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Seeing is learning: Vision care for rural and migrant children in China

Uncorrected vision is prevalent among rural children and those who migrate from rural areas to urban areas with their parents in China, of which more than 20 per cent are nearsighted. Since 2012 the Rural Education Action Program (REAP)¹ has carried out the largest empirical vision care project ever conducted in China. More than 20,000 children in different parts of China have been screened and about 5,000 pairs of eyeglasses have been dispensed to those who are nearsighted. REAP has been able to create a comprehensive picture of vision care for rural and migrant children in China. The successfully implemented project so far has provided valuable lessons for treating vision problems. First, wearing eyeglasses can remarkably improve children's educational performance and self-confidence. Second, in contrast to widespread opinion in rural China, eyeglasses are by no means harmful to children's eyesight. Third, and in contrast to another myth, specific 'eye exercises' used as a traditional alternative to eyeglasses cannot slow the onset or progression of myopia. Finally, teacher incentives to encourage children to wear eyeglasses will improve rates of eyeglasses usage, help to overcome vision problems and thus lower educational barriers. Based on these findings, researchers of the project are currently working with local governments in rural China to incorporate vision care into the healthcare agenda.

World Bank and World Health Organization-supported studies suggest that approximately 10 per cent to 15 per cent of all children aged 8 to 12 in developing countries have problems related to poor vision. Over 90 per cent of these eye problems are caused by refractive error, and in most cases they can be corrected with properly fitted, quality eyeglasses. However, studies show that many children with refractive error in developing countries do not have or wear eyeglasses, and some of them have never even been examined (Congdon et al., 2008; Yi et al., 2015). Based on the results of recent REAP study that more than 20 per cent of the children are nearsighted, the situation appears to be even worse in rural areas and migrant communities of China compared to other countries. Myopia (near sightedness), which causes difficulty in seeing distant objects, is very common in school-aged children and is responsible for more than 90 per cent of children's poor vision; over 60 per cent of rural

children with refraction problems do not have eyeglasses (Congdon et al., 2008).

Why is it that many nearsighted children do not wear eyeglasses?

Concerning the large share of nearsighted children who do not wear or have eyeglasses in rural areas and migrant communities in China, the question arises over the reasons behind it. There are multiple potential explanations for this uptake puzzle including poverty, lack of knowledge about myopia,

¹ The Rural Education Action Program (REAP) is an impact evaluation organization that aims to inform sound education, health and nutrition policy in China. REAP's goal is to help students from vulnerable communities in China enhance their human capital and overcome obstacles to education so that they can escape poverty and better contribute to China's developing economy. More about REAP can be found at: <http://reap.fsi.stanford.edu/>.

Figure 1: The REAP vision care project in China by the numbers

Vision care for rural children	Vision care for migrant children
19,977 fourth and fifth grade students screened	4,408 fifth grade students screened
252 primary schools	94 migrant primary schools
178 towns	11 districts with large migrant populations in Shanghai and Suzhou
18 counties	967 pairs of eyeglasses distributed
4,000 pairs of eyeglasses distributed	

and misinformation. The first reason is likely poverty. Especially for those families in deep poverty, which account for a considerable share in remote rural areas and some migrant communities, a pair of eyeglasses for the child may be far beyond the household budget.

However, why do families with enough disposable income not buy eyeglasses for their children? The reason here may be a matter of misinformation and lack of knowledge about myopia. Children and their parents may be not aware that they cannot see clearly (the children may simply think the world is blurry). A commonly held but mistaken view in China is that wearing eyeglasses is harmful to children's vision and causes their vision to deteriorate faster. Many children, parents and teachers believe that eye exercises (a series of self-applied massages around eyes) protect vision and slow the progression of myopia, which is better than wearing eyeglasses. Other misconceptions persist, including that primary school students are too young to wear eyeglasses, and there is no need to wear eyeglasses if the problem of poor vision is not severe.

Unfortunately, there is little current empirical evidence or reliable data sets that could be used to study children's vision problems in China, or the impacts of poor vision on their academic performance and mental health. Given the prevalence of uncorrected vision among children, it is important to better understand the correlates and potential consequences of myopia among rural and migrant children. This is particularly true if the effects of addressing vision problems are comparable to other, more costly educational interventions such as teacher training, scholarships, computer assisted learning, or reduced class sizes.

The REAP vision care project in China

Since 2012 the Rural Education Action Program (REAP) has carried out the largest empirical vision care project ever conducted in China. With the generous support of Stiftung Auge, IAMO has been actively participating in the project. The goals of the study are to:

- Measure the prevalence of poor vision in rural and migrant areas of China.
- Measure the impact of poor vision on education.
- Determine effective ways to get students to acquire and wear glasses.
- Develop strategies for policy makers to bring vision care into the national health care agenda.

To date, REAP has carried out two studies of randomized controlled trial. One study is implemented in rural Northwest China (Gansu and Shaanxi provinces), and the other study in Shanghai-Suzhou urban and suburban areas, which are home to large migrant communities.

For both studies, primary schools were randomly selected in rural areas or migrant communities. Within each school one class was randomly selected in each of the fourth and fifth grades. A questionnaire was administered to collect information on students and their family characteristics. Children were also given standardized math exams and psychological tests of well-being, and administered with a visual acuity assessment at the baseline and endline of the project.

Eligible children were randomized by school to receive different interventions including free eyeglasses, vouchers, an education campaign, and teacher incentives to encourage children to wear eyeglasses. During the project, each school was revisited without notice and the eyeglasses wear rate for each school was calculated.

In summary, 19,977 grade four and grade five students in 252 primary schools in northwest China and 4,408 grade five students in 94 migrant primary schools in Shanghai-Suzhou urban and suburban areas were screened, and a total of 4,967 pairs of eyeglasses were dispensed by the end of the two studies.

Lessons learned so far

Uncorrected vision is prevalent among rural and migrant children in China.

24.3 per cent of the children in vision care for rural children project failed visual acuity screening, which means that nearly one out of four students in grades four and five has poor vision. The share is a bit higher in vision care for migrant children project (around 28 per cent). Although there is a relatively easy way of correcting refraction errors by wearing properly fitted eyeglasses, only a small share of children did so. In both studies, only 4 per cent of the children self-reported having eyeglasses. Some observers assert that migrant children will be more likely to acquire a pair of eyeglasses after their families move from villages to cities. However, our data on the prevalence of uncorrected vision do not support this theory. Eyeglasses ownership among migrant children is even a bit lower than

rural children – about one in seven children that needs glasses actually has them in migrant communities; by contrast, the rate is one-sixth in rural areas.

Wearing eyeglasses can improve children's educational performance and self-confidence.

Mathematics test scores were chosen to measure children's academic achievement because it provides direct evidence of children's cognitive skills, and, to the largest extent, reduces home learning effects while focusing on classroom learning. Separate math tests have been administered at baseline and closeout of the project, and results show that the simple act of wearing eyeglasses raises a nearsighted child's test scores by an average of 14 points. Further study of the effects of three interventions suggests that dispensing free eyeglasses at school has a greater impact on children's educational performance than the other two interventions of providing vouchers or an education campaign. A mental health test is designed to test children's psychological well-being, particularly their anxiety level. Preliminary results show that poor vision negatively affects children's mental health and those nearsighted children become more self-confident after they have worn a pair of properly fitted eyeglasses for a period.

Wearing eyeglasses is not harmful to children's vision and eye exercises do not slow down the onset or progression of myopia.

Many nearsighted children do not use eyeglasses even after they or their parents realize their refractive status. Besides poverty, massive misinformation about wearing eyeglasses is another reason for not wearing them. Previous investigations indicate that many children, their parents and teachers believe that wearing eyeglasses hurts children's eyes and causes their vision to deteriorate faster. Analysis clearly confirms that this is by no means the case; rather, wearing eyeglasses significantly contributes to slowing the progression of nearsightedness. Free eyeglasses were provided to nearsighted children with an average visual acuity of 0.3 (normal vision acuity = 1.0) at the beginning of the project. After a period of nine months, on average, the nearsighted children who regularly wore their eyeglasses experienced a visual acuity decline of 5 per cent; in comparison, those who did not wear their eyeglasses regularly experienced a more severe visual acuity decline of 10 per cent. Further, a common misconception among most people in China is that eye exercises protect vision and slow the progression of myopia. Results from the project show that there are no significant differences in myopia progression between the group of children who perform eye exercises regularly and the group who did not. Although it may partly relax one's eyes, eye exercises actually cannot solve the problem of myopia.

Providing teachers with incentives to encourage children to wear eyeglasses will improve rates of eyeglasses usage.

Earlier vision care studies revealed that nearly half of nearsighted children (with the support of adults) chose not to wear eyeglasses even when they knew they had a vision problem. This is a key obstacle in developing a model for publicly funded vision care. Observational data suggests that one of the main ways that might improve rates of eyeglasses uptake is whether a teacher encourages children (explicitly or by example) to wear eyeglasses because teachers are key fixtures in the day-to-day lives of children. Hence, an incentive mechanism is designed whereby teachers will be rewarded if they encourage their nearsighted students to seek vision care. During the project period, each school was visited three times without notice and the number of nearsighted children wearing eyeglasses was secretly counted. So far the results are encouraging: teachers encouraging students to wear eyeglasses make a huge difference. Usage rates in the teacher incentive group reached 81 per cent, which is 28 percentage points higher than the group with no teacher incentives.

Future agenda

Thus far, REAP has had great success and important lessons have been learned. More than 20,000 children in different parts of China have been screened and about 5,000 pairs of eyeglasses have been dispensed to those who are nearsighted. At the same time, REAP has been able to put together a comprehensive picture of vision care for rural and migrant children in China. The results from the project have shown that: Firstly, uncorrected vision is pervasive and damaging for children, and warrants swift action. Secondly, eyeglasses are a safe and effective treatment for vision problems among children. Thirdly, eye exercises are not effective for correcting children's vision problems. Fourthly, subsidized vision care is an important driver of uptake. Finally, vision screening at school can be effectively executed by teachers locally.

The successfully implemented Seeing is Learning project found that despite the high prevalence of uncorrected vision in rural areas and migrant communities of China, access to vision care is limited. The data showed that China's methods for screening and treating vision problems needs radical revision. The Chinese government needs a model for vision care screening and treatment to implement throughout the country. To this end, REAP seeks to create a model vision care county in Gansu Province that will serve to build lessons for the rest of Gansu and the rest of China. By employing each of the major lessons that have been learned from the project, the goal is to provide vision care to every child in grade 4 to grade 6 in the county's poor rural schools so that their school performance will rise.

Further Information

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