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Nudging to use: Achieving safe water behaviors in Kenya and Bangladesh☆

Jill Luoto [a,*], David Levine [b], Jeff Albert [c], Stephen Luby [d]

[a] RAND, Santa Monica, CA, USA
[b] Haas School of Business, University of California, Berkeley, USA
[c] Aquaya Institute, San Francisco, CA, USA
[d] Center for Innovation in Global Health, Stanford University, USA

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ABSTRACT

Consistent adoption of preventive health behaviors could save many lives, but we do not understand how to create consistent adoption. For example, low-cost point-of-use (POU) water treatment technologies such as chlorine and filters can substantially reduce diarrheal disease, a leading cause of child mortality worldwide. Nonetheless, these products are not consistently used anywhere in the developing world, even when available and heavily subsidized. We ran complementary randomized field studies in rural western Kenya and urban Dhaka, Bangladesh in which households received free trials of POU products to test the role of marketing nudges on usage. Health-oriented marketing messages inspired by behavioral economics incrementally increase the use of all products in both countries. We discuss how our findings from these two studies complement and contradict each other, and what we can learn generally about the uptake of these (and potentially other) preventive health goods.

1. Introduction

Inadequate access to safe water is a primary cause of the estimated 750,000 child deaths from diarrhea that occur each year in poor countries (Liu et al., 2012). The good news is that low-cost point-of-use (POU) safe water products such as chlorine or a filter can substantially reduce diarrheal disease (Arnold and Colford, 2007; Brown et al., 2008; Clasen et al., 2006, 2007; Du Preez et al., 2008a,b). The bad news is that adoption and regular use of POU technologies remain low among the global poor, limiting their health benefits (Kremer et al., 2009; Luby et al., 2008; Luoto et al., 2011; Rosa and Clasen, 2009). Usage typically remains low even after years of social marketing (Holla and Kremer, 2009; Kremer et al., 2009), and sometimes even when products are free (Luoto et al., 2011; Mäusezahl et al., 2009).

We examine whether 'nudges' (Thaler and Sunstein, 2009) in the form of marketing messages derived from behavioral economics can increase water treatment among poor households in rural Kenya and in urban slums of Dhaka, Bangladesh. Specifically, households in both settings were randomly assigned to receive different message "frames" emphasizing the reasons for safe water treatment, and one half of households in both settings was randomly assigned to a "commitment with reminder" treatment that requested a verbal pledge to use the safe water product, coupled with visual reminders of this commitment to hang in their homes.

We tested these nudges in the context of two complementary field experiments in which participating households received free trials with a variety of competing and effective POU products, as well as

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* Corresponding author. 1776 Main Street, PO Box 2138, Santa Monica, CA 90407-2138.
E-mail address: jluoto@rang.org (J. Luoto).

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repeated educational messages about the importance of safe drinking water and its link with reducing diarrheal illness.[1]

Price and information matter: In both countries freely provided safe water products combined with repeated educational messages increased safe water treatment relative to baseline or to a control group. However, we found large differences in take-up rates across settings; in Kenya we observed usage of the freely provided products in 50% of follow-up visits, but in only 13% of visits in Bangladesh.

Despite different base rates of take-up, our marketing nudges increased product usage in both settings. The effects of the messages appear additive in both settings, and together they raise rates of observed water treatment by 4–11 percentage points, or 12–50%, beyond that achieved by distributing the products for free coupled with repeated educational messages. Specifically, in Kenya messages that framed safe water technologies as both avoiding disease and improving health (as opposed to a positive frame that mentioned only improving health) raised usage rates by 0.1 standard deviations, or roughly 14%. The effects of marketing messages that asked consumers to publicly commit to water treatment and provided a reminder poster increased usage by almost exactly the same amount. Results from Bangladesh were broadly similar, although the commitment with reminder treatment in Bangladesh increased water treatment more than the framing treatment. Combining results from separate RCTs from two different settings increases confidence in our findings.

2. Study settings

2.1. Background and summary statistics

We partnered with CARE-Kenya from July 2008 to February 2009 to study 400 randomly selected compounds (a collection of households; Luo tradition allows for polygamous marriages) in 28 villages within the largely rural Nyawita sublocation of Nyanza province in western Kenya. Nyanza is among Kenya's poorest regions and was chosen because people rely seasonally on turbid water sources such as the Yala River or earthpans — surface ponds that sometimes go dry during the dry season. Drinking water conditions vary considerably throughout the year, and most respondents prefer rainwater collection and public taps, when available.

In Dhaka, we partnered with ICDDR,B from January to December 2009 to conduct a study among 800 households residing in low-income sections of the densely-populated mixed-income community of Mirpur. This is a crowded urban community (“slum”) where the most common source for drinking water is piped water from a shared tap.

Table 1 presents baseline summary statistics of households from both settings. Both are poor. A similar share of respondents (18%) reports an education level beyond primary and average household size is about six people in both countries.

In both countries most water stored at households was contaminated. In Kenya, 87% of baseline water samples tested positive for *Escherichia coli*, an indicator of fecal contamination. The mean and median *E. coli* counts were 155 and 19 coliform forming units (CFU) per 100 mL of water. Similarly, in Dhaka 83% of household water samples taken from control households tested positive for *E. coli*. The mean and median *E. coli* counts were 182 and 44 CFU/100 mL.

In Kenya, 98% of respondents had heard of at least one point-of-use water treatment method at baseline (WaterGuard, a dilute chlorine solution). At the same time, only 7% reported that their current drinking water was treated by a POU product and we could detect chlorine in only 1.5% of homes. In Dhaka there was much less baseline awareness of POU products (likely due to fewer years of and less intense social marketing). Nevertheless, still a majority had heard of at least one POU product (65%, most commonly a filter). No Dhaka household reported usage of any POU product at baseline.

2.2. Experimental designs

We describe the experimental design in Kenya and highlight relevant differences for the Dhaka study. More details on Dhaka's experimental design can be found in Luoto et al. (2011).

Prior to the start of the Kenya study, CARE staff conducted a census of all compounds in the 28 villages and recorded which had a child under five, the sole criterion for inclusion in the study. From this list, 400 compounds were chosen by a random-number generator. (In Dhaka the baseline sample was 800 households randomly chosen from 800 urban compounds, which are collections of 6–20 households that share a common water tap and latrine.)

In July–August 2008, our enumerators visited these compounds and asked to conduct a baseline interview with the mother of the youngest child. If that mother was not available, a mother of a child under five was selected. If no eligible mother was available, enumerators substituted the father (11% of baseline interviews in Kenya, 2% in Dhaka).

The baseline interview asked respondents about their current water and hygiene knowledge and behaviors, as well as prior exposure to any POU technologies. Enumerators then read an educational script about the dangers of unsafe drinking water, followed by detailed presentations on three POU products in a randomized order: a liquid chlorine product branded as WaterGuard, Procter & Gamble's flocculant–disinfectant powder branded as PUR[2], and a gravity-driven porous ceramic filter. All three products substantially reduce contamination in drinking water (Clasen et al., 2005, 2006; Crump et al., 2004; Jain et al., 2010). (In Dhaka we added a tablet chlorine product branded as Aquatabs, and replaced the ceramic filter with a siphon filter. For more product information see web appendix.)

After introducing the three POU products, enumerators then presented our experimental marketing messages. A random half of respondents heard a “positively framed” message. The other half of respondents heard a “contrast framed” message that contrasted what one stands to lose from non-use with the gains from using the products.

At this point, respondents were randomly assigned one of the three POU technologies for a two-month trial. Upon receiving their assigned product, enumerators asked one-half of respondents to commit verbally to the enumerator to use their new POU product for all of their drinking water, and gave a poster to hang in their homes as a reminder of this commitment. The assignment of products and both marketing treatments (the framing treatment and the ‘commitment with reminder’ treatment) were implemented orthogonally to each other. Table 2 has more details on this cross-randomization design. Also, all marketing treatments emphasized the expected health benefits from use of any safe water product; we did not present relative comparisons of one product versus another.

In Kenya, each family received a covered bucket with tap along with their assigned product to minimize recontamination of treated water within the household and because the filter we used in Kenya included safe storage in its design (and we wanted to be consistent across products within Kenya). (In Dhaka, 200 of the 800 households were assigned to a control group and did not receive any products. Also in Dhaka, households typically prefer to use a traditional storage device with a narrow mouth, so we did not distribute safe storage containers to the 600 households in the intervention group that received products. We discuss below the possible effects of the buckets in Kenya.)

[1] These studies also examined how much alleviating the traditional constraints – price, information, and varying product preferences – would increase usage and identified preferred products (Albert et al., 2010; Luoto et al., 2011). The appropriate role of charging for POU products has been explored by others (e.g., Kremer et al. (2009); Ashraf et al. (2010); Holla and Kremer (2009)).

[2] Flocculants reduce turbidity in visibly muddy water.