Willingness and Ability to Pay for the Kosim Clean Water Filter in Ghana

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Sector(s): Health

Fieldwork: Innovations for Poverty Action (IPA)

Location: Northern Ghana

Sample: 1,500 households who lack access to clean drinking water

Target group: Rural population

Outcome of interest: Diarrhea Take-up of program/social service/healthy behavior Water quality

Intervention type: Preventive health Water, sanitation, and hygiene Pricing and fees

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Lack of access to clean water is one of the most significant threats to health and welfare in developing countries, particularly in rural Africa. In northern Ghana, researchers measured households' willingness to pay for a ceramic water filter. Using an innovative measurement technique, they examined whether people who were willing to pay more for the filter actually used it more and whether the price people paid for the filter influenced how much they used it. Researchers found that willingness to pay for the filter was low—only 10–15 percent of the cost of the filter. People who were willing to pay more for the filter were likely to use it more often and saw greater benefits in terms of reducing diarrhea among children. The price people ultimately paid for the filter did not affect how much they used it.

Policy issue

Lack of access to clean water is one of the most significant threats to health and welfare in developing countries, particularly in rural Africa. Diarrheal disease, which often results from poor water quality, killed approximately 1.4 million people per year as of 2013.[1] Delivering treated water through pipes has been possible in developed countries and urban areas in developing countries, but many countries do not have the capacity or resources to deliver piped water to rural areas with dispersed populations. Household and point-of-use water treatment using technologies like chlorine and water filters could potentially be a more cost-effective solution. This study examined people's willingness to pay for a water filter in northern Ghana. Accurate measures of how much people are willing to pay for preventive health products like water filters are important for setting prices and identifying the optimal size of discounts or subsidies, especially when charging a price can limit access for those with the greatest need

Context of the evaluation

The sparsely populated northern region of Ghana is one of the least developed parts of the country and has low access to clean water. The majority of its residents make their living in agriculture. The low population density makes state or community-wide

water treatment intervention costly. Among the households participating in the study, diarrhea incidence was relatively high: on average, households had 0.24 episodes of diarrhea among children aged 0 to 5 in the past two weeks in 2010.

The Kosim filter is sold by Pure Home Water (PHW), a Ghana-based NGO, and has been demonstrated to be highly effective at removing particulates and pathogens from water without needing electricity or chemicals, making it suitable for rural households. The filter requires effort to use, but if used properly can reduce diarrhea among adults and children who drink from it. At the time of the study, the average cost of producing a filter and delivering it to a rural household in a village-level distribution was approximately GHS 21 (about US$15 at the time). Demand for the filter was near zero at a break-even price, so the level of subsidy to provide, and consequently the relationship between price and access, use, and outcomes were key concerns for an NGO with a limited subsidy budget.



A girl pours water into a bucket in Ghana.

Photo credit: Sura Nualpradid, Shutterstock.com

Details of the intervention

Between October 2009 and June 2010, researchers studied the willingness to pay, and the impact of household water filters in a sample of 1,265 households from 15 villages in rural northern Ghana. First, field staff held a meeting in each village to demonstrate how to use the water filter. Then they installed a sample water filter in the village and encouraged individuals to see the filter working, taste the water, and ask questions. The field staff returned for a sales visit after two weeks. The two-week interim period was to allow families time to try the filter, determine their willingness to pay, and obtain necessary funds. A week after the village meeting, field staff made visits to each household to remind them of the upcoming sales visit.

Households were offered the opportunity to purchase the filter through door-to-door sales. The households were randomly assigned to one of two sales scripts. In the take-it-or-leave-it (TIOLI) sales script, the water filter was offered at a fixed price, with no bargaining, and the household had to decide to pay the price, or not, and had to provide the necessary cash by the end of the day.

The Becker DeGroot Marschak method (BDM) is a procedure to measure willingness to pay. In the BDM group, sales agents instead asked households to first state the maximum price that they would be willing to pay for the filter, and then they drew a random price from a cup. Before they made the draw, sales agents informed households that when they randomly draw a price, if it is slightly more than the household's willingness to pay, the household will not be able to make the purchase. Households could then adjust their bid until the draw, but could not change it after. Once the household confirmed the final bid they then made the random draw, and then made the purchase or not.

Follow-up surveys were completed after one month for all households, and after one year for a random selection of eight of the 15 study villages. The surveys measured whether households retained the filters, used and maintained them properly, and recent diarrhea episodes of children five and under.

Results and policy lessons

Researchers found that willingness to pay for the filter was low. Nearly all households were willing to pay something for the filter; however, the median willingness to pay was only 10-15 percent of the cost of manufacturing and delivery. This result is consistent with findings of other research that has found low willingness to pay for water treatment and other preventive health goods.

People who were willing to pay more for the filter were likely to use it more often, and more frequent use was associated with reduced diarrhea among children. Researchers found that the filter's benefits, as measured by reductions in reports of diarrhea among children, increased with the price people were willing to pay for the filter and how much they subsequently used it. The one-month follow-up survey found that bouts of diarrhea in the last two weeks were reduced by 7 percentage points from a base of 21 percent (a 33 percent reduction). However, after one year there is no evidence of benefits, in fact, there is evidence filter may have increased episodes of diarrhea. Researchers suggest this may be attributed to the large drop in use after one year. Another possibility is a reduction in other health investments as the filter was seen as a substitute instead of complementary.

BDM can be used as a way to measure willingness to pay in the field even when literacy and numeracy are low: Researchers can use guided practice rounds and confirmation checks to ensure the process is clearly understood even by people with low literacy and numeracy. Willingness to pay measures like these can potentially be useful in pricing health products and informing other types of policy decisions including other areas including labor markets, weather insurance, and environmental conservation.

Berry, James, Greg Fischer, and Raymond Guiteras. "Eliciting and Utilizing Willingness to Pay: Evidence from Field Trials in Northern Ghana." Working Paper, July 2015.

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1. GBD 2013 Mortality and Causes of Death Collaborators. 2015. "Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013". *The Lancet* 385(9963):117-171.