

Adoption of Safe Drinking Water Practices: Does Awareness of Health Effects Matter?

The demand for environmental quality - clean air, potable water, sanitation, safe food - is often presumed to be low in developing countries due to poverty. But is poverty the only reason for low demand for environmental quality or is it also lack of adequate information about environmental hazards? A recent SANDEE study demonstrates that awareness and education can be powerful tools in the fight against dirty water and water-borne diseases.

This study reveals that the demand for clean water and consequent adoption of safe drinking water practices is strongly dependent on awareness and education. The impact of these 'informational' variables is equivalent to the impact of increases in wealth. Thus, providing poor people with information about problems associated with dirty water can prevent health hazards such as diarrhea and other water-borne diseases. When it comes to environmental health, we do not need to wait for poverty to decrease; educating people will go a long way in getting the right results.

In this study, **Jyotsna Jalan, E. Somanathan and Saraswata Choudhuri** of the Indian Statistical Institute examine the determinants of clean drinking water practices by using a national data set for urban India. The authors also estimate willingness to pay for clean water for a subset of households from Delhi.

Contaminated drinking water is a major health hazard in developing countries, particularly for the poor and the vulnerable. In India alone, there are more than a million child deaths per year as a result of waterborne diseases such as diarrhea (Parikh et. al., 1999). The main public intervention to improve drinking water quality is provision of piped water to households. The World Health Organization estimates that universal availability of piped and regulated drinking water would result in a reduction of some 7.6 billion diarrhea cases annually. However, this type of infrastructural intervention is unlikely to expand rapidly in the short-run. The main reasons for this are the heavy financial investments required and the absence of a clearly expressed demand from the public, which in turn depends on public awareness of the health hazards of contaminated water.

A substitute short-term solution is disinfection at point of use, such as boiling water or straining contaminants. Such household-specific interventions can have a large health impact. This study examines why some households adopt such clean technologies and others do not.



DATA - NATIONAL FAMILY HEALTH SURVEY OF INDIA

Jalan, Somanathan, and Chaudhuri use 1998-99 data from the National Family Health Survey (NFHS) of India. This household survey covers 99 percent of India's population. It has an overall target sample size of approximately 90,000 ever-married women in the age group 15-49. The current study includes only urban households with 15 or fewer members. Accordingly, the study covers 20,681 households.

The NFHS data shows that of the 7,351 households that had children in the 0-3 age group, 14 percent reported at least one case of diarrhoea in the preceding two weeks. Among the households who treat their drinking water, five different methods are used: (i) straining water with an ordinary cloth, (ii) using alum (aluminum sulphate, a flocculant) tablets, (iii) using an ordinary (candle) filter, (iv) using an electronic filter or (v) boiling water. To examine the influence of awareness on household willingness to pay for clean water, the authors estimate a multinomial logit model where a household has different choices available—no purification, and the above five purification options (methods (ii) and (iii) are clubbed together)

Every year contaminated drinking water and improper sanitation result in over 1.7 million deaths across the world. Most deaths occur in developing countries and nine out of ten victims are children. These figures are worrisome but of more immediate concern is the realization that many of these deaths could be averted. Governments have attempted to solve this problem by providing clean piped water, but universal coverage is un-likely in the short-run because of the costs involved. Hence, it is very important to consider alternative measures such as purification of water at the point of use or adoption of home purification methods.

Currently, many home water purification techniques are available in India. These include, straining with a cloth, alum tablets, use of clean storing vessels, boiling water, use of wick and electronic filters. However, data from the National Family Health Survey of India shows that almost fifty percent of all households consume water without using any type of purification technique. Among richer households, 32 percent do not adopt purification methods. Two-thirds of the poorest households fail to use purification methods. The question is why do more households not adopt these measures? Is it poverty that results in lack of demand for such simple technologies? Given that a relatively costless technique like straining water with a cloth folded-over eight or more times is successful in removing copepods (which are a host for cholera bacteria), poverty cannot fully explain the decision of households to forgo such techniques.

It is here that “awareness” as a determinant of the demand for safe drinking water comes into play. Jalan, Somanathan and Chaudhuri examine different sources of awareness - formal schooling, exposure to mass media and occurrence of diarrhoeal diseases (the assumption here is that occurrence of a waterborne disease would increase household awareness about the need to improve the quality of water consumed). They analyze the role and importance of each of these awareness indicators in the adoption of water purification techniques and contrast this with wealth as a determinant of safe drinking water practices.

DOES AWARENESS INFLUENCE HOUSEHOLD DECISIONS TO ADOPT SAFE WATER PRACTICES?

The statistical analyses undertaken in this paper offers some very useful insights about the importance of wealth versus awareness in motivating households to adopt clean water practices. The study reveals that:



- Educational attainment and wealth both significantly increase the likelihood that households will adopt safe drinking water practices.
- The effect of increases in schooling on purification behavior is overall comparable to the effect of increases in wealth.
- Listening to the radio and reading the newspaper raise adoption of purification techniques. If a female adult household member reads a newspaper at least once a week, the likelihood of adopting safe drinking water practices increases by some 8 percent. Among households not exposed to the print

media, 60 percent do not treat their water. This proportion falls by half for households that read newspapers.

- A prior bad health experience (from diarrhoea, for example) raises the probability of households boiling their drinking water by about 5 percentage points.

WILLINGNESS TO PAY FOR CLEAN WATER

From a policy perspective, it is important to understand what people are willing to pay for purification technologies. The authors estimate willingness to pay to improve the quality of water using data from a sub-sample of households from Delhi. They estimate that the average person in Delhi is willing to pay approximately Rs.25 per month to ensure that drinking water is clean.

Expected Willingness to Pay for Purification Techniques in Delhi

Wealth and Education Groups	Controlled WTP Rs/Year
<i>Wealth Categories</i>	
Bottom quartile	158
Second quartile	218
Third quartile	252
Top quartile	329
<i>Highest number of years of education of adult females</i>	
No education	171
1-7 years	212
8-13 years	314
14+ years	426

Controlled WTP refers to WTP for sub-samples (e.g. bottom wealth quartile) keeping other variables at their mean levels.



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An important question is whether better informed people are willing to pay more for a better environmental quality than the uninformed? That is, how does willingness to pay relate to household wealth, education and media exposure? The analysis shows that an increase in wealth that moves a person from the poorest group to the richest roughly doubles expected willingness to pay. An increase in education from no education to ten years of education results in more than doubling willingness to pay for safeguard measures. Thus, the effect of education on demand for clean water is at least equal to, if not more significant than, wealth effects.

The analysis of willingness to pay for clean water technologies reinforces the importance of educating women. Households with adult females with high school education rather than primary schooling are willing to pay 50 percent more for clean water technologies. An equivalent increase in male member education increases willingness to pay only by 21 percent. Similarly, households where females read the newspaper are willing to pay more for purification methods.

POLICY WATCH -- 'WATERING' DOWN IGNORANCE

The study demonstrates that adoption of household purification methods and willingness to pay for improved quality water rises with education and exposure to media, apart from the usual wealth factor. This throws up several areas where government and civil society can intervene in an effective manner:

- Education and awareness campaigns about clean water should be increasingly used as tools for public health interventions.
- Educating women has a greater influence on adoption of safety measures. Hence, female education should be the primary focus of clean water campaigns.
- Media (especially radio and print) can play a powerful role in sensitizing people to health hazards from unsafe drinking water.

These strategies do not negate the need for increased supply of regulated pipe water. Unsafe drinking water is one of the foremost environmental and poverty related challenges developing countries face. Every possible policy to make water safe needs to be considered and adopted.

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