

Conversations with Dr. Kartini Shastry, October 12 and 25, 2018

Participants

- Dr. Kartini Shastry – Associate Professor of Economics, Wellesley College
- Josh Rosenberg – Senior Research Analyst, GiveWell

Note: These notes were compiled by GiveWell and give an overview of the major points made by Dr. Shastry.

Summary

GiveWell spoke with Dr. Shastry of Wellesley College as part of its investigation into India's iron and folic acid (IFA) supplementation program. Conversation topics included the program's implementation, monitoring, cost-effectiveness, and potential improvements and results from two of Dr. Shastry's research papers on the program: *Implementation and Effects of India's National School-Based Iron Supplementation Program*

(<http://academics.wellesley.edu/Economics/gshastry/berry%20et%20al%202018%20IFA.pdf>) and *Inputs, Monitoring, and Crowd-out in School-based Health Interventions: Evidence from India's Midday Meals Program*

(https://www.povertyactionlab.org/sites/default/files/publications/Inputs-Monitoring-and-Crowd-Out-in-School-Based-Health-Intervention_Berry%20et%20al%202018.pdf).

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IFA program and Dr. Shastry's research

India's national IFA program provides iron and folic acid supplementation to schoolchildren. It aims to reduce the prevalence of anemia caused by iron deficiency. Through this program, state governments supply supplement tablets to primary schools that, in turn, provide the tablets to children. The tablets contain both iron and folic acid.

The IFA program was first implemented in the 2013-14 school year. Between 2012 and 2015, Dr. Shastry's study team conducted multiple surveys of 378 schools in the five blocks of Kendujhar District in the state of Odisha. They also conducted a randomized controlled trial (RCT) in a sample of these schools to evaluate the impact of two interventions related to the IFA program. Results of this research are published in the two papers mentioned above.

Survey results

Supply chain

In spring 2014, Dr. Shastry's study team conducted an uptake survey to determine which schools received tablets during the 2013-14 school year. They found that some schools received no tablets and that in some blocks, only 50-60% of schools received tablets. In contrast, in a December 2014 survey conducted during the program's second year, 100% of schools reported receiving tablets. These results

suggest that between the 2013-14 and 2014-15 school years, Odisha's state government improved its tablet supply chain.

The importance of a well-functioning supply chain is demonstrated by another survey finding: the IFA program had no effect on children's hemoglobin levels, a measure of iron status. However, by the time hemoglobin levels were measured, most schools had run out of tablets. For this reason, Dr. Shastry believes that children's hemoglobin levels may have improved during supplementation but dropped once supplementation ended—an effect possibly caused by supply chain issues, not by ineffective supplement tablets.

School distribution

India's central government requires that primary schools provide a hot midday meal to children every day. Though Odisha is a relatively poor state, Dr. Shastry's study team found that its schools were regularly open and consistently served a meal, with monitors observing no meal in only around 1% of 500-600 visits. Dr. Shastry attributes this consistency to the state government, which prescribes a menu and is supposed to provide schools with rice and money to purchase lentils. Almost all of the schools surveyed by Dr. Shastry's study team had received rice. She believes that this consistency may be specific to Odisha and has heard anecdotal evidence that meals are served less consistently in other parts of the country.

The IFA program requires that primary schools distribute supplement tablets to children during these midday meals. Typically, school headmasters are responsible for overseeing tablet distribution, or they may delegate this responsibility to one or multiple teachers. During the program's first year, tablet distribution was supposed to occur daily. During its second year, the frequency of tablet distribution changed from daily to weekly. In the second year of the program, 41% of children surveyed by Dr. Shastry's study team reported receiving tablets weekly. In contrast, 90% of school headmasters reported providing tablets weekly.

Providing tablets to children during the summer

The IFA program also requires that primary schools provide supplement tablets for children to bring home and take during the summer. However, Dr. Shastry does not believe that schools are currently doing so or could successfully do so without an improved supply chain. This is a problem because a suspension of supplementation during the summer could cause any improvements in children's hemoglobin levels to be lost. Thus, the school-based nature of the IFA program may limit its ability to sustain improvements year-to-year.

RCT results

Dr. Shastry's research team conducted an RCT in a sample of schools in the state of Odisha to evaluate the impact of two interventions on the IFA program:

1. **Micronutrient mix program** – Addition of a micronutrient mix (MNM) to school meals to complement IFA supplementation

2. **High intensity monitoring** – Increased monitoring of school meals early in the intervention

Approximately half of schools received the MNM (MNM treatment group), and the other half did not. Within each of these two groups, approximately half of schools received high intensity monitoring (high intensity monitoring treatment group).

Crowd-out effect

The addition of the MNM program had a negative effect on IFA program implementation, with students in the MNM treatment group less likely to report regularly receiving tablets in school. These results suggest a crowd-out effect in which the introduction of a new program crowded out implementation of an existing program. The study team believes that this effect was caused by resource constraints that limited schools' ability to implement both programs successfully.

This effect was smaller in schools where more teachers participated in meal delivery. Dr. Shastry attributes this result to more effective program management by the headmasters of those schools. This could either be because headmasters who delegated were also superior program managers or because increased teacher participation actually improved program implementation.

Other potential sources of crowd-out

Outside of the midday meal program and the IFA program, Dr. Shastry is not aware of any other primary school-level health interventions in India that might contribute to crowd-out. In addition to weekly iron and folic acid tablets, the IFA program also requires schools to distribute deworming tablets biannually. While this could lead schools to confuse the two types of tablets, Dr. Shastry's study team did not find any evidence of this occurring.

Monitoring effect

Over the RCT's five-month span, the study team conducted around ten school visits, including IFA program surveys, a facility survey, attendance checks, and monitoring visits in which monitors tested meals for the nutrients in the MNM to determine if it had been added. The study team decided to vary the frequency of these monitoring visits. Monitors visited schools in both monitoring groups once per month during the last three months of the study. In a high intensity monitoring treatment group, monitors visited schools in this group once per month during each of the first two months of the study (the low intensity group did not receive visits during these months).

The study found that increased monitoring improved hemoglobin levels and reduced the probability of being anemic by about 6-9 percentage points. Dr. Shastry proposed several possible explanations for the effect of these two additional visits:

1. **Time of monitoring** – The two visits occurred during mealtimes, when tablets were supposed to be distributed, and thus may have encouraged diligent program implementation.

2. **Height measurement** – During monitoring visits, monitors randomly selected three children and measured their height. Dr. Shastry believes that headmasters may have interpreted these measurements as being motivated by concern about children’s health. Thus, the two visits, which provided two additional opportunities for headmasters to witness height measurements and thus to develop concern about children’s health, may in turn have motivated diligent program implementation.
3. **Habit formation** – The two visits occurred early in the intervention and thus may have caused schools to develop a habit of diligent program implementation.

Potential government monitoring

Dr. Shastry believes that the Indian government could implement a similar monitoring program and that increasing the number of government monitoring visits could possibly lead to improved program outcomes. However, for two reasons, government monitoring may have limited success:

1. The effects of increased monitoring may not continue. While there were no explicit incentives attached to the monitoring visits during the first year of the program, the simple awareness of being monitored may have caused schools to perform better. However, this effect could disappear over time if schools do not maintain high performance without explicit incentives.
2. It is possible that schools would change their behavior less in response to government visits than they do in response to visits from researchers or other groups.

Potential improvements to the IFA program

Implementing school-level distribution interventions

Because of the supply chain improvements observed between the 2013-14 and 2014-15 school years, Dr. Shastry believes that other supply chain problems may be solved without external intervention. She notes, however, that those improvements may have been specific to Odisha.

In contrast, Dr. Shastry does not expect problems with the schools’ distribution of tablets to students to be resolved without external intervention. While school administrators may grow more familiar with the program over time and thus remember to distribute tablets more regularly, it is also possible that they may grow less diligent as the program ages. She notes, however, that any intervention, whether at the supply chain or school distribution level, can only succeed if schools are open and meals are being served. Thus, the effectiveness of any intervention will be context-specific.

Other potential improvements

Dr. Shastry speculated about other potential improvements to the IFA program, including:

1. **Targeting anemic children** – Children diagnosed with anemia could be treated with a higher dosage of iron supplement tablets. While this would likely be a more effective way to improve children’s health, it would also be more expensive, so Dr. Shastry does not believe this practice is likely to be implemented in the near future.
2. **Providing other micronutrients** – Dr. Saurabh Mehta, a member of Dr. Shastry’s study team, believes that children may not be receiving sufficient amounts of other micronutrients, such as vitamin A and zinc, to absorb iron. Thus, the effectiveness of iron supplementation in improving their nutrition may be limited. These concerns motivated the study team to measure the effects of the MNM, with which they originally planned to provide children with 100% of the recommended dietary allowance (RDA) of these micronutrients. Instead, India’s National Institute of Nutrition only allowed them to provide 50% of the RDA due to its belief that children obtain these micronutrients from other sources, including the midday meal. However, laboratory tests of the midday meals show that without fortification, the meals contain only small amounts of vitamin A and zinc. For this reason, Dr. Shastry believes that the government may want to consider incorporating these other micronutrients into the IFA program.
3. **Providing incentives** – Dr. Grant Miller conducted a study in China and found that providing school headmasters with financial incentives to reduce anemia prevalence amongst students had an effect on headmaster behavior. This suggests that providing incentives or using program success as a measure of headmaster job performance could be effective ways to improve program implementation.

Cost-effectiveness of the IFA program

Implementation

Implementation of the IFA program only requires that schools distribute tablets once a week while serving the midday meal. As long as a meal is served, Dr. Shastry does not believe that it requires substantial additional time on top of meal delivery. Thus, while the meals themselves add significant administrative burden, the only administrative burden added by the IFA program is the requirement that a headmaster or teacher remembers to distribute tablets. It is difficult to measure the marginal cost of this administrative time.

Monitoring

Dr. Shastry believes that cost-effectiveness analyses of such programs need to better consider the cost and time needed for program monitoring, which, in an effective program, will be more expensive than implementation. Currently, such monitoring is often not occurring. While the IFA program requires that schools be audited, Dr. Shastry’s study team neither observed an audit nor found evidence of audits occurring in any of the schools they visited.

Fortification

Micronutrient fortification may reduce the cost-effectiveness of the IFA program by eliminating the need for supplementation. For three reasons, however, Dr. Shastry believes that progress to successful fortification in India will be slow and that it is unlikely to replace the need for supplementation in the near term:

1. **Difficulty of implementation** – While India’s government has expressed interest in fortification programs, these programs are difficult to implement. For example, Dr. Shastry’s research team had discussions with state governments about a potential mandate that wheat obtained through the public distribution system be fortified, but such a mandate was never enacted due to difficulty of implementation.
2. **Limited coverage** – Fortification is successful in the United States because almost everyone purchases food from grocery stores, which means that they consume fortified products. In India, however, many people are subsistence farmers who grow their own crops. For this reason, even if commercial food products such as wheat are mandated to be fortified, subsistence farmers may not be reached. In addition, other efforts to reach these farmers have been ineffective. Dr. Esther Duflo, Dr. Abhijit Banerjee, and Dr. Rachel Glennerster have conducted research in India on a program encouraging subsistence farmers to fortify their wheat at mills. They found that participation was very low and deemed the program unsuccessful.
3. **Limited effectiveness** – In their work on double-fortified salt, Dr. Sharon Barnhardt, Dr. Duflo, and Dr. Banerjee found that the amount of iron provided through salt fortification is inadequate to affect health outcomes. This suggests that multiple sources of iron are necessary to affect health outcomes, which in turn suggests that supplementation and fortification could function complementarily.

*All GiveWell conversations are available at
<http://www.givewell.org/research/conversations>*