Access to Clean Water & the Role of Information and Transaction Costs: Field Experimental Evidence from India*

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Abstract

In a rural region of India where groundwater is heavily contaminated with a hazardous naturally occurring compound, we worked with the state government agencies to implement a cluster RCT to study the reasons behind the lack of demand for water quality. We study the constraints households with young children and pregnant mothers face in accessing clean water: is it the lack of information on water quality or is it a combination of information and the transaction costs associated with applying for water via a government private tap water connection program. Our results indicate that the information campaign alone was sufficient to successfully increase awareness and knowledge of arsenic and its ill effects as well as awareness of alternate water supply schemes implemented by the state government. However, to translate this increased awareness into actual change in behaviour and outcomes related to water safety, the transaction cost treatment was salient. In particular, we find large effects on demand for improved water quality and adoption of water safety practices. Most notably the transaction cost treatment led to an increase in breastfeeding (planned) durations among (pregnant) mothers.

*JEL codes:*C93; I10; I12; I18

Keywords: randomized controlled trial; water contamination; information; transaction costs

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1. Introduction

The World Health Organization (WHO) has called it the "world's largest mass poisoning of a population in history". An estimated 140 million people are exposed to arsenic consumption at levels above the WHO prescribed critical level of 10 µg/L (Ravenscroft et. al, 2009*)*. Arsenic is a naturally occurring compound that is widely distributed in the environment, mostly in groundwater. While in the short run consuming arsenic contaminated water leads to vomiting, diarrhoea and skin lesions; long term effects cause life-threatening diseases including cancer, neurologic, pulmonary and cardiovascular disease, hypertension, and diabetes mellitus (WHO, 2018). Children are more susceptible to arsenic poisoning because of their low immunity and greater proportion of water in body relative to adults. Moreover, epidemiological evidence suggests that arsenic crosses the placenta and adversely impacts health in utero and later in life (Kile et al.; 2016).

India, together with Bangladesh, constitutes the largest population in the world exposed to arsenic through drinking water. More than 70 million people across 35 districts of India are exposed to unsafe levels of arsenic in groundwater. A majority of this affected population live in the Eastern states of Assam and West Bengal. Children comprise nearly 50 percent of the arsenic affected population and consuming arsenic contaminated water is likely a contributor to India's high child mortality rate of 39 deaths per 1000 live births (Asadullah and Chaudhury, 2011).

A handful of papers have looked at the effect of drinking contaminated water on child health in developing countries. Kile et al. (2016) show that mothers who drank arsenic contaminated water during pregnancy were more likely to give birth to low-weight infants. Greenstone and Hanna (2014) study the relation between environmental regulations (air & water) and infant mortality in India. They find that regulations related to water pollution have no effect on infant mortality rates. Do et al. (2018) show that curtailment of industrial pollution in the River Ganges led to lower incidences of infant mortality in India. Brainerd and Menon (2014) study the impact of harmful chemicals released in water via fertilizer use on infant mortality and child health outcomes and find that exposure to fertilizers during pregnancy has a negative impact on child health outcomes.

Despite the adverse health implications of drinking contaminated water and the prevalence of arsenic in groundwater, rural Indian households in arsenic affected areas continue to rely on groundwater. For instance, according to the 2011 census, only 9.2% of the population in the state of Assam rely on safe drinking water compared to the national average of 32%. Moreover, over 50% of households use groundwater as their primary sources of drinking water.

Economic theory suggests at least three explanations for this low demand for water quality. First, households make choices based on their knowledge of the health production function (Gronau, 1997). Consequentially, if there is incomplete information about the health function, households may make sub-optimal choices. Consistent with this, Madajewicz et al. (2007) find that randomly chosen households in Bangladesh who were informed that their water was contaminated with Arsenic were 37 percentage points more likely than control households to switch sources within one year. Similar evidence has been found in India on the effect of information provided through water testing on increased household demand for water quality (Jalan and Somanathan 2008; Barnwal, van Geen, Goltz and Singh 2017; Hamoudi et. al. 2012). Contrary to this, Bennear et. al. (2013) find that conveying richer information on arsenic risks does not lead to an increased demand for safer sources of water. However, they point out that their insignificant results could be driven by the high existing knowledge base in Bangladesh about arsenic contamination.

Second, though the health effects may be common knowledge, households may face liquidity constraints that leads to underinvestment in household infrastructure. Barnwal et. al. (2017) offer a test kit for measuring arsenic to randomly chosen households in Bihar and find that the take up is highly sensitive to price. Devoto et. al. (2012) find that households are more willing to pay for private water connections when it can be purchased with credit.

Third, government schemes that provide universal access to basic necessities, such as electrification, gas and water supply involve transaction costs (Blankenship et. al., 2020; Peters, Sievert and Toman, 2019). The application procedures, necessary documentation, investment of time and physical submissions involve substantial costs. It is imperative to understand and lower transaction costs for the successful implementation of any government rural development program (Renkow, Hallstrom and Karanja, 2004).

In this study, we partnered with the National Health Mission, Government of Assam and the Public Health Engineering Department (PHED), the main government body responsible for provision of clean drinking water to rural households in Assam. Using a cluster Randomized Controlled Trial (RCT), we study the constraints rural households face in accessing clean water in a heavily arsenic contaminated part of the state of Assam in India. We seek to understand whether households face information constraints or whether it is a combination of information gap and the transaction costs associated with getting piped water connections from a government surface water scheme. Due to the availability of alternate sources of water in Assam and the abundance of surface water, we do not expect liquidity constraints to be binding. According to the 76th round of the NSSO, rural households in India spend over 30 minutes to collect water compared to 10 minutes in Assam, which is the lowest across all states of India. This is explained by the geography of the state; Assam is situated on the banks of the river Brahmaputra and its 11 tributaries that are running across the state. Assam also receives more than 1500 mm of rainfall every year. Further, to address the rise in arsenic levels, in 2008-09, centrally flagship programs were introduced by the Assam Public Health Engineering Department (PHED) to provide access to safe treated surface drinking water from two neighbouring rivers at minimal cost to households.

We randomize 83 villages from Titabor block of Assam, one of the most heavily arsenic contaminated regions in India, into two treatment arms and one control group. The sample comprised of households with young children (less than 6 years of age) and households with pregnant women. **Treatment 1 (Information Treatment)** households were shown an information video about arsenic and its harmful impact on health, especially adverse implications for children and pregnant women. They were also made aware of alternate sources of safe water that are available in the community such as surface water sources, community taps and private household water connections via various public schemes including the Jal Jeevan Mission (JJM); Government of India's flagship scheme for provision of drinking water.[1] **Treatment 2 (Information and Transaction Cost Treatment)** households were provided the same information given to Treatment 1 but in addition were also made aware of the paper and procedures that needed to be completed to access tap water via this scheme. Further, they were offered help with filling out a one page Letter of Intent (LOI) application form for private household water connection being provided by the local public water supply department under the JJM. **The control group** was sent a generic SMS informing them about the availability of tap water connections under the JJM.

Our contribution is to examine the impact of providing health-specific information about water quality and reducing transaction costs in accessing government water supply simultaneously in the same study. If information alone is sufficient to change knowledge and outcomes, then we

[1] Our treatment provided very comprehensive arsenic specific risk information and prevention measures. Literature suggests that comprehensive information campaigns are more effective in changing behavior compared to those that focus on encouraging just one type of preventative behavior (Duflo et. al. 2015).

should see a larger coefficient on treatment 1 relative to treatment 2. On the other hand, households may be more likely to change attitude and behaviour towards health, when, in addition to information, they are also provided with an easy alternative. In that case, we should see larger effects of treatment 2.

Our results are striking. First, the take up rate of the LOI submission was almost 100% (only three households opted out) while no one in treatment 1 or the control group submitted an LOI directly to the PHED office. Second, we find that relative to the control group, both treatment 1 and treatment 2 have higher arsenic awareness and knowledge about alternate water schemes and government water supply schemes. Awareness of water schemes increased by more than 25% due to the intervention induced reduction in transaction costs. Third, households had a higher demand for water quality and this increased demand is due to the reduction in transaction costs in our intervention. Fourth, only treatment 2 group witnessed an increase in water safety practices after the intervention compared to the control group. Finally, and perhaps most importantly, mothers and pregnant women in treatment 2 households were more likely to increase both the probability and frequency of breastfeeding after the intervention. We find no effects on child health outcomes or the actual switching to safer water sources, which can probably be explained by the relatively short duration of our study.

A straightforward neoclassical explanation of our results is that households are constrained by both lack of information about the health production function and the transaction costs involved in evaluating alternative water supply options such as comparing the costs, completing arduous paper work and the time cost of submission of the applications to the nearest PHED office. At the same time, we cannot rule out a behavioural explanation for the results. If households have time inconsistent preferences (e.g., hyperbolic discounting), then they would seek out instant gratification, even at the expense of adverse long run health effects. In this case, the submission of the LOI may have acted as a pre-commitment device that allowed households to restrict their future choices and engage in healthy behaviour. In particular, those who chose to submit the LOI were bound to invest in tap water in the future.

Regardless of the theoretical explanation of our results, we find strong evidence that though information campaigns can increase household awareness and knowledge, information provision alone is not sufficient to change health behaviour linked to drinking contaminated water. This is consistent with informational interventions increasing knowledge recall, but this increased knowledge does not translate to behavioural changes (Fryer, 2016). The information-plus-transaction cost intervention resulted in large improvements in health specific knowledge, attitudes, and behaviour. The large take up of the program suggests that households on their own were not able to overcome the daunting administrative barriers imposed by the public water supply scheme. Moreover, the improvement in preventive health measures such as testing and filtering water, increase in (planned) breastfeeding duration, higher willingness to pay for water suggests that behavioural changes are contingent on the commitment to an alternative option.

The remaining paper is structured as follows. In section 2, we explain the background of the study and the geography where the intervention was conducted. Section 3 discusses the sample selection procedure and the baseline analysis. The intervention and randomization are explained in section 4 while section 5 presents the methodology and the description of the primary outcome variables. We show results from the endline data in section 6 and finally conclude the discussion in section 7.

2. Background and Study Sample Description

In 2019, the government of India launched the Jal Jeevan Mission (JJM) which aims to provide regular supply of drinking water of adequate quantity and prescribed quality to every rural households, at affordable service charges. It assists the States/U.T.s in planning and building infrastructure for safe drinking water supply and providing financial assistance for building infrastructure both at household and village level. In areas where water quality is an issue, it also assists in technological interventions for removal of contaminants. 'Paani Samitis', a local level body consisting of 10-15 members, plan, implement, manage, operate and maintain the water supply at village level. So far the mission has helped around 6.76 crore households across several states in India with tap water connections (JJM dashboard).

The experiment was implemented in Titabor block of Jorhat district in Assam (Figure 1). The subdistrict Titabor falls in Jorhat district situated in Assam state, with a population of approximately 250,000 individuals who are majorly engaged in tea plantation and agriculture. Informal conversations with the Assam state officials revealed that PHED has faced several roadblocks to implementing the JJM in Titabor. Households lack information about contaminated groundwater in the region and there exists a deep-rooted cultural dependency on groundwater. Thus, though the scheme aims to provide tap water to all rural households in Titabor by 2024, there is an existing lack of demand. Notably, our treatment preceded the rollout of the government information campaign about the JJM in Titabor or the actual provision of water through the JJM in this area. This, and the short duration of our study, makes us confident that it was our intervention, and not any government outreach activities, that led to changes in outcomes observed in the study.

With this background, there are three reasons why we chose this particular region. **First,** among the 35 districts of Assam, Titabor block in Jorhat district has the largest number of habitations exposed to arsenic as per data from the *Central Ground Water Board*. The concentration of arsenic varies between 194 to 491 microgram per litre in these habitations, which is far beyond the safety limit of 50 micrograms (WHO & Bureau of Indian Standards). **Second,** to address the rise in arsenic levels, in 2008-09, The *Greater Titabor Water Supply Scheme* was launched which draws surface water from two neighbouring rivers. The scheme planned to cover 507 habitations covering approximately 40,000 people distributed over 17 Gram Panchayats (GPs) of Titabor block. Despite the availability of safe government supplied water, only 21% of households in Titabor consume water from the publicly provided source (Census 2011). More recent data from NFHS (2015-16) suggests that approximately 60% of the rural households in Jorhat source water from boreholes, tube wells or wells. A probable reason for the same could be significant transaction costs involved in getting the government supplied water. **Third,** information of arsenic is very low in this region. Aggarwal, Barua and Vidal-Fernandez (2020) find that, among public schools in Titabor, 51% of students knew of iron in their groundwater, however only 7.5% knew of arsenic. Further, more than 50% of school teachers had never heard of groundwater arsenic. Similarly, Mahanta, Chowdhury and Nath (2016) find that 86% of households of Titabor did not know about the prevalence of arsenic in groundwater.

Our sample comprises of households with young children (0 to 6 years of age) and/or pregnant women. There are few reasons for this choice of target population. *First,* arsenic poisoning can become a chronic illness if arsenic is consumed regularly, especially by children. There is ample epidemiological evidence that arsenic affects child growth outcomes (Watanabe et al. 2007; Minamoto et al. 2005; Rahman et. al. 2009). Thus, by informing families with children early, we aim to have long lasting effects on health outcomes. *Second,* arsenic can affect education outcomes through cognitive impairment and school absenteeism. Aggarwal, Barua and Vidal-Fernandez (2020) find that children in Titabor with prolonged exposure to contaminated water sources experience higher rates of absenteeism, grade retention, and lower test scores. Similarly exposure to arsenic contaminated water was associated with impaired intellectual and motor function in Bangladesh (Wasserman et al., 2004). *Third*, we include pregnant women and women with small children in our sample due to both the higher prevalence of stillbirths among women who are exposed to arsenic during pregnancy and to study breastfeeding behaviour in arsenic affected regions. Keskin, Shastry and Willis (2017) find that, following an arsenic awareness campaign in Bangladesh, mothers were more likely to exclusively breast-feed infants and for longer. These babies had lower mortality and fewer episodes of diarrhoea.

3. Data collection and Baseline

In November 2021, we partnered with the National Health Mission, Government of Assam and the Public Health Engineering Department (PHED), the main government body responsible for provision of clean drinking water to rural households in Assam. Following this partnership, the PHED provided access to administrative data on the number of households in each village of Titabor with access to tap water. Based on this data, out of the 162 villages of Titabor, we sampled 110 villages with low to non-existing tap water connections (i.e. we sampled villages where less than 40% of the population had private household tap water connections). Within these villages, the sample is drawn from households being serviced by Accredited Social Health Activist (ASHA) workers working under the National Health Mission. ASHAs are Government of India's frontline health workers that mobilize the community and facilitate them in accessing health and health related services such as immunization, Ante Natal Check-up (ANC), Post Natal Check-ups, supplementary nutrition, and sanitation. The ASHAs compiled data on all households for these 110 villages with children (0 to 6 years) and pregnant women who were being serviced by them. Thus, we received administrative data on the name and contact (village, phone number if exists) of the mother/pregnant woman and the details of children. Out of the 110 villages, we received ASHA data for 85 villages with pregnant women and small children. Our final ASHA data included more than 4000 households across these 85 villages. Two villages were dropped as we conducted a short piloting exercise with these villages, the remaining 83 villages were used for randomization.

Baseline data was collected in December 2021 and January 2022 via a mix of phone surveys and in person surveys. While the ASHA data included phone numbers of female household members, we conducted in person surveys wherever phone numbers were missing or incorrect or where households were not reachable. Approximately 30% of the baseline surveys were completed via in person surveys. Households that already had tap water connections were dropped from the sample. Further, 25 households from each village were randomly chosen for our study for a final sample of 2075 households (25 households in each of the 83 villages).

The sample size for the study was chosen based on power calculations assuming dependent variables that are measured continuously, such as proportion of households dependent on groundwater sources, duration of breastfeeding (in days) etc. We assumed a groundwater usage rate of 55% and a standard deviation of 50 based on 2011 Census. Using data from Aggarwal, Barua, Vidal-Fernandez (2020), we choose the intra cluster correlation coefficient (ICC) as 0.13. This was based on habitation level data and whether the child had access to safe water. We assume the same MDE across comparisons of control group with treatment 1 and control group with treatment 2.[2]

The baseline survey included information on demographic characteristics of households, water sources and usage, health information, breastfeeding practices, arsenic related information, information on exposure to mass media and social interactions. **The final baseline sample includes 2064 fully completed surveys.** 11 surveys had to be dropped due to duplicate entries. The questions specific to breastfeeding and child health were only asked to mothers, 865 households did not have a mother available at the time of the call/in-person survey to answer the mother-child questions. The flow chart of activities including timelines and sample selection criteria is given in figure 2.

3.1. Baseline Analysis

Table 1 shows means and standard deviations of key variables from the baseline data. 92 per cent of our sample households are Hindus. Majority (64%) of households belong to Other Backward Class (OBC) caste category which is common for this region of Assam with predominance of tea garden labourers.[3] Only 24 per cent of households own *Pucca* (permanent or solid dwellings) house in our sample. Fixed asset is a binary variable that captures if the household owns house and/or land, and '0' if it does not. The non-fixed asset binary variable takes the value of 1 if the household owns assets including television, mobile phones, refrigerator, cooler, motorcycles, bicycle/scooter and/or car/bus/truck/micro-bus/boat. Despite the low income levels in the sample, almost 100 percent of the population owns such assets. On an average, the sample households' monthly income is only slightly larger than INR 10,000 (USD 125). 80 per cent of households had male household heads and the average age of the household head is 39 years. Highest level of education for household heads is 10 years of

[2] We used the *loneway* command in stata to compute the within village ICC. The power calculations were done using the *clustersampsi* command in stata.
[3] Other Backward Class is a category of population, created by the Government of India in year 1991 besides the existing categories (General Class, Scheduled Castes and Scheduled Tribes) to refer to castes and communities which were educationally or socially under developed at that time.

education. Approximately 58 per cent of households in our sample have breastfeeding mothers i.e. 1194 out of 2064 households. In addition, there are 32 households with two mothers who are breastfeeding. Further, 128 households (6%) have mothers who are pregnant. Despite the prevalence of arsenic in the entire district, 75% of households in our sample are dependent on groundwater sources for drinking water. The remaining consume water from surface water sources, public taps and bottled water.

4. Randomization and Intervention Design

4.1 Randomization and Balance

Following the baseline survey, 83 villages were randomly assigned to the two treatments and one control group. A multi-stage stratified random sampling was conducted to allocate the villages between the three groups: control group, treatment 1 group and treatment 2 group. The stratification at village level was done to avoid the problem of cross-contamination between the amongst the control and treatment groups. The criteria for stratification was on the basis of percentage of tap water usage in a village based on administrative data provided by the PHED.

After the stratification, the villages were randomly allocated to the three groups: control group (28 villages, 698 households), treatment 1 group (27 villages, 671 households) and treatment 2 group (28 villages, 695 households).

Table 2 shows the balance in baseline characteristics across the three groups. We show regression results where we regress each of the pre-treatment characteristics (columns 1 to 9) on a dummy variable for being assigned to treatment 1 and a dummy variable for being assigned to treatment 2. The regressions include stratification fixed effects and heteroskedasticity robust standard errors are clustered at the village level. None of the coefficients are significant suggesting that the data is completely balanced. Male household heads are marginally more likely to be assigned to the treatment 2. However, the coefficient is only significant at 10%. Moreover, this could be simply by chance. Further, we will control for all the covariates (column 1 to 8) in the final regressions to improve precision.

4.2 Intervention & Endline

The intervention was rolled out between March and April 2022. While we had planned to conduct group based intervention with the help of ASHA workers, we faced certain constraints during the pilot exercise. In particular, only about 30% of invited households attended the intervention after repeated requests from the ASHA. Moreover, pregnant women and women with small children found it difficult to come to a common location given the child care constraints. The region mainly harbours tea workers and it is difficult for them to leave work to participate in the intervention. Also, having the ASHA worker present at the time of the intervention may cause contamination, since ASHA workers from treatment and control groups often meet at the NHM office, it would be hard to prevent information sharing. Thus, for the main intervention, we moved to a door to door in-person survey conducted by trained surveyors. Our survey team was divided into two groups, with no common surveyors across the two teams to avoid contamination. One team of surveyors was trained to disseminate information in Treatment 1 villages while the second team visited Treatment 2 villages.

Households in treatment 1 group (**information only treatment**) were shown an eight minute informative video about arsenic contamination of groundwater. The video included information on the safe and unsafe sources of water, health impact of arsenic on children and adults, interviews with a health expert who discussed arsenic induced ailments and the breast milk being free from arsenic, with a school teacher who discussed absenteeism due to arsenic induced illnesses, and a patient who was diagnosed with a debilitating skin disease attributed to arsenic. In the video, we also interviewed a senior PHED official who discussed the alternate sources of safe water available in Titabor block including the provision of tap water under the JJM. To reinforce the content of the video and to enable information sharing within a household, pamphlets were also provided to each of the treatment households.

For treatment 2 (**information and transaction cost treatment**), along with the video and pamphlets, further information was provided about the provision of tap water under the Jal Jeevan Mission. This information included administrative details and application process along with information on cost of the private tap water connection. Further, we offered to assist with filling and submitting a PHED designed Letter of Intent form which is an application form to show an intent towards setting up a tap water connection in the household.

For households in the control group a generic SMS with information on provision of private tap water connections under the Jal Jeevan Mission was sent to ensure that the intervention on transactions costs treatment is not designed to succeed. The message also informed the recipients to visit the Titabor PHED office for further information about the program and its provisions.

Attrition and non-compliance/refusal was very low in our sample. Only 111 households (8% of treatment group) were not treated due to migration, refusal to participate, death and nonavailability of household members. Thus, the compliance rate is very high in the sample making the intention to treat effects very close to the average treatment effects.

Take up of the LOI was very high, 99.52% of the households availed the option of submitting LOI and thereby apply for tap water. Only 3 households did not wish to apply for tap water as they were not interested in tap water. Access to administrative PHED data meant that we were able to track if any household from the control or treatment 1 group submitted an LOI directly to the PHED office in Titabor town. By the end of the endline surveying, no households had filled out LOIs directly.

Finally, we conducted endline surveys approximately 1.5 to 2 months after the intervention. We followed the same approach for endline surveys, most surveys were completed by phone and those where phone numbers were not reachable, we conducted in person endline surveys. We completed 1985 surveys during the endline out of our sample of 2064. Thus the attrition rate is very low in our experiment (3.8%).

5. Methodology

Letting T be an indicator for whether an individual was assigned to treatment and Y be an indicator of the outcome variables:

(1) $Y_{iv} = \beta_0 + \beta_1 T^1_{iv} + \beta_2 T^2_{iv} + \beta_x X_{iv} + e_{iv}$

Where Y is the outcome of interest for household i in village v. β_0 is the value of the dependent variable for households assigned to the control group. T^1_{iv} is the dummy variable for assignment to treatment 1 while T^2_{iv} indicates assignment to treatment 2, X_{iv} are the household level covariates and e is a mean-zero error-term. We include stratification fixed effects in the regression and control for baseline variable, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. Standard errors are clustered at the village level to correct for heteroscedasticity.

This is an "intent-to-treat" analysis as we consider treated all individuals assigned to the treatment group. However, given the very low attrition, the ITT estimates will be very close to the Average Treatment Effect (ATE) The criteria for stratification was on the basis of percentage of tap water usage in a village based on administrative data provided by the PHED. If the arsenic information alone decreases groundwater consumption and increases safe practices, then β_1 should be larger in magnitude. If the two treatment arms are complementary to each other, then β_2 should be significantly larger in magnitude than β_1.

We are interested in measuring the effect of treatment on several measures of information and awareness, water safety practices, health and breastfeeding behaviour. Measuring the effect on a large number of outcomes (more than 20 in our case) raises concerns about multiple inference i.e. even in the absence of treatment effects, some coefficients may emerge significant simply by chance (Romano and Wolf, 2005). Instead, following Anderson (2008), we create summary indices of key outcomes of interest using a GLS-weighting procedure. This method increases efficiency by ensuring that highly correlated indicators receive less weight than uncorrelated indicators. The choice of using this approach is guided by our survey questions on knowledge and awareness which are expected to be highly correlated with each other and thus, we weight those variables lower. On the other hand, this approach assigns higher weights to variables that represent "new" information.

Using Anderson (2008) approach, we calculate the standardized weighted index I for each observation i as follows. First, we selected the k indicators for outcome j as shown in the below table. Then, we adjust the sign of each variable to ensure that positive direction ensures a "better outcome". Next, we normalize indicators by the mean and standard deviation of the control group. The next step is to create the weights using the inverse of the variance covariance matrix of the normalized indicators where the weight is equal to the sum of the row elements of the inverse-covariance matrix. Finally, we construct the index using the weighs to get an efficient GLS estimator that is normalized so that the index is distributed with a mean 0 and standard deviation of 1. Following are the six indices that we create and the table below shows the variables that are used to create these indices. A summary index allows us to ascertain whether the intervention had an average effect on each of the indices being tested but at the same time being robust to concerns about multiple inference (Kling et al., 2007; Liebman et al., 2004). However, we also report the results on individual outcome variables to measure magnitudes of the effect.

1. *Arsenic awareness index:* an index created out of 8 binary indicators of arsenic related knowledge and awareness.
2. *Index of knowledge of alternate water schemes:* This index captures the knowledge of the respondent with respect to the government mitigation efforts and availability of safe water schemes in the region. We use three binary variables to create this index.
3. *Index of knowledge of procedures and costs:* We asked respondents whether they were aware of the paper work that was required to access water under the JJM and if they

knew the costs involved. These two variables were used to create an index of knowledge of paperwork and costs.

4. *Water Demand index:* This index captures the increase in demand for safe water measured by household demand and willingness to pay. The index comprises of three variables; whether the household has ever inquired/applied/submitted LOI/considered applying for a piped water scheme. And two categorical variables for households willingness to pay for safe water in terms of actual costs (rupees) and time households are willing to spend for procurement of water (in minutes)
5. *Index of water safety:* An index that measures safe drinking water practices in the household. Three variables are used to create this index: whether the household got their water tested for any contaminants, frequency of filtration of water and remedial measures been taken at home against arsenic contamination.
6. *Breastfeeding behaviour index:* Breastfeeding outcomes are measured only for women who are pregnant or breastfeeding. This index is defined as a weighted combination of two variables. The first captures the probability of (planned) breastfeeding while the second captures the duration of (planned) breastfeeding.

Index	Description
Arsenic awareness index	Captures awareness/knowledge of respondents regarding arsenic contamination based on correct answers to the following questions. • Are you aware of arsenic in groundwater in the region? Yes/No • Arsenic is poisonous to human health. Yes/No • Arsenic is visible in water. Yes/No • Arsenic poisoning leads to visible symptoms in humans. Yes/No • Arsenic adversely impacts infants and child health. Yes/No • Breastmilk is safe from arsenic contamination. Yes/No • If arsenic is found in tube well water, you should switch to safe source. Yes/No • Boiling water removes arsenic. Yes/No
Index of knowledge of alternate water sources	Captures awareness regarding safe sources of water availability in the region: • PHED supplies safe drinking water in rural areas of Assam. Yes/No • Are you aware of mitigation measures to resolve arsenic contamination in the area. Yes/No • Are you aware of surface water schemes in Titabor block. Yes/No
Index of knowledge of procedures and costs	Captures awareness regarding application procedure for piped surface water supply to homes: • Are you aware of the paperwork and procedures for the application. Yes/No • Are you aware of how much it costs to get the private water connection. Yes/No

Water Demand index	Captures demand and willingness to pay for safe drinking water: • Have you ever inquired/applied//submitted LOI/considered applying for a piped water scheme? • How much expense are you willing to incur for safe drinking water supply in a month (In Rupees). This variable has 7 categories, 1 for Rs 0, 2 for less than Rs 50/-, 3 for between 50 to 100 rupees and so on until 6 for above Rs. 300/-. • How much time are you willing to spend to procure water from a safer source (in minutes). This variable has 6 categories, 1 for "no time", 2 for less than 10 minutes, 3 for between 11 to 20 minutes, 4 for between 21 to 30 minutes, 5 for 31 to 60 minutes and 6 for above 60 minutes
Water safety index	Captures the measures taken by households to reduce arsenic contamination: • Whether the household has tested it's groundwater for contaminant • Are you taking any remedial measures at home against arsenic contamination in drinking water. Yes/No • Frequently of filtering drinking/cooking water before usage using different techniques.
Breastfeeding behaviour index	Captures breastfeeding behaviour and practices among pregnant/nursing mothers: • Whether currently breastfeeding child/Whether planning to breast feed child? • How many months of duration/planned duration of breastfeeding

In addition, we also measure the effect of treatment on the following individual outcome variables:

7. Source of drinking water: Binary variable equal to 1 for groundwater sources and 0 for surface water sources
8. Child health outcome: In the past two months, have you noticed your child have any of these symptoms: stomach pain, skin diseases, diarrhoea, vomiting? Yes/No
9. Do you discuss any of the following topics with your family/relatives/neighbours/ friends:
    - Quality and quantity of water received at home. Yes/No
    - Health of children and/or mothers/expectant mothers. Yes/No
    - Government water supply schemes. Yes/No
    - Financial expenses incurred on water. Yes/No

6. Endline Analysis

In tables 3 to 8 column (1) we show the impact of the information and the information plus transaction cost treatment on the six composite indices. The remaining columns in these tables shows the breakdown of the sub-components i.e. variables that were used to compute each of the index variable. Against each column, we also show the difference between the two treatment groups, the F-statistic of the difference in coefficients and the associated p-values.

Table 3 shows the results for arsenic awareness. Note that *a-priori*, for arsenic related awareness and knowledge, we do not expect the coefficients on the two treatment conditions to be significantly different from each other. Relative to the control group, both treatment arms retained knowledge of arsenic and its ill-effects by 0.23 and 0.32 standard deviations, respectively, 1.5 months after the intervention. Both coefficients are highly statistically significant (at 1% level), however, the difference between the coefficients is not significant at conventional levels. While the aggregate index shows no differences across the two treatment conditions, we observe larger effects of the information plus transaction cost treatment on the sub-components. For instance, households in this treatment group are 7.4 percentage points more likely than the information treatment to know that arsenic is poisonous to human health and this difference is statistically significant. In the control group, 56% of households were aware that arsenic is poisonous to human health. The magnitudes of the effects are large, ranging from 6.1% to 24.7% with largest effects for knowledge of adverse implications of arsenic on child and infant health.

In table 4 we show results for the index of knowledge of alternate water supply schemes in the region and the related arsenic mitigation measures. Relative to the control group, the information and information plus transaction cost treatment had an increase in knowledge by 0.19 and 0.27 standard deviations, respectively. However, the difference between the two intervention arms is insignificant. Looking at the sub-components, treatment 2 had a statistically significant increase in knowledge of water supply schemes with no effects among treatment 1. 45% of households in the control group were aware of existing water supply schemes. This implies that awareness of water schemes increased by more than 25% among the households in our sample after the information plus transaction cost intervention (0.12 increase over a mean of 0.45).

Table 5 shows results for knowledge of administrative procedures and costs. While the intervention had no effect on the composite index, the difference between the two treatment arms is statistically significant at the 10% level. In particular, treatment 2 households were 17.3% points more likely to know about the administrative process. Looking at the components, we can see that this is being driven by awareness of the paperwork.

The key policy question is whether the observed increase on various measures of household knowledge translated to behavioural and attitude changes that could eventually improve health outcomes. Table 6 shows results for an important index, the water demand index. This variable is measured by combining three sub-categories, namely, the households willingness to pay (in rupee amounts) and time (in minutes) and whether the household has considered/inquired/applied for tap water from the government. First, compared to the control group, the index is positive and significant for only the information and transaction cost treatment. There is no effect of the information treatment alone on the households demand for improved water quality. The difference between the two treatments suggests that all of this increased demand is due to the reduction in transaction costs in our intervention. The sub-components show some interesting results. First, the control group averages for willingness to pay is very low. Households are willing to spend only Rupees 50/-, on an average for water (mean of 2.5 for a categorical variable as defined in Table 1) and approximately 20 min per day to source clean water. Second, the intervention had no affect on the willingness to pay components of the index. Third, the information plus transaction cost treatment led to a 46% increase in demand for water. Note that according to the administrative data almost 100% of households in this treatment group submitted a letter of intent for tap water while no one from the control or information treatment submitted an LOI till the end of endline surveying. The discrepancy in numbers between the self-reported and administrative data can be explained by a lack of information sharing within the household. Out of the 695 households assigned to this treatment condition, only 223 households (32%) had the same respondent who participated in the in-person intervention and who was surveyed in the endline. The discrepancy between the administrative and self-reported numbers could thus be explained by household members who had signed the LOI but had not communicated this information to the family member who responded to the endline survey.

The next table (Table 7) looks at another policy relevant outcome variable, namely, water safety practices adopted by the households. The index of water safety shows positive and significant effects of the information plus transaction cost treatment (0.22 SD). The sub-components reveal that, among households who had heard of arsenic in their groundwater, the intervention led to an increase in the probability of utilizing remedial measures such as using community tap water, rain water harvesting or bottled water. While only 26.6% of the control group who had heard of arsenic used remedial measures, 12% of households in the information treatment and 16% of households in the information plus transaction cost treatment resorted to cleaner sources of water. There is no statistically significant difference between the two treatment arms which suggests that information alone was sufficient to increase the propensity to switch to available clean sources of water. We asked households "How often do you filter drinking/cooking water using different techniques (like boiling, sand filters, RO)". The response was a categorical variable, ranging from 1 for "never" to 7 for "each time we drink/cook". Reassuringly, households increased the frequency of filtration in response to the information and transaction cost treatment. We get conflicting results in column (4) where the information treatment led to a decrease in the probability of testing the water for contaminants by 3.5 percent. In the control group, only 6% households were testing their water for the presence of contaminants, thus there is a large decline in testing relative to the control group. Since the entire Titabor block has been declared by the PHED to be contaminated with arsenic, this result is not necessarily a undesirable outcome. Our information treatment increased the awareness about the presence of arsenic in the entire Titabor block, hence it could have decreased the need for testing.

One of the easiest ways to protect an infant from drinking contaminated water is to increase the duration and frequency of breastfeeding. While arsenic is known to readily cross the placenta, exclusive breastfeeding protects infants against arsenic (Fängstrom et al. 2008). One of the main aims of the intervention was to make expectant and breastfeeding mothers aware of this. The results for breastfeeding index in Table 8 are striking. The information and transaction cost treatment increased the breastfeeding behaviour index by 0.18 standard deviations (significant at 5%). Looking at the components of this index, it is clear that both probability of breastfeeding and duration of actual/planned breastfeeding increased. While the probability of breastfeeding increased by 4.1 percent, the duration increased by 2.6 months; both estimates significant at the 10% level. In the control group, the mean duration of breastfeeding is 25 months. Our estimates translate to an approximate 10 percent increase over this. This is an important result for policy purposes as it shows that giving information alone is not sufficient to change breastfeeding attitudes if not accompanied with knowledge of alternate options. Mothers are more likely to respond when they are made aware of alternatives and when those alternatives are made easily available.

Finally, we study a broad range of outcome variables. Note that given the short duration between the intervention and the endline survey, we do not expect any changes in health outcomes or switching to surface water sources. In table 9, column 1, we study the effect of the intervention on the probability of drinking groundwater and the health of the child/infant (column 2). We find insignificant results for either the information treatment or the information plus transaction cost treatment. Among those who had ever inquired/applied or considered applying for tap water, our survey also asked why the respondent had not received tap water connections. The majority of households gave the reason for not getting connection as either "not enough time elapsed since submission" or "I was informed that water supply is not yet available in my area". This is not surprising given the short time period of our study. Finally, we are interested in studying whether our intervention led to any discussions in the community about water quality. We asked respondents the following four binary response question: "Do you discuss any of the following topics with your family/relatives/neighbours/ friends: (1) Quality and quantity of water received at home (2) Health of children/mothers (3) Government water supply schemes (4) Financial expenses incurred on sourcing water". The results are shown in columns (3) to (6). All estimates are insignificant except one. There is a positive effect of the information treatment on discussions about government water supply schemes (6.2 percent increase, significant at the 10% level).

Taken together, our results indicate that the information campaign alone was sufficient to successfully increase awareness and knowledge of arsenic and its ill effects as well as awareness of alternate water supply schemes and mitigation efforts implemented by the state government. However, to translate this increased awareness into actual change in behaviour and outcomes related to water safety, the transaction cost treatment was salient. Notably, almost everyone who was offered the option of submitting a LOI, did so. At the same time, there was no significant decrease among treated households in the probability of using groundwater, which can be explained by the short duration of the time between the intervention and the endline survey and the consequent gap between applications and actual tap water connections. Most importantly, in the absence of an actual increase in tap water connections, the transaction cost intervention increased water safety practices such as filtration and usage of safer sources of water (such as community taps, bottled water, rain water harvesting). Further, mothers were more likely to increase both the probability and duration of breastfeeding in response to the transaction cost treatment.

7. Conclusion

We conducted a Randomized Controlled Trial in a heavily arsenic contaminated rural region of India in partnership with the National Health Mission, and the Public Health Engineering Department (PHED), the main government body responsible for provision of clean drinking water to rural households. The RCT was implemented to understand the constraints households face in accessing water via a large government tap water scheme: the information constraint (treatment arm 1) or a combination of lack of information and transaction costs (treatment arm 2) involved with public water supply schemes.

Our results are striking: we find strong evidence that though information campaigns can increase household awareness and knowledge, information provision alone is not sufficient to change health behaviour linked to drinking contaminated water. This is consistent informational interventions increasing knowledge recall, but this increased knowledge does not translate to behavioural changes. The information-plus-transaction cost intervention resulted in large improvements in health specific knowledge, attitudes, and behaviour. The large take up of the program suggests that households on their own were not able to overcome the daunting administrative barriers imposed by the public water supply scheme. Moreover, the improvement in preventive health measures such as testing and filtering water, increase in (planned) breastfeeding duration, higher willingness to pay for water suggests that behavioural changes are contingent on the commitment to an alternative option.

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Figure 1: Geographical location of Titabor Block in Jorhat District of Assam

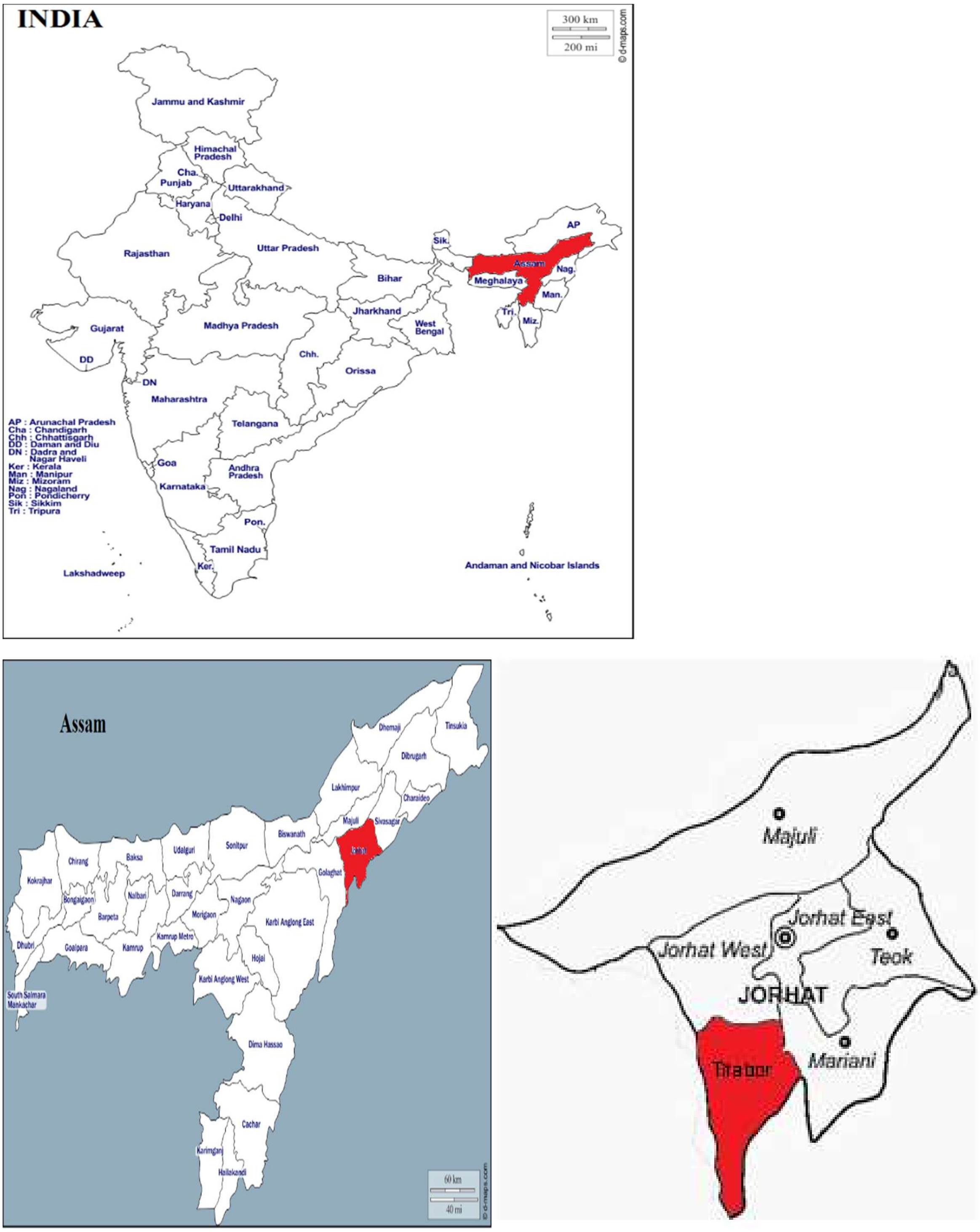
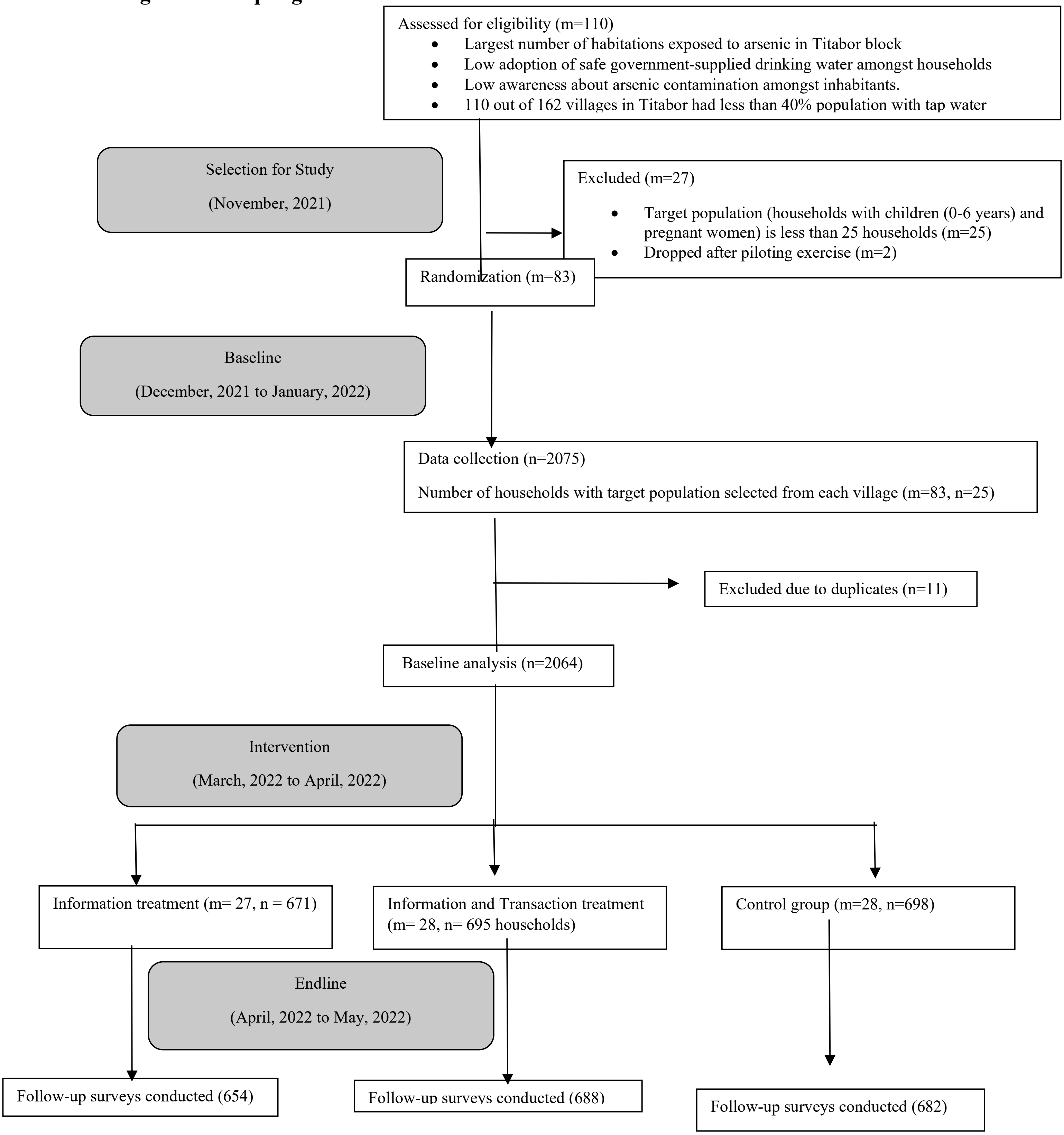


Figure 2: Sampling Cascade and Flow of Activities



Note: m=number of villages, n=number of households

Table 1: Summary Statistics from Baseline Data

	(2)	(3)
	Means	Standard Deviations
Religion:		
Hindu	0.918	0.274
Muslim	0.039	0.194
Christian & Buddhists	0.043	0.202
Caste:		
General	0.138	0.345
OBC	0.641	0.480
SC	0.074	0.261
ST	0.138	0.345
others	0.009	0.095
Income (in Rupees)		
less than 10,000	0.723	0.447
10,001 to 25,000	0.208	0.406
25,001 to 50,000	0.053	0.225
50,001 to 1 lakh	0.011	0.105
More than 1 lakh	0.003	0.581
Male Household Head	0.805	0.396
Age Household Head	39.19	14.34
Education Household Head		
Elementary, Anganwadi or no Formal	0.274	0.446
Middle & Secondary Education	0.487	0.499
High Secondary Education	0.182	0.385
Above High Secondary Education	0.057	0.232
Type of House	0.238	0.426
Proportion with Fixed Assets	0.998	0.049
Proportion with non-Fixed Assets	0.992	0.090
Number of Children	0.641	0.525
Number of Household Members	4.605	1.494
Households with pregnant mothers	0.062	0.241
households with breastfeeding mothers	0.578	0.494
Primary Source of Drinking Water is Groundwater	0.752	0.432

N=2064

Table 2: Baseline Balance Regressions for Household Demographic Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Number of Children	Religion Dummy (Hindu)	Caste Dummy (OBC)	Income Ranking	Male Household Head	Age Household Head	Household Head: Secondary/Higher Education	Type of House	Number of Household Members
Information Treatment	-0.032	-0.019	-0.038	0.098	-0.027	0.498	0.027	0.050	0.146
	(0.036)	(0.037)	(0.058)	(0.086)	(0.046)	(1.575)	(0.046)	(0.045)	(0.128)
Information & Transaction	0.007	0.005	-0.045	0.062	0.062*	-0.024	-0.001	0.041	0.023
cost Treatment	(0.039)	(0.031)	(0.052)	(0.062)	(0.036)	(1.554)	(0.045)	(0.038)	(0.130)
Observations	2,039	2,064	2,064	2,064	2,060	2,060	1,496	2,064	2,064
R-squared	0.001	0.006	0.005	0.013	0.032	0.015	0.006	0.011	0.006

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression where the baseline characteristic variable is regressed on the two treatment dummies controlling for stratification fixed effects. N=2064

Table 3: Effect of Information & Transaction Cost (TC) Treatment on Awareness about Arsenic

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Arsenic awareness index	Are you aware of arsenic in the region	Arsenic is poisonous to health	Arsenic is visible in water	Arsenic produces visible symptoms	Arsenic adversely impacts infants/child health	Is breastmilk safe from arsenic	If arsenic is found in your tube well water, switch to safe source	Boiling water removes arsenic
Information Treatment	0.232***	0.123***	0.154***	0.085***	0.152***	0.175***	0.164***	0.156***	-0.014
	(0.067)	(0.038)	(0.037)	(0.031)	(0.037)	(0.040)	(0.040)	(0.040)	(0.017)
Information and TC Treatment	0.321***	0.170***	0.228***	0.061**	0.223***	0.247***	0.238***	0.240***	-0.010
	(0.056)	(0.035)	(0.032)	(0.028)	(0.036)	(0.034)	(0.035)	(0.035)	(0.015)
(Information+TC)-	0.089	0.047	0.074**	-0.024	0.071**	0.072**	0.074**	0.084***	0.004
F-statistic	2.14	1.76	6.21	0.58	4.64	5.3	5.1	6.7	0.09
P value	0.147	0.188	0.015	0.447	0.034	0.024	0.027	0.01	0.759
R-squared	0.047	0.031	0.07	0.017	0.067	0.072	0.057	0.068	0.011
Mean of the control group		0.319	0.559	0.175	0.489	0.526	0.438	0.497	0.087
Observations	1,985	1,985	1,985	1,985	1,985	1,985	1,985	1,985	1,985

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. The variables in columns 2–9 are dummy variables equal to 1 if the respondent answered correctly. Column (1) aggregates the measures in columns (2) to (9) based on the method described in the paper.

Table 4: Effect of Information & Transaction Cost (TC) Treatment on Index of knowledge of alternate water sources

	(1)	(2)	(3)	(4)
	Index of knowledge of alternate water schemes	Awareness of PHED	Awareness of mitigation measures	Awareness of surface water schemes
Information Treatment	0.188**	0.114***	0.016	0.048
	(0.081)	(0.036)	(0.034)	(0.037)
Information and TC Treatment	0.271***	0.126***	0.024	0.119***
	(0.087)	(0.039)	(0.036)	(0.043)
(Information + TC)-Information	0.083	0.012	0.008	0.071*
F-statistic	1.24	0.14	0.06	3.42
P value	0.269	0.707	0.806	0.068
R-squared	0.032	0.038	0.012	0.017
mean of the control group		0.599	0.194	0.45
Observations	1,985	1,985	1,985	1,985

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. The variables in columns 2–4 are dummy variables equal to 1 if the respondent answered yes to the questions. Column (1) aggregates the measures in columns (2) to (4) based on the method described in the paper.

Table 5: Effect of Information & Transaction Cost (TC) Treatment on Index of knowledge of procedures and costs

	(1)	(2)	(3)
	Index of knowledge of procedures and costs	Aware of paperwork	Aware of costs
Information Treatment	-0.028	-0.008	-0.016
	(0.085)	(0.038)	(0.040)
Information and TC Treatment	0.145	0.081*	0.047
	(0.102)	(0.046)	(0.046)
(Information + TC)-Information	0.173*	0.089**	0.063
F-statistic	3.45	4.58	2.24
P value	0.067	0.035	0.138
R-squared	-0.102	-0.046	-0.046
mean of the control group		0.378	0.315
Observations	1985	1985	1985

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. The variables in columns 2–3 are dummy variables equal to 1 if the respondent answered yes to the questions. Column (1) aggregates the measures in columns (2) and (3) based on the method described in the paper.

Table 6: Effect of Information & Transaction Cost (TC) Treatment on Water demand

	(1)	(2)	(3)	(4)
	Water demand index	Willingness to Pay (costs)	Willingness to Pay (time)	Considered/enquired/applied for piped water
Information Treatment	0.001	-0.018	-0.032	0.021
	(0.083)	(0.075)	(0.086)	(0.040)
Information and TC Treatment	0.602***	0.011	0.026	0.461***
	(0.088)	(0.074)	(0.084)	(0.039)
(Information+TC)-Information	0.601***	0.029	0.058	0.440***
F-statistic	82.51	0.24	0.67	198.35
P value	0.0000	0.6254	0.4148	0.0000
R-squared	0.097	0.023	0.013	0.199
mean of the control group		2.519	3.315	0.358
Observations	1,985	1,985	1,985	1,973

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables: gender, age and education of the household head, religion, caste, income and the type of house. The variables in columns 2 and 3 are categorical variables while column 4 reports estimates for a dummy variable. Column (1) aggregates the measures in columns (2) to (4) based on the method described in the paper.

Table 7: Effect of Information & Transaction Cost (TC) Treatment on Water safety behaviour

	(1)	(2)	(3)	(4)
	Water safety index	Remedial measures taken	Frequency of filtration	Tested for Contaminants
Information Treatment	0.098	0.120***	0.189	-0.035**
	(0.080)	(0.037)	(0.155)	(0.014)
Information and TC Treatment	0.217***	0.160***	0.334**	-0.025
	(0.076)	(0.033)	(0.156)	(0.016)
(Information+TC)-Information	0.119*	0.04	0.145	0.01
F-statistic	3.57	1.19	1.22	0.88
P value	0.062	0.279	0.273	0.350
R-squared	0.038	0.033	0.024	0.032
mean of the control group		0.266	5.307	0.06
Observations	1,985	1,985	1,985	1,587

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. The variables in columns 2 and 4 are dummy variables while column 3 reports estimates for a categorical variable. Column (1) aggregates the measures in columns (2) to (4) based on the method described in the paper.

Table 8: Effect of Information & Transaction Cost (TC) Treatment on Breastfeeding Attitude and Behaviours

	(1)	(2)	(3)
	Breastfeeding behaviour index	Currently breastfeeding/Whether breast fed child?	How many months/planned duration of breastfeeding
Information Treatment	0.023	0.003	0.501
	(0.087)	(0.025)	(1.631)
Information and TC Treatment	0.179**	0.041*	2.594*
	(0.078)	(0.022)	(1.516)
(Information + TC)-Information	0.156**	0.037*	2.093
F-statistic	4.98	3.55	2.04
P value	0.028	0.063	0.157
R-squared	0.021	0.014	0.039
mean of the control group		0.903	25.22
Observations	1,196	1,196	1,122

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house. Columns 2 reports estimates for a dummy variable while column 3 reports estimates for a continuous variable. Column (1) aggregates the measures in columns (2) and (3) based on the method described in the paper.

Table 9: Effect of Information & Transaction Cost (TC) Treatment on Various Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Drinking Water Source is Groundwater	Observed Child Sick Last 2 Months	Discuss: Quality/Quantity of Water	Discuss: Health of children/pregnant mothers	Discuss: Govt water supply schemes	Discuss: financial expense on water
Information Treatment	0.044	0.006	0.014	0.014	0.062*	-0.038
	(0.044)	(0.040)	(0.049)	(0.042)	(0.037)	(0.037)
Information and TC Treatment	0.005	0.015	-0.004	-0.011	0.040	-0.047
	(0.044)	(0.037)	(0.048)	(0.040)	(0.038)	(0.035)
Observations	1,985	1,196	1,985	1,985	1,985	1,985
R-squared	0.048	0.028	0.028	0.014	0.021	0.026

Heteroskedasticity robust standard errors are reported in brackets, with clustering at the level of the village (at which treatment was assigned). *** p<0.01, ** p<0.05, * p<0.1. Regressions include stratification fixed effects. Regressions control for baseline variables, namely, gender of the household head, age and education of the household head, religion, caste, income and the type of house.