfed children of age 9 months and older fed more than 3 times per day, and for non-breastfed children over 6 months of age receiving at least 1 cup of milk and 4 meals per day.

Table A.4: Baseline ECD outcomes of non-attributed intention-to-treat population

		Control (n=200)	Intervention (n=190)	P-value
Child development[#]				
Cognition score		41.6 (8.6)	40.5 (7.9)	0.34
Receptive language score		14.0 (4.3)	13.9 (4.1)	0.90
Expressive language score		14.1 (5.1)	13.7 (5.0)	0.81
Fine motor score		29.0 (5.6)	28.8 (4.9)	0.99
Gross motor score		41.1 (10.6)	40.5 (9.5)	0.92
Social-emotional score		69.2 (13.4)	68.5 (12.7)	0.99
Child health				
Diarrhea in past month				
	Yes	55 (27%)	39 (21%)	0.18
	No	145 (73%)	151 (79%)	
Symptoms of respiratory tract infection in past month				
	Yes	115 (57%)	103 (54%)	0.69
	No	85 (43%)	87 (46%)	
Number of times ill in past month		1.0 (0.9)	0.8 (0.8)	0.20
Child nutrition and growth				
Hemoglobin (g/L) [§]		105.7 (94.0-118.0)	107.5 (98.0-118.0)	0.61
Anemic [§]				
	Yes	110 (56%)	96 (52%)	0.82
	No	85 (44%)	87 (48%)	
Height (cm) [*]		76.2 (72.5-80.0)	75.5 (72.0-79.0)	0.34
Weight (kg) [*]		9.7 (8.6-10.7)	9.6 (8.6-10.4)	0.96
Weight for age [*]		0.14 (1.11)	0.12 (1.09)	0.50
Length/height for age [*]		0.21 (1.23)	0.02 (1.29)	0.37
Weight for length/height [*]		0.09 (1.18)	0.17 (1.11)	0.20

Data are mean (SD), n (%), or median (IQR). P-values for difference in means across control and intervention group are adjusted for clustering at the village level.

'Anemic' is a dummy variable = 1 if altitude-adjusted hemoglobin concentration < 110 g/L. 'Underweight' is a dummy variable = 1 if child's weight-for-age z-score is more than two SD below the mean of the WHO reference population.

[#] Expressed in Bayley-III raw scores. Baseline Bayley-III scores are missing for 1 child.

[§] Hemoglobin values are missing for 15 children at baseline.

^{*} Height and weight are missing for 9 children.

Table A.5: Estimated effects of intervention on psychosocial stimulation

Outcomes	Intervention			Mean of control group at follow-up
	No.	β (95% CI)	P-value	
Panel A: Caregiver's beliefs and skills				
Summary index[§]	388	0.25 (0.07-0.44)	0.007	-0.13
Recognizes importance of interactive reading activities	389	0.07 (-0.03-0.17)	0.14	0.51
Recognizes importance of interactive parent-child play activities	389	0.06 (-0.01-0.14)	0.10	0.73
Know how to read to child	390	0.12 (0.02-0.22)	0.02	0.44
Know how to play with child	390	0.05 (-0.05-0.15)	0.31	0.64
Panel B: Caregiver's investment				
Summary index[§]	387	0.35 (0.18-0.52)	<0.001	-0.15
Used toys to play	387	0.14 (0.02-0.26)	0.02	0.44
Told story	387	0.09 (-0.01-0.19)	0.06	0.16
Read book	387	0.08 (-0.02-0.18)	0.12	0.09
Sang song	387	0.05 (-0.02-0.13)	0.17	0.31
No. of children's books at home	387	1.22 (-0.27-2.71)	0.10	3.36
Play area for child	387	0.11 (0.03-0.19)	0.005	0.29

[§] In panel A, 'summary index' is the weighted average of the measures in rows 2-5. In panel B, 'summary index' is the weighted average of the measures in rows 2-7.

The variables in rows 2-5 of panel A are dummy variables equal to 1 if the respondent gave a score above 4 on a 7-point Likert scale. The variables in rows 2-5 and row 7 of panel B are dummy variables equal to 1 if the respondent gave reported that he engaged in this activity on the day before.

When we use the Romano-Wolf stepdown procedure to adjust the p-values of all variables (except for the summary indices) for the family-wise error rate, the ITT effects on the probability that a child had a play area remains significant at the 5% level.

Table A.6: Estimated effects of intervention on health promotion

Outcomes	Intervention			Mean of control group at follow-up
	No.	β (95% CI)	P-value	
Panel A: Dietary diversity				
Minimum dietary diversity*	389	0.03 (-0.03-0.10)	0.30	0.85
Iron rich foods index**	384	0.23 (0.01-0.46)	0.04	-0.04
Dietary diversity index [§]	389	0.12 (-0.08-0.32)	0.22	-0.01
Any grains, roots or tubers	389	-0.01 (-0.03-0.02)	0.61	0.99
Any legumes or nuts	389	0.02 (-0.09-0.13)	0.76	0.59
Any dairy products	389	0.01 (-0.09-0.11)	0.86	0.52
Any flesh foods	389	0.03 (-0.06-0.11)	0.55	0.69
Any eggs	389	-0.05 (-0.14-0.03)	0.19	0.64
Any vitamin-A rich fruits or vegetables	389	0.03 (-0.05-0.11)	0.49	0.73
Any other fruits or vegetables	389	0.07 (-0.02-0.17)	0.12	0.82
Panel B: Meal frequency				
Minimum meal frequency*	389	-0.03 (-0.08-0.02)	0.27	0.13
Meal frequency index [§]	389	0.12 (-0.12-0.36)	0.30	-0.05
Number of times breastfed	389	-0.23 (-0.60-0.15)	0.22	0.60
Number of times fed fresh milk	389	0.11 (-0.11-0.34)	0.30	0.51
Number of times fed soft, semi-solid or solid foods	389	0.04 (-0.14-0.22)	0.65	2.67
Panel C: Nutritional supplementation				
Nutrition supplementation index [§]	384	0.12 (-0.08-0.32)	0.23	-0.04
Iron supplements	384	0.04 (-0.04-0.13)	0.30	0.19
Zinc supplements	385	0.06 (-0.04-0.17)	0.22	0.32
Calcium supplements	389	0.03 (-0.06-0.13)	0.45	0.58

* In line with the WHO, 'minimum dietary diversity' = 1 if the child received foods from 4 or more food groups (see rows 4-10) on the previous day. 'Minimum meal frequency' = 1 for breastfed children age 6-8 months fed more than twice on the previous day, for breastfed children of age 9 months and older fed more than 3 times per day, and for non-breastfed children over 6 months of age receiving at least 1 cup of milk and 4 meals per day.²⁸

** 'Iron rich foods index' is the weighted average of the measures in row 5, 7, 9, and 10 of panel A and row 2 of panel C.

[§] 'Summary index' of dietary diversity in panel A is the weighted average of the measures in row 4-10 of panel A. 'Summary index' of meal frequency in panel B is the weighted average of the items in row 3-5 of panel B. 'Summary index' of supplementation in panel C is the weighted average of the variables in row 2-4 of panel C.

The variables in row 4-10 of panel A are dummy variables equal to 1 if the corresponding food was consumed by the child on the day prior to the survey. The variables in row 3-5 in panel B are the number of feedings on the day before. The variables in row 2-4 of panel C are dummy variables equal to 1 if the corresponding nutritional supplement was given to the child during the year.

When we use the Romano-Wolf stepdown procedure to adjust the p-values of all variables (except for the summary indices) for the family-wise error rate, no ITT effects on non-aggregated outcomes remain significant at the 5% level.

Table A.7: Dose-response relationships

	Panel A: Skill development index		Panel B: Health index	
	(1)	(2)	(1)	(2)
HH Visits	0.010** (0.005)	0.018 (0.061)	0.019*** (0.005)	0.114 (0.072)
HH Visits ²		-0.0004 (0.003)		-0.005 (0.004)
Observations	385	385	390	390
R ²	0.33	0.33	0.04	0.05

Column (1) gives a control function estimate of the treatment effect of one household visit, assuming a linear relationship between the number of household visits and the child's development. Column (2) gives control function estimates of the treatment effect of one household visit, assuming a concave relationship. Residuals used in the control function estimation are derived from regressing the number of household visits on treatment status, the distance to the village committee, and the interaction between treatment status and the distance to the village committee. In all regressions we control for province fixed effects. For the estimation of dose-response effects on the skill development index, we also included tester fixed effects. All standard errors are clustered at the village level. P-values for two-tailed tests are computed for each coefficient using the cluster-correlated Huber-White estimator.

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