Tackling malnutrition among China's rural babies

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A child draws as part of the cognitive development test. Credit: REAP

In regions of rural China where health education is limited, parents know more about the nutritional needs of their pigs than of their own children. And while piglets are raised to be robust and ready to command high market prices, infants in this part of the world suffer from high rates of anemia and cognitive delays that put them – and the country's economy – at risk, according to Stanford researchers.

Those researchers are now experimenting with ways to encourage parents to feed their children more nutritious food. And they're hoping

their results will push the Chinese government to implement policies to curb malnutrition, especially anemia.

"Anemia acts like an invisible drag on the Chinese economy," says Scott Rozelle, director of the Rural Education Action Program (REAP) at Stanford's Freeman Spogli Institute for International Studies (FSI). REAP is a part of FSI's Center on Food Security and the Environment.

Rozelle and his colleagues spearheaded a survey of 1,800 babies in Shaanxi province that shows the scope and impact of malnutrition throughout the region. Their findings will soon be published.

Despite China's rapid economic growth in recent decades, anemia among rural populations remains widespread. Left untreated, anemia decreases oxygen to the brain and can hurt cognitive and physical development. The World Health Organization estimates that effective treatment of anemia can improve national economic productivity by up to 20 percent. Other research has shown that the long-term effects can be even greater.

But poor nutrition is only partially to blame for the high rates of cognitive delays that the researchers discovered. Rozelle and his team also found that most parents don't spend enough time playing and talking with their babies. In general, parenting practices in the region do not involve providing babies with mental stimulation, which is also an important part of cognitive development.

Testing and treating 1,800 babies

Rozelle and his colleagues first set out to understand the scope of the problem by measuring anemia rates among rural Chinese babies. Between April and October, 2013, REAP administered the largest survey of rural baby nutrition ever conducted in China. Over the course of four weeks, a team of around 120 surveyors tested 1,824 babies in

351 poor, rural villages across Shaanxi Province.

The researchers found that in the region, where pig farming is one of the main industries, more than three times as many parents had accurate information about pig nutrition than about baby nutrition. When asked whether micronutrients are necessary for the healthy growth of baby pigs, over 70 percent of caretakers responded "yes". But only 21 percent of caretakers believed that micronutrients are also important for human babies.

The researchers also found that 49 percent of the children in the survey had anemia, and 40 percent showed significant cognitive or motor delays. These rates exceed the global average for children and indicate widespread deficiencies in child nutrition in the region.

The REAP team then set up an experiment. One third of households were given a free daily supply of nutritional supplements for their children. Another third were given the same free supplements, and were enrolled in a text message reminder program. A final third of households served as a control group. The study is ongoing through April, 2015, but 12 months into the program, the researchers have found that the supplements have reduced anemia rates by 28 percent, although cognitive delays have persisted.

Anemia linked to poor diets

In contrast with their children, the parents who participated in the survey seemed to be well-fed and showed relatively low levels of anemia (19 percent). Many also reported purchasing expensive baby formula for their children, indicating a willingness to spend financial resources on child nutrition. The problem therefore seems to be not one of poverty, but rather one of information: parents are unknowingly feeding their children food that is lacking in iron and other micronutrients.

The nutrients missing from the babies' diets are plentiful in solid foods such as fruits, vegetables, and lean meat. International standards for child nutrition advise that complementary foods be introduced to infants at around six months of age. By one year of age, solids should make up more than half of a child's diet.

Parents in the REAP study, however, waited until between one year and 18 months to introduce solid foods. Many mothers stopped breastfeeding at six months, switching their babies to diets consisting mostly of rice porridge or wheat-flour based soups.

Many parents said early childhood diets were unimportant for healthy development.

"I don't think the foods he eats matter since he doesn't eat that much," one parent told the researchers. Another insisted, "Formula and porridge are good enough for my baby. He is always happy after mealtime."

The "Hidden Hunger"

Sometimes described as "hidden hunger," micronutrient deficiencies like anemia can go undetected because those afflicted often look healthy. Young children can appear to be well fed or even overweight, but still lack critical nutrients for normal development. In remote places where blood tests are unavailable, it can be impossible to tell that a child is anemic.

But about 25 percent of the world's population is anemic, making the condition the most common form of malnutrition. About 25 percent of people are anemic worldwide, including half of pregnant women and 40 percent of children under the age of five.

The effects of anemia, however, are most severe among infants and

toddlers. The damage it causes is difficult to reverse after the first several years of life.

Nutritional Myths

Rozelle's team found several misconceptions about infant health and nutrition. One myth was especially common: that babies cannot digest solid food until they can walk.

"I wouldn't dare give her anything before that," said one parent. "Soft, clean foods are good for my baby. Hard foods are not healthy."

Some parents even assumed that soft foods were better for their child's cognitive development. "A good way to make him smarter is to feed him starches and rice. You can't feed him hard food," explained a mother about her young son.

The interviews also highlighted a lack of knowledge about malnutrition, and about the links between nutrition and health. "Genes cause malnutrition," said one mother. "You'll know if your skin turns pale and you become really thirsty."

Another answered, "[Anemia] is caused by not eating enough." When asked how anemia is treated, answers included drinking sugary water, adding red sauce to food, eating peanuts, getting a blood transfusion at the hospital, and taking traditional Chinese medicine.

In reality, anemia can be treated at home with a daily low-cost iron supplement (like the one being distributed as part of the REAP study), or simply by adding more iron-rich foods to a child's diet.

"No one ever told me how to feed my baby"

The pervasiveness of misinformation about baby nutrition stems from a lack of access to health and nutrition education. As one mother explained, "No one ever told me how to feed my baby." The majority of interviewees reported relying on older family members for guidance on how to feed and care for children.

Local doctors do little to encourage proper child health care. Many prescribe medicines to treat immediate symptoms of malnutrition, such as colds or diarrhea, without addressing underlying issues.

One parent whose baby was found to be anemic reported, "The doctor never said anything to help me understand my child. He just told me to buy some rice powder and medicine."

Other parents refuse to see a doctor at all. An interviewee with two young sons admitted to having never taken her children for a check-up for fear that her fertility would be monitored under China's one-child policy. Some mothers said they relied on traditional Chinese medicine to treat health problems rather than visit doctors.

Parents also frequently relied on information from local baby formula sales representatives. When asked how she makes decisions about her baby's health, one mother reported, "I read the booklets at the formula store for information." Perhaps unsurprisingly, this same mother was late in introducing solid foods to her child, and during the interview fed her 15-month-old child a type of formula that stated clearly on the label that it was suitable only for babies up to 12 months of age.

"The formula salesperson said to ignore that," she explained.

Nourishing the Future

The REAP team designed an experiment to tackle both problems:

infants' poor diets and parents' lack of nutritional knowledge. The project, called Nourishing the Future, was funded by the International Initiative for Impact Evaluation, UBS Optimus Foundation, China Medical Board and others.

A map of Shaanxi province, where the REAP survey was carried out. Credit: Wikipedia

Each household in the study, with the exception of a control group, received a one-year supply of daily supplement packets called NurtureMate, manufactured by Heinz, another partner in the project. The powdered mix of iron, zinc, folic acid, and vitamins can be added to milk or formula, or sprinkled on porridge.

In addition to supplements, the treatment group received instruction in the basics of childhood nutrition. At 8:00 every morning, half of the treatment group also received a daily text message reminder to administer the packets: "Have you taken your NurtureMate today? Your baby needs the nutrients to grown strong and stay healthy!"

Text message reminders appear to have been modestly effective in improving program compliance. Caregivers who received the reminders gave their baby the micronutrient supplements, on average, 10 percent more often over the course of the first six months of the study. So far, however, this improved compliance has not led to a corresponding fall in anemia rates.

Other factors influence infant development

Although anemia rates fell among the two treatment groups, Rozelle's team found no cognitive improvements.

"It's still early, but it's becoming clear that nutrition is not the only piece of the puzzle," says Alexis Medina, the project manager of Nourishing the Future. "Several things affect brain development in young kids. One is nutrition. Another is the mental stimulation that children get through games, toys and face-to-face interaction with adults."

The babies Medina and her team evaluated had very few toys or books at home, and received minimal attention from their caretakers in terms of playing, singing and talking.

"A lot of parents we talked to didn't think much about whether they were playing with their kids enough," Medina said. "But some actually thought it was a waste of time. We had several mothers tell us, 'Babies don't remember much when they're young, so I don't bother talking or reading to [my baby]. They can't understand me yet anyway, so what's the

point?'"

A REAP surveyor tests how a baby reacts to his own reflection. Credit: REAP

Changing policy

With its first high-quality data sets in hand, REAP is now looking for long-term answers to the child malnutrition epidemic in China.

"Sure, we can help the 1,800 babies who are participating in our study now, but what about the other 10 million babies just like them?" asks Rozelle. "To reach all of China's at-risk babies – that's our ultimate objective. And to do that, we need an effective government program."

In fact, the Chinese government has already unveiled a new pilot

program that aims to provide every rural baby living in poverty with a free daily nutrient packet. But instead of delivering the packets directly to households, families have to travel several hours to the local county seat to pick up their packets. To date, the pilot has been rolled out in about 350 poor rural counties, with another 300 scheduled for 2014. But the government pilot doesn't include any baseline research, and thus lacks important data on the health impacts and cost-effectiveness of this type of nutritional intervention.

A nurse tests a child's blood for signs of anemia. Credit: REAP

The scant data available suggests that only a small share of eligible families are actually making the effort to pick up their packets. This is the gap REAP is looking to fill with its studies. Rozelle hopes that REAP's new data on baby nutrition will help shape the government's

pilot program as it grows.

REAP has a long history of pioneering research and impacting national policy around rural education and health in China. Between 2008 and 2012, REAP surveyed 60,000 rural Chinese school-aged children and found that 30 percent were anemic. That study helped influence the government's decision to launch a ten-year, nationwide school lunch program funded at more than $20 billion.

"The Chinese government has identified early childhood nutrition as a key policy priority in the coming years," Rozelle says. "However, we believe they will need help figuring out the best way to implement their policy ideas. This is where REAP can help, by providing evidence-based solutions."

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