Community Participation in Arsenic Mitigation Efforts in Bangladesh

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Sector(s): Environment, Energy, and Climate Change, Health, Political Economy and Governance

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Location: Singair, Bangladesh

Sample: 1000 households in 20 villages

Partner organization(s): Christian Commission for Development in Bangladesh (CCDB), Columbia University Earth Institute, National Institutes of Health (NIH)

The natural occurrence of arsenic in groundwater is an important public health concern in several countries. In Bangladesh, millions of people are estimated to be at risk of drinking water containing unsafe levels of arsenic. Researchers examined the impact of delivering arsenic education and water arsenic testing through a community member vs. an outsider. Adding a community participation component to the program had no effect on whether households switched to a safe drinking water source.

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Several widespread health problems can be traced to environmental exposures like contaminated groundwater. Providing households with environmental health information is seen as an important way to reduce these health problems in developing countries because of its relatively low cost. If information can promote positive changes in behavior by increasing awareness of health risks, it could potentially help people avoid environmental exposures and improve their health. Yet, there is little evidence about the effectiveness of environmental health information campaigns or what features make them effective. For example, are information campaigns led by community members more effective than those led by outside trainers because community members can provide repeated reinforcement of the information?

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The natural occurrence of arsenic in groundwater is an important public health concern in several countries worldwide. In Bangladesh, between 35 and 77 million people are estimated to be at risk of drinking water containing unsafe levels of arsenic, primarily from shallow tube wells. Exposure to elevated levels of arsenic in water is associated with cancer, developmental effects, cardiovascular disease, skin lesions, deficits in childhood cognitive and motor function, and mortality. The most common option to avoid exposure to elevated arsenic that exceeds the Bangladesh standard of 50 µg/L is switching to an arsenic-safe well often located within short walking distance of one's home, followed by the construction of deep tube wells that tap low arsenic aquifers. Other options such as piped water systems, rainwater collection, and arsenic filters are only used by a small portion of the population because they are unaffordable for many households in Bangladesh.

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Researchers examined the impact of delivering arsenic education and water arsenic testing through a community member vs. an outsider on the rate of baseline unsafe well users switching to a safe well and the change in the concentration of arsenic in their urine from baseline to follow-up. They identified twenty villages in Singair sub-district in which at least 40 percent of wells had unsafe arsenic concentrations according to national standards. All twenty villages received arsenic education and water testing training, but half were randomly assigned to have a community member deliver it and the other half to receive training from someone who lived outside the community. A subset of 50 households in each study village were randomly selected to participate in a baseline questionnaire, and then follow-up survey 4–6 months after the intervention.

Researchers conducted an intensive training on the dissemination of arsenic educational messages and water arsenic testing for all arsenic testers in collaboration with the Christian Commission for Development Bangladesh (CCDB). “Outside testers” were CCDB workers who did not live in the village they were working in, while “community testers” worked in the villages in which they resided. In both the community tester and outside tester villages, the tester went to each study household at least once to: 1) measure the arsenic concentration of the household’s primary drinking water source; 2) conduct a structured 40-minute arsenic education session on the health implications of chronic arsenic exposure and arsenic mitigation options; and 3) provide assistance to households with arsenic contaminated wells to locate a nearby arsenic-safe drinking water source by conducting additional water arsenic testing. These household visits were performed in each village over a period of three months.

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Overall, 53 percent of households in both community tester and outside tester villages switched to arsenic-safe wells after receiving arsenic education and water arsenic testing. However, community testers had no additional impact on well-switching compared to outside testers. While researchers found that community testers provided significantly more reinforcement than outside testers, this did not appear to increase their relative effectiveness in reducing arsenic exposure. In line with these findings, compared to outside testers, community testers had no additional impact on arsenic levels in respondents’ urine relative to the effectiveness of outside testers.

In villages with low to moderate arsenic contamination (less than 60 percent of wells unsafe) the vast majority of household using unsafe wells at baseline switched: 74 percent for the community tester villages and 72 percent for the outside tester villages. However people who were unsafe well users at baseline who lived in areas with high arsenic contamination (more than 60 percent of wells unsafe) were significantly less likely to switch their wells. These findings suggest that arsenic mitigation options other than well-switching such as deep tube wells, arsenic filters, and rainwater harvesting should be implemented in areas of high arsenic contamination.

Even though they were not significantly more effective than outside testers, community testers could potentially be a more sustainable and less costly approach if incorporated in existing community health worker programs.

Ahmed, Kazi, Pam Factor-Litvak, Alexander Geen, Christine George, Joseph Graziano, Tariqul Islam, Diane Levy, Xinhua Liu, Joyce Moon-Howard, Ashit Singha, Vesna Slavkovich, and Alessandro Tarozzi. 2012. "A Cluster-Based Randomized Controlled Trial Promoting Community Participation in Arsenic Mitigation Efforts in Singair, Bangladesh." *Environmental Health* 11(2012): 1-21.