School-Based Nutrition Programs to Improve Child Health in India

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Sector(s): Education, Health, Social Protection

Location: Kendujhar district, Odisha, India

Sample: Primary school children in 148 government schools

Target group: Primary schools

Outcome of interest: Enrollment and attendance Student learning Food security Health outcomes Nutrition

Intervention type: Information Subsidies

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Partner organization(s): International Initiative for Impact Evaluation (3ie), Douglas B. Marshall, Jr. Family Foundation, International Growth Center (IGC), Wellesley College

Schools are often responsible for implementing various programs that target child outcomes, but the simultaneous implementation of such programs may affect their execution and ultimate impact. In 2012, India introduced an iron and folic acid supplementation program as part of their national midday meal scheme in an attempt to reduce the prevalence and severity of anemia among school children. Researchers conducted an evaluation to test the impact of introducing a second school-based nutrition program, and monitoring these two programs, on child nutrition and program implementation. Results showed that high intensity monitoring improved the implementation of the government's iron and folic acid supplementation program and, in turn, improved child health. The introduction of the new micronutrient mix intervention crowded out implementation of the government's iron and folic acid supplementation program, leading to no net change in child health.

Policy issue

Malnutrition includes micronutrient deficiencies like iron deficiency, which is a leading cause of anemia globally and a condition that is particularly harmful during early childhood, causing fatigue and slower physical and cognitive development with potentially long-lasting effects.[1] Governments around the world often rely on the school system to deliver calories and nutrients to improve child welfare. However, when schools are tasked with implementing multiple nutrition programs, there is a risk of newer programs inhibiting (or crowding out) the implementation of existing programs or interfering with school activities. Factors that can contribute to crowd-out include resource and administrative capacity, constraints on staff time, or the belief that a new program will suffice. Prior research has shown that monitoring service providers can be an effective method to improve the

implementation of public services. However, there is uncertainty about how to best implement new programs without crowding out existing programs. Can the simultaneous implementation of two school-based nutrition programs in India complement one another and improve child health? Furthermore, can monitoring program implementation improve delivery and impact students' nutritional levels?

Context of the evaluation

Micronutrient deficiency is particularly acute in India, where 58 percent of children under five are anemic.[2] Like many governments around the world, India relies on existing school infrastructure to deliver programs aimed at improving child welfare, so in an effort to improve nutritional levels among children and encourage school attendance, the Indian Supreme Court mandated a school feeding program for children in grades one through eight, known as the "midday meal scheme." To further address malnutrition, in 2012, the government introduced a national iron and folic acid (IFA) supplementation program to reduce the prevalence and severity of anemia.

In the Indian state of Odisha 41 percent of children under five are underweight and 65 percent are anemic.[3] The midday meal program, aimed at providing nutritious meals, is the responsibility of headmasters or teachers who obtain food materials and cooking fuel and hire and supervise cooks. In addition, while the process of distributing tablets for the IFA program relied on government officials, the rest of the program's implementation in schools, which included distribution of free iron and folic acid supplements weekly and deworming medication biannually, was the responsibility of the headmasters and teachers. As more students participated in the program, tablet distribution and ingestion monitoring became increasingly difficult for teachers and headmasters, who in this context, considered running this program to be an administrative burden.

The children in this study's sample were 44 percent underweight and 60 percent anemic, fairly representative of Odisha. Among the households in the study sample 50 percent had electricity, 30 percent owned a phone, and 50 percent of household heads were literate. Despite such poverty, school enrollment rates are high in Odisha with 82.8 percent of both boys and girls aged 6-17 attending school.[4]



School children in India eating their mid-day meals.

Photo credit: Tukaram.Karve, Shutterstock.com

Details of the intervention

In partnership with the National Institute of Nutrition and the Government of Odisha, researchers conducted a randomized evaluation to test the impact of a supplementary micronutrient mix (MNM) program and heightening monitoring on the delivery of the IFA program and child health outcomes. Out of 148 schools included in the study, 75 were randomly assigned to receive the MNM program in addition to the IFA program, while the remaining 73 served as the comparison group, receiving access to only the status quo IFA program. Schools in the MNM group were provided a micronutrient mix containing Vitamins A, D, C, B1, B2, B6, B12, Niacin, Zinc, Selenium, and Calcium, intended to complement the IFA program by helping children absorb iron. In addition, headmasters, cooks, and other staff received a training on adding the vitamin mix to meals and the health benefits of consuming micronutrients, with headmasters often playing a more hands on role throughout the implementation. Additionally, these schools received fliers with instructions on adding the MNM to food and cups with exact measurements for the mix.

In addition, half of the schools in both the MNM and comparison groups were randomly selected to receive high-intensity monitoring. While all schools were visited during mealtime on a random day once per month during the last three months of the study, schools in the “high-intensity monitoring” group received a random monthly visit for the whole duration of the five-month evaluation. Visits involved observations of meal quality, child attendance, distribution of food items and quantities to children, amount of food consumed, and height measurements of randomly chosen students. Headmasters and cooks were also asked about preparation of meals and storage of equipment and ingredients.

The MNM and high-intensity monitoring programs were launched in November 2014 and continued through April 2015. Researchers collected data on student attendance, MNM usage, IFA tablet distribution, quality of midday meals, and child health outcomes including weight and hemoglobin levels.

Results and policy lessons

The addition of the MNM program to the existing IFA program hindered, or crowded out, the implementation of the IFA program and did not improve child health. However, early and regular monitoring of the programs did improve the implementation of the IFA program and led to better child health outcomes. Schools that received both the MNM program and the high-intensity monitoring experienced no change in the implementation of the IFA program, suggesting that the crowd-out and the monitoring effects cancelled each other out. Students in these schools did experience an improvement in child health, suggesting that without the crowd-out effect, the MNM mix would have its intended effect of complementing the IFA program, improving iron absorption and child health.

MNM take-up: Schools in the MNM group received approximately 0.6 kg of the mix per enrolled child and used nearly all of it. In addition, meal samples show that MNM increased the intake of vitamin A and zinc by 190-376 micrograms (30-60 percent of the recommended daily allowance (RDA) for children) and two milligrams (20 percent of RDA) respectively, as compared to intake among children receiving status quo meals. These increases persisted through the end of the intervention. There was no impact of high-intensity monitoring on MNM take-up.

IFA implementation: MNM and high-intensity monitoring had opposite effects on implementation quality of the IFA program. The students in high-intensity monitored schools were 0.04 to 0.05 percentage points (7.2 to 8.3 percent) more likely to report receiving IFA tablets regularly while those in the MNM only group were 0.03 percentage points (6.2 to 6.3 percent) less likely to report receiving the tablets as compared to students in non-MNM schools. Schools that received both MNM and high-intensity monitoring did not see improvements in how well the IFA program was implemented.

The impact of monitoring alone became stronger as the school year progressed—by February 2015 headmasters were more likely to report distributing tablets to students. However, across all months of the program, neither intervention affected whether school headmasters showed enumerators an IFA tablet or the number of tablets distributed to students as reported by headmasters. The results suggest that the MNM crowded out or reduced IFA implementation while the high-intensity monitoring on its own crowded in or improved IFA implementation. This crowd-out of IFA by MNM is concentrated in schools with less administrative capacity.

Child Health: The MNM treatment alone had no effect on child health, but after five months high-intensity monitoring did increase hemoglobin levels by 0.17-0.24 g/dL and reduced the likelihood of being anemic by 6 to 9 percentage points (10-15 percent decrease relative to the comparison group). Students in schools that received both the MNM and high-intensity monitoring saw a similar increase in hemoglobin levels as those in the high-intensity monitoring only schools.

Surprisingly, the positive effect on hemoglobin levels was driven by children around the threshold of anemic not those with moderate or severe anemia, who tend to be more responsive to treatment. This unexpected result could be due to lower attendance rates for moderately anemic children or the low levels of micronutrients distributed by the IFA program Additionally, neither intervention had an impact on body measurements, which is not surprising given that changes in such measures like height or weight may take time and the duration of the program was short.

Among schools that only received MNM, crowd out of the IFA program may explain the lack of impact on child health. In contrast, for schools who received only high-intensity monitoring, improvement in IFA implementation may explain the decrease in anemia. Finally schools with both MNM and high-intensity monitoring did not experience crowding out of the IFA program due to the moderating effects of the monitoring intervention, explaining improvements in child health.

The evaluation's results suggest that school-based micronutrient distribution programs can be successful, but questions remain around how best to deliver simultaneous programs and engage school officials to implement these programs effectively. Additionally, top-down monitoring of programs may be a potential way to improve implementation of public health programs, and this kind of monitoring may offset the challenges of implementing multiple programs at once.

Berry, James, Saurabh Mehta, Priya Mukherjee, Hannah Ruebeck, Gauri Kartini Shastry. 2021. "Crow-out in School-Based Health Interventions: Evidence from India's Midday Meals Program." Journal of Public Economics 204, no. 104552 (December): 1-15. doi: https://doi.org/10/1016/j.jpubeco.2021.104552.

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