Visualization of Future Benefits to Increase Preventive Health Investment, Savings, and Labor Supply in Kenya

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Sector(s): Health

Fieldwork: Busara Center for Behavioral Economics

Location: Bungoma and Kakamega, Western Kenya

Sample: 3,750 women in 205 villages

Target group: Children Women and girls

Outcome of interest: Diarrhea Health outcomes Savings/deposits Water quality

Intervention type: Information Preventive health Psychosocial support

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Individuals often fail to invest in preventive healthcare, even when such investments cost little and individuals are aware of their benefits. Researchers evaluated the impact of light-touch psychological interventions on health and economic outcomes, with a particular focus on the chlorination of drinking water. One intervention encouraged participants to visualize alternative realizations of the future based on current behavior; a second one built participants' ability to make concrete plans. After 12 weeks, visualization increased objectively measured chlorination; it also reduced diarrhea episodes among children and increased savings. After almost three years, visualization increased chlorination, savings, and labor supply, while effects of the planning intervention were weaker.

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Diarrhea is the second leading cause of death worldwide among children aged one to five, contributing to nearly half a million deaths in 2015. It is a leading cause of morbidity and stunts healthy growth in children through enteric dysfunction.

Chlorine can be used to purify water. In many settings, it is readily and cheaply available, but infrequently used by individuals without access to clean water. Interventions which provide chlorine for free, often in combination with information or marketing campaigns, can increase usage of chlorination somewhat, but take-up often remains low.

A growing body of evidence suggests that behavioral or psychological constraints may explain some of the low demand for preventive health products. For example, low demand for commitment products suggests a role for present bias in health decisions. People may not be sufficiently future-oriented to consider the health benefits to their children, and weigh these against small costs in the present. It is, however, not yet explored how low-cost, scalable psychological interventions can address these

behavioral constraints across multiple target behaviors.

سياق التقييم

In Bungoma and Kakamega counties in rural Western Kenya where the study took place, child diarrhea is relatively high. At baseline in 2017, the diarrhea prevalence of children under the age of three was 16 percent. Most of the population relied on communal water sources, usually wells with pumps or springs. Women and children collect drinking water in plastic jerry cans and store it in jerry cans or pottery jars. Water can be (re)contaminated easily if storage containers are left open, or when water is removed from storage pots.

Stakeholders in Kenya have carried out efforts to reduce diarrhea prevalence through chlorination, but take-up of chlorination remains low. Since 2003, an NGO had been heavily promoting and distributing chlorine dilute in the area, leading to widespread awareness of the product and knowledge that chlorination reduces diarrhea. Despite a previous campaign in which villages in the study areas received chlorine dispensers, use of chlorine remained low. At baseline, based on water samples collected in unannounced home visits in 2018, 22 percent of households had detectable total chlorine in their water, despite 66 percent of households reporting chlorination as one of their main methods of treating water.

CHLORINE DISPENSER
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A woman and children are standing next to a chlorine dispenser installed at a water source in a village in Kenya.

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معلومات تفصيلية عن التدخل

Researchers evaluated the impact of psychological interventions on the take-up of chlorination, as well as on a number of other health and economic behaviors. 3,750 women aged between 18 and 35 years in 205 villages in Bungoma and Kakamega counties participated in the program. The target population was chosen because women are primarily responsible for collecting water, and women within this age range were most likely to have small children, who are most vulnerable to water-borne illness.

The researchers randomly assigned participants into three “active” program groups and one comparison group.

1. *Visualization + Information Module (“V+INF”):* Participants in the first group received a two-session group intervention where participants visualized alternative realizations of the future, depending on their behavior in the present. The core of this Visualization intervention was to encourage participants to connect their present behavior to outcomes in the future. The intervention aimed to increase patient behavior by making future outcomes more vivid and tangible in participants' minds, thus increasing their perceived value relative to the more immediate costs required to attain them. The approach was deliberately visual and emotional, with participants asked to put themselves in the shoes of their future selves, imagine how they would feel, and ‘talk’ to them. Particular emphasis was put on how participants could use future visualizations in their everyday life in order to overcome any temptations they might encounter. The intervention was not specific to chlorination or health. Instead, it taught a general approach to decisions involving costs in the present and benefits in the future.
2. *Planning + Information Module (“P+INF”):* Participants in the second group received a two-session intervention that aimed to improve their planning skills, based on a psychotherapy approach called "Behavioral Activation." This involved helping participants to undertake activities that they were struggling to do regularly by making specific plans and establishing routines. Through simple diaries and planning exercises, they learned to set short-term goals, establish routines and reduce avoidance. In particular, people are taught to start with the easiest tasks, so they quickly earn a sense of accomplishment, which improves mood and increases the likelihood they persist with the task. Similarly to the Visualization program, facilitators avoided prescribing what activities participants should do, but merely aimed to teach skills to help them achieve their priorities.
3. *Active Comparison Exercise + Information Module (“AC+INF”):* Participants in a third, active comparison group also gathered as a group for workshops of the same format, but they discussed topics likely to be psychologically inactive. The purpose was to simply attend a session and interact with women from neighboring villages. During the session, participants discussed birds and plants of Kenya.

   In addition, all three groups received a short information module about the benefits of chlorination, to hold beliefs about chlorination constant across groups. The module also gave instructions on chlorination dosage, the importance of covering water containers, and highlighted that the smell of chlorine is not harmful and reduces over time.

4. *Pure Comparison Group (PC):* The researchers also compared these programs to a fourth, pure comparison group (“PC”), who were simply surveyed at the endline and did not receive any intervention.

Participants in the visualization, planning, and active comparison groups participated in four sessions: initial data collection and the first intervention session, a second intervention session one week later, data collection 10 weeks after the first session, and a final round of data collection 30 to 36 months after the first session. Participants in the pure comparison group did not participate in the initial data collection or the interventions. Households in all four groups received an unannounced visit 12 weeks after the first session, where enumerators collected a drinking water sample.

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The visualization intervention increased chlorination of water, decreased child diarrhea episodes, and was cost-effective. Effects extended to non-health outcomes, including savings and labor supply, and were visible almost three years after the initial intervention. By contrast, the planning intervention had minimal impacts.

Visualization increased chlorination of household drinking water and was effective at decreasing diarrhea episodes: Twelve weeks after the first session, the share of households in the Visualization group whose drinking water contained chlorine in an objective chlorine test increased by 5 percentage points from a base of 23 percent (a 22 percent increase). When asked an unprompted question about how they treat their water, participants in the Visualization group were seven percentage points more likely to state that they chlorinate it (from a base of 73 percent— a 10 percent increase). After almost three years, when asked the same unprompted question about how they treat their water, participants in the Visualization group were five percentage points more likely to state that they chlorinate it (a six percent increase from a base of 85 percent).

The number of diarrhea episodes per child under the age of five in the Visualization group decreased by 0.16 episodes, from a base of 0.34 episodes (a 47 percent decrease) after 10 weeks. This effect did not persist over time, although this may have been due to seasonal effects, as the long-run data collection occurred during the dry season, when diarrhea is more likely to be caused by airborne viruses.

By comparison, the Planning intervention had positive but insignificant effects on objective chlorination measures and no impact on diarrhea outcomes for children under five years of age after 10-12 weeks.

The Visualization intervention was also cost-effective: Delivery of the intervention costs approximately $4 per household. The estimated cost per Disability-Adjusted Life Year (DALY) saved ranges between $62 and $248, depending on assumptions about the duration of the effect on diarrhea, and on whether benefits to children under 5 or 15 years old are considered. The estimates are well within the WHO's highly cost-effective category (up to $1508).

Information raised knowledge on chlorination. The information module about the benefits of chlorination slightly improved participants' beliefs about the effectiveness of chlorination in preventing pediatric diarrhea. Participants of the active intervention groups (who received the information module) showed 0.08 SD higher beliefs than participants in the pure comparison group (who did not receive information). The positive effects on information last over time, but do not drive behaviour, as evidenced by the lack of behavior change seen in the group who received information only.

Visualization and planning both led to greater beliefs in ability to achieve desired outcomes: After ten weeks, both the Visualization and the Planning groups showed increases in the belief that they are able to achieve desirable outcomes and overcome obstacles - a concept that psychologists call "self-efficacy". It was measured by asking participants' agreement to statements like ""I always manage to solve difficult problems if I try hard enough." This result showed that both Visualization and Planning interventions strengthened the connections that participants make between their behavior in the present and desired outcomes in the future. While both groups were affected, the observed effects were stronger and more long-lasting in the Visualization group. After 30-36 months, participants in the Visualization group maintained higher levels of self-efficacy than those in the Planning group (0.14 SD difference), consistent with the differential long-term effects on chlorination. Furthermore, participants in the Visualization group were better at vividly imagining themselves and their family in the future. There were no detectable differences between the groups in time preferences over effort or money, planning skills, or attitudes towards risk.

Visualization also had impacts on non-health outcomes: The Visualization and Planning treatments were not specific to chlorination, but considered many examples of daily behavior, inspired by the participants' own ideas. Visualization led to a higher amount of money saved regularly per week. This effect persisted after almost 3 years, by which point the Visualization group had accumulated 41% higher savings. Visualization participants also joined more rotating savings and credit associations (ROSCAs), and saved more for productive investments (education, business, agriculture). Beyond savings outcomes, Visualization participants worked 2.3 hours more in the last 7 days than comparison participants, on a base of 13 hours (an 18 percent increase), 30-36 months after the intervention. A likely explanation is that some participants used the Visualization sessions to

develop longer-term career visions, including applying for salaried jobs. This increased their labor supply in the long-run.

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