

Researchers

Nathan Fiala
University of Connecticut

Ana Garcia Hernandez
Universidad del Rosario

Kritika Narula
Yale University

Nishith Prakash
University of Connecticut

Timeline

2017-2018

Sample Size

100 schools (2,471 girls)

Research Implemented by IPA

Yes

Wheels of Change: The Impact of Bicycle Access on Girls' Education and Empowerment Outcomes in Rural Zambia

Abstract

Previous evidence suggests that providing bicycles to school girls reduced the gender gap in school enrollment in India, but little has been known about the impact of bicycle distribution programs in sub-Saharan Africa and whether such programs can increase girls' empowerment. In rural Zambia, researchers partnered with World Bicycle Relief (WBR) to evaluate the impact of bicycle access on girls' educational and empowerment outcomes. The study found that the bicycles reduced commute time, increased punctuality to school, and reduced the number of days girls were absent from school by 28 percent in the previous week. The program also improved measures of empowerment, including girls' sense of control over the decisions affecting their lives (i.e., their "locus of control" increased). Researchers did not find evidence that the program impacted school dropout or grade transition.

Policy Issue

Increased educational attainment for girls is correlated with many benefits, from reducing early pregnancies, to improving health[1] and schooling outcomes, to even enhancing the productivity of their future children.[2] However, in many developing countries, school attendance and performance levels remain a challenge for girls. The long walk to school may be a critical barrier to girls' school attendance in rural areas, as lack of support from families,

exhaustion, and insecurity discourage many girls from walking long distances to school.

Rigorous evidence from India showed that providing bicycles to school girls could largely reduce the gender gap in school enrollment.^[3] However, little is known about the impact of bicycle distribution programs in sub-Saharan Africa, and whether such programs have other benefits such as increasing girls' empowerment and educational attainment.

Context of the Evaluation

According to the Zambia Demographic and Health Survey of 2007, 10 percent of all girls aged 9-13 were out of school in Zambia.^[4] According to ZEDS (2002), the second most cited reason for late enrollment in school was distance, with the problem more severe in rural areas than in urban areas. For example, 42 percent of children in the Southern province of Zambia, where this project took place, started school late due to distance, compared to 16 percent in the more urban Copperbelt province.^[5]

The Zambian Ministry of General Education is focusing on a range of solutions aimed at increasing girls' school attendance, including bursaries for girls, making school a safe place from gender-based violence, and improving sanitation. Finding more innovative strategies to increase school attendance of girls is of particular policy interest for the Ministry.

Details of the Intervention

Researchers conducted a randomized evaluation to test the impact of access to bicycle on school attendance, transition to the next grade, examination scores, and empowerment outcomes for girls. Girls were eligible if they were in 5th, 6th, or 7th grade and walked at least three kilometers to school.

A total of 100 schools in the Mazabuka, Kalomo and Monze districts were randomly assigned to one of the three groups:

- 1. Standard bicycle program:** All eligible girls who attended schools in this group were offered WBR's standard Bicycles for Educational Empowerment Program (BEEP): students received a bicycle on the condition that the bicycle be used primarily to travel to school (students signed a study-to-own contract to formalize the agreement). A Bicycle Supervisory Committee (BSC) was formed consisting mostly of teachers, Parent Teacher Association (PTA) members, students, and local leaders. This committee was in charge of monitoring the program. A field mechanic was trained for each school, who provided maintenance checks and repairs for a fee borne by the recipient of the bicycle. Each school was then provided with a startup spare parts kit and each beneficiary student was required to pay a contribution of 50 Kwacha (~US\$5) toward this kit and preventative maintenance. *(25 schools)*

- 2. Bicycle program without payment:** All eligible girls who attended schools in this group were offered WBR's standard Bicycles for Educational Empowerment Program (BEEP) with a slight modification: no financial contribution was obtained from the

beneficiary students for the spare parts kit (Students/parents are still required to pay for spare parts they purchase and preventative maintenance.). (20 schools)

3. Comparison group: Eligible girls at schools in this group did not receive bicycles during the study period. (55 schools)

The bicycles were successfully distributed to the 45 schools in the third term of the 2017 school year. The follow-up survey was conducted approximately one year later, in the third school term of 2018.

To measure empowerment, girls at program schools participated in game-like activities to provide a measure of their bargaining power in the household and their willingness to share their opinions, in addition to responding to survey questions.

Results and Policy Lessons

Overall, the study found that giving girls access to bicycles to ride to and from school reduced their commute time, increased their punctuality, and reduced the number of days girls were absent from school by 28 percent in the previous week. Findings also suggest the program improved measures of empowerment. Researchers did not find evidence that access to bicycles impacted school dropout or grade transition.

Commute time and punctuality: Giving girls access to bicycles reduced their commute time to school by a third (35 minutes each way), helping them arrive at school on time. While girls in the comparison group were late to school a little over two days (2.19) each week, girls with access to bicycles were late less often than one day a week (.76 days), which represents a 66 percent increase in punctuality.

School absenteeism: The program reduced absenteeism by 28 percent, which translates to an addition of about 5 school days for girls in the Southern Province, where students in primary school miss an average of 18 days in a school year.

Dropout: Researchers found a positive but insignificant impact on dropout rates. One reason for not finding a statistically significant impact on dropout might be the low level of dropout of the sample in the study.

Empowerment: Girls at schools that received the bicycles reported feeling more in control of the decisions affecting their lives (i.e., their “locus of control” i) than girls in the comparison group and they displayed more pro-social tendencies (i.e., reported they would help or collaborate with a friend in need). The program also appears to have improved girls’ self-image (based on how they rank themselves academically and how likely they believe they are to succeed in life) though these effects were only marginally statistically significant. Researchers did not find that the intervention had any statistically significant impact on aspirations, fertility preferences (number of children they wanted to have in the future), or their freedom of movement (the probability of being allowed to visit friends or family or go to the market by themselves).

Mobility and safety: The intervention reduced the probability that a girl missed school or left for home early from school due to concerns of safety by one third. It also reduced the probability of girls being teased or whistled at on the way to school by about 22 percent.

Commute time: The study found that access to the bicycles on average (both groups combined) reduced the time taken to commute to the school by about 35 mins one way, a one-third decrease of their commuting time before receiving the bicycles.

See the results presented by researcher [Ana Garcia Hernandez](#) in a [webinar](#) coordinated by [World Bicycle Relief](#) below ([slides here](#)). Note: Both the webinar and slides are in Spanish.

Sources

[1] Glewwe, P., Gragnolati, M., and Zaman, H. 1998. "School Enrollment and Completion in Vietnam: An Investigation of Recent Trends."

[2] Lam, D. and Duryea, S. 1999. "Effects of Schooling on Fertility, Labor Supply, and Investments in Children, with Evidence from Brazil." *The Journal of Human Resources* 34, no. 1 (Winter 1999): 160-192. Accessed October 30, 2017. <https://doi.org/10.2307/146306>.; Strauss, J. and Thomas, D. 1995. "Human resources: Empirical modeling of household and family decisions." *Handbook of Development Economics* 3, no. A (1995): 1883-2023. Accessed October 30, 2017. [https://doi.org/10.1016/S1573-4471\(05\)80006-3](https://doi.org/10.1016/S1573-4471(05)80006-3).

[3] Muralidharan, Karthik, and Nishith Prakash. 2017. "Cycling to School: Increasing Secondary School Enrollment for Girls in India." *American Economic Journal: Applied Economics*, 9 (3): 321-50.

[4] Zambia Demographic and Health Survey. 2007. Accessed October 30, 2017. [https://www.dhsprogram.com/pubs/pdf/FR211/FR211\[revised-05-12-2009\].pdf](https://www.dhsprogram.com/pubs/pdf/FR211/FR211[revised-05-12-2009].pdf).

[5] Zambia DHS EdData Survey, 2002. <https://www.zamstats.gov.zm/phocadownload/Demography/2002%20Zambia%20DHS%20EdData%20Survey.pdf>

September 09, 2019