Hiring Additional Instructors in Childcare Centers in India Improved Learning and Nutrition

Researchers:

Alejandro Ganimian

Karthik Muralidharan

Christopher Walters

Sector(s): Education, Health

J-PAL office: J-PAL South Asia

Location: Tamil Nadu, India

Sample: 4675 children in 320 Anganwadi centers across four districts in the state of Tamil Nadu

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Although there is growing evidence across economics, neuroscience, and psychology about the importance of pre-school education, there is still relatively little guidance on how to improve its provision at scale—especially in low- and middle-income countries. Researchers conducted a randomized evaluation in the Indian state of Tamil Nadu on the impact of adding an additional education-focused worker in early childhood development centers on students' learning and health outcomes. The program increased the time spent on pre-school education, boosting learning in math, reading, and executive function. It also allowed the main worker to devote more time to health and nutrition, reducing severe malnutrition and stunting. The estimated benefits of the program, as measured by the expected increases in future wages through better learning outcomes, far outweighed its costs.

Policy issue

A large body of evidence has established the central role of early childhood health and education in fostering lifetime well-being and economic success.[1] Child-nutrition literature has shown that early life interventions can help improve child nutrition up to the age of two.[2] However, there is still a limited understanding of whether interventions can reduce stunting between the ages of three to five. Despite growing policy interest, little evidence exists on cost-effective ways of improving the quality of early childhood education programs in low- and middle-income countries at scale.

Across many lower-income countries, access to public pre-school systems has improved,[1] but it has not been accompanied by substantial improvements in student learning or attendance. Governments also face difficult decisions about which programs to fund when deciding how to spend limited public funds. Can adding an extra worker focused on pre-school education improve the learning and health outcomes of children under age five?

Context of the evaluation

India has the largest number of children under the age of six in the world—over 160 million. Data from a national survey in 2019-21 suggests that 35.5 percent of Indian children under age five are stunted and 32.1 percent are underweight.[3], As of 2016, India had the world's largest number of malnourished children, which threatens to diminish their development potential. Additionally, Indian children display low levels of learning starting as early as primary school, and learning outcomes are worse for children who attend public schools. For example, 19 percent of public school first graders are able to read words as compared to 42 percent of private school first graders.[4]

The Integrated Child Development Services (ICDS) program is the primary government program responsible for early childhood development in India. ICDS provides services in health, nutrition, and pre-school education via a network of *anganwadi* centers—early childhood care centers in communities. It is the largest program of its kind in the world, reaching tens of millions of socio-economically disadvantaged children between the ages 0–6, who are likely to benefit the most from early childhood education and nutrition programs. All *anganwadi* centers are staffed with one worker who is responsible for managing all services provided at the center, and one helper who helps to maintain the center and prepare food for the children. While the *anganwadi* worker is expected to have at least a secondary school education, the helper is not required to have formal education beyond basic literacy. This study was conducted in the state of Tamil Nadu, which is home to 4.2 million children between the ages of 3–6. Despite the state being ranked high nationally in terms of child nutrition, 25 percent of the children in Tamil Nadu are stunted and 22 percent are undernourished. Furthermore, based on an initial check on time-use, on average, *anganwadi* workers in Tamil Nadu spent only 38 minutes per day on pre-school instruction out of the scheduled two hours.

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Details of the intervention

In partnership with the Government of Tamil Nadu, researchers conducted a randomized evaluation to test the impact of adding an extra worker to early childhood development centers on students' learning and health outcomes. Researchers randomly sampled a total of 320 *anganwadi* centers across four districts to be representative of a population of 60 million people. Half of these centers received the extra worker (called "facilitator") and the other half continued to operate with only one main worker and a helper (who focuses on cleaning the center and feeding the children). Facilitators were hired on two-year contracts using similar eligibility criteria to those for the main worker. They were expected to work half the time of workers and they were paid accordingly (INR 4000 per month compared to INR 8000 per month, or US$60 per month compared to US$120 per month).

Prior to the study, the Government of Tamil Nadu had collaborated with UNICEF to develop an early childhood education (ECE) curriculum that indicated what instructors should do on every day of the year. This allowed the workers and facilitators to implement it with only six days of training per year.

A baseline survey was conducted between September to November 2016 prior to randomization, and a follow-up survey was conducted sixteen months later. The outcomes studied were children's scores on independent tests of math, language, and executive function skills, as well as measures of nutrition. The nutrition outcomes included weight-for-age (a measure of wasting) and height-for-age (a measure of stunting). Executive function refers to skills that help children to focus, self-regulate emotions and behaviors, and adapt to new situations, among other things. [5] The researchers measured executive function by testing children's inhibitory control (the ability to control impulses), working memory (a type of short-term memory that involves temporarily storing information), and cognitive flexibility (the ability to switch between thinking about different topics). Finally, the researchers also measured worker attendance, use of time, and tardiness through unannounced visits.

Results and policy lessons

Researchers found that the addition of an extra worker focused on early childhood education doubled the total instructional time and led to an increase in math and language test scores after eighteen months. Further, the intervention also lowered rates of stunting and severe malnutrition in the participating group. The researchers estimated that, even erring on the side of caution, the increase in the value of the participants' future earnings, adjusted for inflation, would be much greater than the cost of the program to the government. Furthermore, the hiring of the extra worker was a more cost-effective option than other policy options the ICDS may consider, such as increasing the pay of existing workers.

Implementation: Virtually all centers assigned to receive a facilitator hired one. Five months after the government issued the order for such hiring, 98% of centers had a facilitator. In fact, the average facilitator was hired within 15 days of such order. Nearly all facilitators received the required six days of training. The majority of centers also had an up-to-date activities register indicating the activities the facilitator completed each day. The government also circulated an order specifying facilitators ought to focus on instruction.

The follow-up rate for participants in the study was 33 percent, meaning that the researchers were not able to collect complete data on 67 percent of participants. The researchers believe this low number was a result of children graduating from preschool, moving to different preschools, families moving away, and inconsistent attendance. In order to get the information they needed, the researchers added an additional household survey delivered to half of the children enrolled at the beginning of the study to assess the aforementioned outcomes.

Center operations and worker attendance: The hiring of the facilitator reduced the likelihood of centers being closed by the start of pre-school instruction by 8.9 percentage points from 12.5 percent to 3.8 percent (equivalent to a 70 percent reduction in closures). This occurred likely because workers were responsible for opening the centers for the facilitators. Consistent with this hypothesis, workers were 10.7 percentage points more likely to be present during unannounced visits at the start of pre-school education time, from 80 percent to 90 percent (a 50 percent reduction in absence).

Time spent on education and nutrition: Facilitators and workers reallocated time as expected, with facilitators spending most of their time on education and workers spending more time on administrative tasks (including keeping records of children's outcomes) and health and nutrition. The typical facilitator spent almost an hour a day on pre-school, *doubling* time on instruction. The typical worker spent 6 more minutes a day on health and nutrition, resulting in a near *tripling* of time on such tasks (from less than 6 minutes to almost 17 minutes a day).

Learning outcomes: Consistent with the increases in time on instruction, children who remained in the centers for the entire study improved in tests of math, language, and executive function (i.e., working memory, mental flexibility, and self-control) by 0.29, 0.46, and 0.18 standard deviations (SDs), respectively. The children who were tested at home, who are more representative of the group originally assigned to receive the program, but who may have aged out, transferred, or dropped out of the centers (and were thus exposed to the facilitators for less time), improved in both math and language tests by 0.13 and 0.10 SDs, respectively.

Health and nutrition: Children who remained in the centers throughout the study were 3.1 percentage points less likely to be severely underweight (i.e., 3 SDs below the expected weight for their age, according to global standards), 4.8 percentage points less likely to be stunted (i.e., 2 SDs below the expected height for their age), and 2.3 percentage points less likely to be severely stunted (i.e., 3 SDs below height expectations), from bases of 9.1 percent, 29 percent, and 5.7 percent, respectively. Those who were weighed and measured at home saw smaller effects that may not replicate if the study were repeated.

Cost-effectiveness: There are three alternative ways to make sense of the cost-effectiveness of the intervention. One of them is the benefit/cost ratio (i.e., how the estimated benefits of the intervention compare to its costs). The predicted effect of the intervention on future earnings is equivalent to 13 times its cost. Another way to understand the cost-effectiveness is the marginal value of public funds (i.e., how the marginal benefit of the intervention compares to its marginal cost). If beneficiaries pay a net tax of 7.7 percent of future earnings once they start working, costs are more than paid back in present value by expected tax revenues. And finally, a third way to understand the cost-effectiveness is a comparison of the intervention to a likely alternative use of funding: unconditional pay increases for childcare workers. The pay increase had no impact on education or nutrition outcomes, unlike the intervention discussed here.

In summary, since this program required the hiring of locally-available staff with a secondary education with a week of formal government-led training, researchers noted that it would be easily scalable, and its potential future benefits accruing to the government would likely greatly exceed the costs of the program if implemented at scale. The researchers also suggest that one promising way to expand and scale this intervention may be to combine the childcare worker with additional optimization of tasks and time allocation thought to improve early childhood development.

Ganimian, Alejandro, Karthik Muralidharan, and Christopher Walters. 2023. "Augmenting State Capacity for Child Development: Experimental Evidence From India." *Journal of Political Economy* (accepted). https://www.journals.uchicago.edu/doi/abs/10.1086/728109

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1. World Bank Group. 2016. "Snapshot: Investing In The Early Years For Growth And Productivity (English)." Washington D.C. http://documents.worldbank.org/curated/en/276471475756836740/Snapshot-investing-in-the-early-years-for-growth-and-productivity.

2. Britto, Pia R, Stephen J Lye, Kerrie Proulx, Aisha K Yousafzai, Stephen G Matthews, Tyler Vaivada, and Rafael Perez-Escamilla et al. 2017. "Nurturing Care: Promoting Early Childhood Development." *The Lancet* 389, no 10064 (January): 91-102. doi: 10.1016/s0140-6736(16)31390-3.

3. Ministry of Health and Family Welfare. 2021. "National Family Health Survey-5 (2019-21). Compendium of Fact Sheets: Key Indicators From India and 14 States/UTs." New Delhi, India: Government of India.

4. ASER. 2020. "Annual Status of Education Report (Rural) 2019: Early Years." New Delhi, India: ASER Centre.

5. Calderon, Johanna. 2020. “Executive function in children: Why it matters and how to help.” *Harvard Health*, September 16, 2020. Harvard Health. https://www.health.harvard.edu/blog/executive-function-in-children-why-it-matters-and-how-to-help-2020121621583