

Qualitative Results

From July 10th to 13th, 2013, we implemented a series of qualitative interview questions about families' awareness of malnutrition, perceived causes of and consequences of malnutrition, and general baby care practices in Shaanxi Province. We visited 10 rural households in three villages in Pingli County in the southeastern part of Shaanxi Province. In each village, we selected two or three households with babies aged between six months and two years old. In each household, we interviewed the primary caregiver, which in all 10 cases, turned out to be the baby's mother. Each interview lasted for about one hour.

Prevalence of Anemia

Many rural mothers are unaware of the dietary and nutritional factors that contribute to a healthy baby. Thus, most of them believe that their children's health is about the same as, if not better than, that of urban children.

- “Rural areas have better air quality, so rural babies are healthier.” – Mother 10
- “Rural babies are better because the air is better.” – Mother 9
- “Rural babies are healthier than urban babies because they run and play a lot, whereas urban ones are always at home.” – Mother 1
- “I think urban babies and rural babies are similar in health.” – Mother 5

These attitudes underline the simple fact that many rural Chinese mothers have little to no awareness of malnutrition as a health issue. Furthermore, our interview questions revealed that many mothers also lacked the most basic understanding of what malnutrition is.

- “I don't know what malnutrition is.” – Mother 5
- “Malnutrition is bad digestion.” – Mother 2
- “[Malnutrition] means you can't digest nutrients.” – Mother 8
- “Malnutrition is when you don't absorb the food you're eating so you'll grow slowly.” – Mother 4
- “It might be genes that cause malnutrition. You'll know if your skin turns white and pale and you become really thirsty. Also, your hair would turn lighter. So dark skin is healthy...” – Mother 7
- “Don't you get malnutrition when you're a picky eater?” – Mother 3

Regardless of the rural mothers' level of understanding of what malnutrition actually is, most of them have no idea how to address malnutrition.

- “I don’t know how to treat malnutrition.” – Mother 5
- “You can treat it by not eating things you can’t digest.” – Mother 2
- “Malnutrition is when your baby is too little and not fat enough... I’m not sure how you can treat it though.” – Mother 9

Not only do they know almost nothing about malnutrition and how to treat it, these mothers know even less about iron deficiency anemia, a type of malnutrition that affects 25% of the mothers and over half (55%) of the babies in the study region.

- “[Anemia] is caused by not eating enough.” – Mother 9
- “If you’re lightheaded and sweating a lot, you’re anemic.” – Mother 7
- “Isn’t [anemia] low blood pressure? ... I’ve only heard of adults having anemia, not kids.” – Mother 6
- “Anemia? ... Doesn’t that mean you don’t have enough blood?” – Mother 2
- “I’m not sure what it is... Something to do with lacking blood or your blood isn’t good.” – Mother 4
- “My grandmother has anemia. She’s been taking medicine, but I don’t think they can cure it. I never thought of it as a big problem. I think people don’t really care about anemia.” – Mother 4

Of the very few mothers who had at most a vague understanding of anemia, even they did not know how to treat it.

- “I don’t know a way to treat anemia.” – Mother 5
- “Drinking some sugary water should work.” – Mother 1
- “You should add [a red salty sauce] to your food to supplement your blood.” – Mother 3
- “Receiving blood from the hospital should help.” – Mother 2
- “You should eat raw peanuts, since they supplement your blood.” – Mother 7
- “You can treat anemia by taking Chinese traditional medicine. My oldest daughter was anemic so she took the medication. She has a larger appetite now.” – Mother 9

I. A lack of proper information perpetuates nutritional ignorance.

This misinformation about anemia and malnutrition is exacerbated by poor instructions (or lack thereof) from local doctors.

- “When he had a cold, my baby received a blood test for anemia. They didn’t report whether the baby was normal, so I just assumed he was.” – Mother 4
- “He was found to be a little bit anemic... the doctor never said anything helpful to help me understand my child. He just told me to buy some rice powder and medicine.” – Mother 5
- “I thought the doctor’s visits were very helpful – every time I’ve taken my child to him, he gives her medicine and she’s better within a day. But the doctor didn’t give me suggestions on how to take better care of my baby.” – Mother 6
- “No one ever told me how to feed my baby. I had no idea how. I would read pamphlets in the hospital. Only then would I get some information. But on an average day I don’t know anything.” – Mother 4

Some mothers have never even taken their babies to the doctor at all.

- “We’ve never had any physicals or nutrition tests done. I’m worried that they would monitor my fertility if I took my baby to the doctor.” – Mother 8
- “We’ve never visited the doctor for any routine checkups. Not even my eldest daughter. I usually just buy local, over-the-counter medicine.” – Mother 9 (Family with 3 kids)

Unable to receive basic and proper nutritional information, many mothers’ health concerns for their children are left unanswered. Other than doctors’ poor instructions, mothers receive information from the previous generation of rural mothers, word of mouth between other families, formula sellers at the market, or simply rely on their own instinct. Without credible sources, ignorance spreads amongst mothers and generates confusion in their parenting and concerns for their children. Thus, it was not surprising to find that many of the infants often had colds or diarrhea, and that mothers reported these basic ailments to be their primary health concerns for their babies.

- “I fear my baby is too small. I don’t know how to make him taller.” – Mother 5
- “Health concerns? Not really, but I’m worried if he eats too much, he’s going to have digestive problems, so I feed him less.” – Mother 6
- “I didn’t take any steps at home to treat my baby when he was sick. I was just really nervous.” – Mother 6
- “I’m annoyed because he gets sick so often and cries all the time, so I worry about that. What I really want to do is improve his immune system. He’s been drooling and getting his teeth in.” – Mother 4
- “I don’t have any concerns. She’s got all her immunizations—free and paid.” – Mother 3

II. Ignorance thus perpetuates malnutrition/anemia.

Without proper basic nutritional education, many mothers misunderstand nutrition, are unaware about nutrition and its impact on health, or haven't even thought about nutrition's effects on health at all.

- "I don't think the foods he eat matter since he doesn't eat that much." – Mother 5
- "I don't think there's a big impact of nutrition on health. Formula and porridge are good enough for my baby." – Mother 2
- "Some foods have impacts [on my baby's health]. Others don't. Soft, clean foods are good for my baby. Hard foods are not healthy." – Mother 8

This misunderstanding of nutrition leads to poor feeding habits. Some mothers even remarked that if their child disliked a certain food, they would not encourage them to eat it, even if the said food was "good for him/her."

- "I like to give him foods he likes to eat." – Mother 8
- "If he dislikes a food, I'll stop feeding it to him." – Mother 4
- "If my baby doesn't like the taste of the food, I won't give it to her. She basically feeds herself." – Mother 1
- "If he doesn't like a food, he spits it out. Trying to feed it to him again is hopeless. So I don't." – Mother 9

Diet and Reasons for Anemia

The widespread ignorance of malnutrition and its consequences results in a trend of poor feeding practices throughout the sample area. The majority of the mothers firmly believed that they were feeding their children the correct foods and at the right times.

I. Mysterious belief about the one-year mark

There was a reoccurring belief that a major change occurs in babies' digestive system when they are one year old, and that this change allows for the introduction of solids in their diet. In reality, however, the twelfth month in a baby's digestive development is not much different than any other month. Contrary to the women's thinking, the one-year mark is not the magical turning point at which babies can suddenly digest solid foods.

The international recommendations for feeding babies are as follows:

- 0-6 months old: Exclusive breastfeeding
- 6-7 months old: Very soft vegetables and fruit in addition to breast milk
- 7-12 months old: Soft and very small pieces of meat and eggs can be introduced

- 12 months on: Solid foods should make up at least half of the baby's diet. The remainder should be breast milk.

These guidelines are a stark contrast to what the mothers are actually feeding their children:

- “She started eating solids at one year old. I wouldn't dare give her anything before that.”- Mother 3
- “I started giving her meat when she was one and a half years old. Before that she wasn't used to meat and would just get sick.”- Mother 1
- “I started feeding him both starches and fruits at one year old, nothing before that though.”- Mother 6
- “I won't feed him fruits or veggies till after one year also, possibly not till one and a half.” - Mother 8
- “A baby can usually walk at one year, and that means he can digest food better. Instead of the baby being held all day, now he can walk around and therefore digest the food better.” – Mother 6

II. Breast milk beliefs and formula fables

The mothers believe that after a year their breast milk is not as nutritious and that they are unable to produce enough to keep their baby full. Because of this common way of thinking, the moms choose to rely on formula to feed their baby after one year, and sometimes earlier. Rather than gradually replacing breast milk with solids, per the international feeding recommendations, the mothers instead simply switch from breast milk to formula, which is available in seemingly unlimited quantities.

- “At one year I will start giving him formula because that's when the milk stops. It was the same with his sister. After that there is not enough breast milk, but formula is unlimited. Also, there aren't enough nutrients left in the breast milk for it to be good at that time.”- Mother 5
- “I plan to stop breastfeeding when he is one year old. Then I will switch to formula.”- Mother 8
- “I am planning to end breastfeeding when she is one year old, and then start feeding her formula. I am going to switch at one year because there is not enough breast milk at that time. Also, at a year my baby can adapt to drinking formula.” Mother 10
- “I stopped breastfeeding when she was ten months old because it wasn't enough for her. Now she drinks formula until she is full.” – Mother 1

There was great variation in the mothers' opinions on whether breast milk or formula was better for a babies' health.

- "I stopped breastfeeding when he was one year old because the nutrients in formula are better. Formula is definitely better for him." – mother 6
- "Breast milk is better because having mother's milk is best."- Mother 8
- "Formula is better for him because breast milk doesn't have many nutrients, but he doesn't like formula. So I have to keep breastfeeding him."- Mother 9

III. Lack of information results in skewed vision of diet

The women's sources of information on baby feeding seem to be outdated and highly variable—there is no quick and accurate source for modern tips on baby care and feeding. The mothers commonly rely on advice from family, friends, neighbors and the older generation, rather than doctors, midwives, or official sources.

- "I get advice from friends and relatives, but I trust my own advice the most. I see how [my baby] is doing and decide whom I trust." - Mother 8
- "I get lots of advice from my family, but they all say something different. I usually listen to whomever I disagree with least." – Mother 2
- "I have learned a lot from the older generation on what to feed my baby." - Mother 5
- "I get tips for what to feed my baby from my mom and other family members. I have seen some stuff on the TV and read some books. I trust everyone because most of it consistent, or I just rely on personal experience."- Mother 6
- "Sometimes I get advice from neighbors, friends and family. I trust advice from those who make the most sense."- Mother 1
- "I look up information online a lot. I trust the Internet more than what I hear from people."- Mother 7
- "Besides my mom and sister, I haven't really received any advice. If the information seems to match what little I have read, I trust it." - Mother 10

Another popular source of information is from formula vendors. Instead of receiving information from doctors or other reliable government sources, the mothers were often advised by formula vendors. The formula vendors' advice and recommendations seemed to be a primary and trusted source of information on proper baby feeding practices. In reality, the formula vendors are not much more educated than the mothers, and almost certainly have external incentives and motivations to maximize revenue. This reliance on a biased source of information simply points to the overall social negligence of the under-nutrition problem in these areas.

- “I read the booklets at the formula store for information.”- Mother 7
- “The person selling formula gives me tips about food, vitamins and supplements for my baby.”- Mother 3
- “I get the information for what to feed baby from books and articles online.” – Mother 1
- “I get a lot of advice at the formula place, and sometimes family and friends’ advice.”-Mother 4
- “His favorite thing to eat is a supplement. It’s basically a protein powder. It says on the box that the supplement is not suitable for babies under one year, but the formula vendor said it was okay, so I feed it to him anyway.”- Mother 4

One of the significant underlying problems is the widespread lack of information that rural mothers have. From the difference in views about the correct baby nourishment, it was clear that in general the mothers were uninformed about many of the correct ways to nourish babies. They were trying to do the best for their babies, as any mother would do, but did not realize how misinformed and incorrect their ideas about nutrition were.

- “In general, people don’t really know what to do. I just try to figure it out by looking and seeing what’s happens.”- Mother 4
- “I do what the doctor says, but I don’t know if it is right or not.” Mother 5
- “I rely on my personal experience to feed my baby.”- Mother 9
- “I’m blindly buying the stuff companies tell us to buy, but I really don’t know anything or have any sources of information. No one ever told me how to feed my baby. I had no idea. I would read pamphlets in the hospital. Only then would I get information. But on an average day I don’t know anything.”- Mother 4

As a result of this lack of information and unreliable sources, the mothers have incorrect information on what they are supposed to be feeding their babies. A majority of the women firmly believe that what they are feeding their baby is correct. Some were very skeptical of new information, even though it could make a tremendous difference in their baby’s life. This general lack of knowledge can be seen in the answers to a simple question: “What is a healthy meal for a baby?”

- “A healthy meal, after 6 months for a baby, is porridge and formula.” - Mother 7
- “A healthy meal for a baby is porridge and meat stock.” Mother 9
- “A healthy meal is vegetables and rice, and meat maybe when he’s a little older.” - Mother 8
- “A healthy meal is a lot of meat cause it’s very nutritious, fruit is good for digestion... and I guess veggies are nutritious too.” –Mother 6

Due to the general lack of knowledge and misinformation, rural mothers are forced to rely on undependable sources of information and therefore incorrectly nourish their babies. In addition to not knowing about nutrition, the mothers know very little of the effects food can have on their children and why it is so important to feed babies the right diet. Most of the mothers had never thought that what they were feeding their children had any effect on the baby's cognitive and motor development.

Parenting and Developmental Delays

Mothers make more mistakes than just feeding their babies poorly - they also do not interact with their babies properly. These mistakes lead to more negative and lasting consequences than poor health - rural babies are behind in their cognitive and motor skills development.

Previous REAP research found that 35% of the babies in rural Shaanxi have cognitive delays, and 57% have motor delays. Some parents in rural Shaanxi are even unaware that their children have developmental problems.

- “My baby is about the same as urban babies.” – Mother 3
- “My baby is pretty smart.” – Mother 5
- “My baby is pretty much the same as city babies. She might even be ahead of them.” – Mother 1

These findings made us curious to find out more about parents' influence on a babies' cognitive and motor development. We found out that parents are indeed part of the reason why rural babies have severe cognitive and motor delays.

We will first address how parenting behaviors affect cognition. Below, we outline two reasons why parents' actions may be at least partly responsible for rural babies' cognitive delays.

Reason #1: Parents don't feed their babies a balanced diet.

As we have described before, rural parents have little knowledge about anemia and how to feed their babies. What's more, parents do not know how nutrition is connected to babies' cognition. In many cases, they have never even thought that nutrition and cognition could be connected.

- “I haven’t thought about how it [food choice] affects my babies’ cognitive development.” – Mother 3
- “I never thought about food [choice] and cognitive development together. I have only heard people saying things like ‘you shouldn’t eat this kind of food’, but I don’t know what types of food a baby should have and how to take care of my baby.” – Mother 7

In other cases, even though they believe that nutrition affects babies’ cognition, they are not clear about what this effect entails.

- “Yeah... Malnutrition might have an effect on cognitive development, but I am not sure how it works. I guess the child might have slow teeth growth and slow physical growth [because of malnutrition].” – Mother 1
- “Food choice might have an effect [on baby’s cognitive development], but I am not very sure...I think starches and vegetables are important [for his cognitive development]. With these foods, he will be more energetic.” – Mother 6
- “Yes, I have [thought that food choice will affect my baby’s cognitive development]... A good way to make him smarter is to feed him starches and rice. You can’t feed him hard food. You should feed him fewer vegetables. The effect of these foods is that he can grow taller.” – Mother 8

A possible answer to why rural babies are behind, therefore, is simply that parents have limited knowledge about the connection between nutrition and babies’ cognition. Since they have never considered that babies’ development is associated with the food their babies eat, they lack incentive to prepare a balanced diet for their babies. As a result, their babies fail to develop better cognition.

Reason #2: Parents interact with their babies poorly.

This does not mean parents don’t like to interact with kids; they love to! Most of them take their babies outside and have their babies play with other children in the village. However, they do these activities without the goal of stimulating the babies’ cognitive development. Many do activities with kids simply because it is fun, or it is just easier to take babies with them when they need to go out.

- “We all love to tickle her for fun.” – Mother 2
- “I like to tickle him for fun, but only when I am not busy with something else.” – Mother 4
- “I take her outside for some grocery shopping or visiting friends.” – Mother 3

An example to illustrate this point is parents' attitude towards toys. Toys are internationally considered a popular and effective way to engage babies' thinking and help their brains to develop.

However, some rural parents do not give their babies any toys to play with.

- "My baby doesn't have any toys. I might buy toys when she starts walking. Her sister had toys before, but she always lost these toys." – Mother 5
- "I don't buy him many toys because his sister will grab the toys. He will also get sick of them. How can I buy toys for so many kids?" – Mother 9, who has three kids in family

Even of those parents who do buy toys for their babies, none of the families that we interviewed ever considered selecting toys for the purpose of stimulating cognitive development.

- "I choose what toys to buy. I buy toys that she hasn't played with." – Mother 2
- "I choose toys based on my feeling. If he doesn't have the toy I will buy one. I just get the cheapest toys in the store. If my family had better income, I would buy more expensive toys for him." – Mother 4
- "I pick a toy randomly. I buy him whatever looks good." – Mother 8
- "I don't choose what toys to buy. I buy whatever she [the baby] grabs off the shelf at the store."

Instead, most babies receive toys such as toy horses, toy cars, toy ducks and other small gadgets. While these toys may help babies grab objects and play around, they cannot stimulate babies' cognition as effectively as toys such as blocks, mirrors, or balls.

The above evidence suggests that parents are ignorant about stimulating babies' cognitive development. When asked if they knew any potential remedies to stimulate babies' cognitive development, most parents not only did not know of any, but also had never even thought about the question before.

- "I don't know [ways to make my baby smarter]." – Mother 3
- "I never thought about [how to stimulate his cognitive development]." – Mother 5
- "I don't know [how to stimulate my baby's cognitive development]." – Mother 6

Some parents even confused cognitive development with school-based knowledge.

- “Babies won’t remember much even if they learn a lot at a young age. That’s why I don’t try to teach her too much.” – Mother 1
- “To make her smarter... I will have her study hard at school.” – Mother 2

While some parents reported that they would like to receive more information on how to take care of their babies, many parents or caretakers seemed overconfident that their information is not only sufficient but also correct.

- “I take care of my baby based on my own experiences.” – Mother 5
- “I am better at taking care of the baby than his mother.” – Grandmother 2
- “I think I have enough information [about how to take care of my baby]. Sometimes I believe this information, but sometimes I don’t. I don’t have a source – just word of mouth. I don’t need more information. I prefer information from my family members, especially my mother-in-law. I take care of my baby based on my instinct. If there’s anything that I don’t know, I will ask my mother-in-law.” – Mother 8

To conclude, parents do not know ways to stimulate babies’ cognition. We think that this lack of knowledge, along with their ignorance on the link between malnutrition and cognitive development, contributes to the fact that rural babies have cognitive delays. Parents think their babies are cognitively behind not because of feeding and interacting with their babies poorly, but because of external reasons that are unrelated to their own behavior.

- “Urban babies are smarter because they talk a lot and are not afraid of strangers.” – Mother 3
- “Urban babies are smarter because they grow up in a more resourceful environment than rural babies.” – Mother 2
- “Overall, my baby is doing worse than urban babies because we live by the main road. It’s hard for the baby to play around – if he runs outside, something could easily happen to him.” – Mother 2

As we mentioned earlier, a previous REAP study also found out that 57% of the rural babies suffer motor delays. We are interested in learning more about whether parents engage in stimulating their babies’ motor development.

Internationally, parents stimulate their babies’ motor skills with activities such as hanging a toy or placing bright-colored objects around the babies to attract their babies to move. However, we observed in the households we visited that all parents hold their babies in their arms at all times, and only let them on the ground when they are old

enough to walk. We did not see a single baby crawling on the ground (or bed) and exploring his surroundings independently of the physical support of an adult. One parent told us:

- “We didn’t let him touch the ground before he learned to walk. It’s not okay for him to be on the floor, only on the bed.” – Mother 9
- “He didn’t crawl. None of our kids learned to crawl.” – Mother 9

Without parents giving babies the freedom to move and explore, it is no surprise that the babies suffer motor delays.

However, it was heartening to learn that all of the parents we interviewed care deeply about their babies. Most parents expressed interest in receiving credible information on this topic.

- “Nobody from my village committee has told me how to make the baby smarter. If someone could do that, it would be perfect.” – Mother 1
- “We don’t have village officials teaching us anything about how to raise baby. I would like that.” – Mother 2
- “Nobody in the village taught us how to raise my baby and make them smarter. I would love such training. People outside my village may trick me, but village residents wouldn’t do that.” – Mother 3

We also discovered that parents with higher education are more likely to raise their babies well. The two parents we interviewed who had attended high school knew much more about the link between nutrition and cognition and stimulating babies’ development.

- “I definitely think he needs better nutrition to have better brain development. If he can absorb nutrients, he can be smarter.” – Mother 4, who started high school
- “I get information about how to take care of my baby from books and the Internet using my phone. I search things like, “how to play with 6 month old baby.”- Mother 10, graduated from high school and technical school
- “I talk to her about new concepts. I point to something new and explain it. I spark her curiosity by gesturing and solving puzzles; I play with the toys so that she is attracted to them. These can trigger her curiosity, hearing and motor development.” – Mother 10, graduated from high school and technical school

To conclude, parents are part of the reason why rural babies in Shaanxi have cognitive and motor delays. Not knowing the connection between nutrition and cognition,

parents do not feed their babies a nutritious diet, causing delayed cognitive development. Furthermore, parents do not interact with their babies in a way that can stimulate their babies' cognition and motor skills. We call for further research on how to address these incorrect practices so that we can help rural babies become healthier and smarter grown-ups in the future.

Future Suggestions

After the interviews, we have found other factors that contribute to the mothers' nutritional and cognitive ignorance. The local rural doctors are only making the problem worse by giving the mothers misleading advice, if any advice at all. Further research as to why these doctors give such poor advice should be considered and evaluated. Next formulate an intervention to improve the quality of these doctors and their recommendations. In addition, we suggest intervening to directly educate these mothers about nutrition, why it is important and what consequences nutrition has on their babies' health. Furthermore, we should teach the rural parents the importance of, the variables effecting, and methods to help stimulate their babies' cognitive and motor development.

Conclusion

Most, if not all, rural Chinese mothers in the Shaanxi Province have little to no understanding of malnutrition and anemia and how to address these disorders. A combination of poor nutritional education, misinformation from doctors, and lack of credible sources, such as the villagers and formula vendors, contributes to a growing ignorance that leads to unawareness of baby health and baby nutrition and poor dietary practices. Thus, mothers create their own feeding standards that differ from the international recommendations. A lack of the right nutrition and proper interaction delays the babies' cognitive and motor development. Ultimately, without adequate nutrition and parenting knowledge, the mothers in the villages prolong the anemia, malnutrition, cognitive problems and motor problems for future generations.