INTERVENTION FACT SHEET 1:
DATA-DRIVEN BEHAVIOR CHANGE • OCTOBER 2015

eawag aquatic research

Achieving long-term use of solar water disinfection in Zimbabwe

Household water treatment can guarantee safe drinking water to prevent diarrhea and cholera. However, high compliance and sustainable use is seldom achieved. The present study designed and evaluated several promotion strategies for solar water disinfection (SODIS), based on results from a baseline survey. Visits to inform households about the costs and benefits of SODIS combined with public commitment and memory aids emerged as the best strategy, resulting in 80-90% of households using SODIS even 14 months after intervention.

Silvie Kraemer-Palacios, Rick Johnston and Hans-Joachim Mosler

Context

The consumption of unsafe water is one of the main causes of diarrhea, which leads to the deaths of an estimated 760,000 children under the age of five worldwide each year. Households in the peri-urban areas of Harare, Zimbabwe, drink unsafe water from wells, surface water, or intermittent piped water supply. Episodes of cholera are frequent in these areas. Household water treatment systems, such as solar water disinfection (SODIS), could prevent a large proportion of diarrhea cases. However they are neither frequently nor consistently used.

Objectives

The main objective of this study was to find out which behavior change strategy would be most effective in securing high compliance and sustained use of SODIS. For that purpose, first, SODIS was introduced in communities in peri-urban areas of Harare. Then, different behavior change strategies were developed and evaluated with regard to the population's sustainable uptake of SODIS.

Activities

Step 1 + 2: Identify, measure, and determine behavioral factors of SODIS use

- A baseline survey was conducted.
- A doer/non-doer analysis revealed the following behavioral factors to explain SODIS use: Knowledge about the contamination of raw water (health knowledge), beliefs about the expensiveness, taste, and how time-consuming or difficult to perform SODIS is, belief about what others think about SODIS (others' approval), and whether performing SODIS is intended in the future (intention) and perceived as a habit.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to enhance SODIS use

The following behavior change strategies were designed:

- Visits using the BCT 'inform households about and assess costs and benefits' were followed by public commitment and the use of memory aids such as a reminder notice.
- The BCT prompt talk to others was used for a pass-on task for which community members were trained to convince other persons to use SODIS, who in turn should convince more persons, generating a 'snowball effect'.
- The pass-on-task in combination with the BCT highlight the discrepancy between set goal and actual behavior contrasted desirable behaviors with actual practices.

Step 4: Implement and evaluate behavior change strategies for SODIS use

- The behavior change strategies were evaluated through a before-after control trial.
- The strategies were implemented in four different areas. A fifth area served as control group.
- Behavioral factors and SODIS use were surveyed several times. The last survey was conducted 14 months after the latest intervention.
- The effectiveness of the promotion activities was measured by observing whether the households had SODIS bottles exposed to the sun.

Findings

- The most effective strategy was the visit to inform households about and assess costs and benefits in combination with public commitment and the use of memory aids such as a reminder notice.
- In the areas receiving these strategies, 80-90% of the households were still using SODIS 14 months after the intervention had ended.

Conclusion

This project revealed that systematic behavior change strategies make it possible to achieve highly frequent and sustained use of household water treatment and thus the safe water consumption levels necessary for improved health.

Duration
2007 – 2009

Partners
Royal College of Surgeons in Ireland (R.C.S.I.)

Funding
European Union, FP6-Inco-CT

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
Mosler, H.-J., Kraemer, S.M., Johnston, R.B. (2013). Achieving long-term use of solar water disinfection in Zimbabwe. *Public Health, 127(1),* 92-98.

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INTERVENTION FACT SHEET 2:
DATA-DRIVEN BEHAVIOR CHANGE • OCTOBER 2015

Using persuasive arguments to change perceived costs and thus consumption of safe water in Ethiopia

Fluorosis is caused by undue fluoride uptake from drinking water. In the Ethiopian Great Rift Valley, the consumption of fluoride-free water from a community filter was promoted by a) a traditional information intervention targeting perceived vulnerability, and b) a systematic behavior change strategy targeting perceived costs. While the intervention targeting perceived vulnerability showed no effects, cost persuasion decreased the perceived costs to a 50% lower value and increased the consumption of fluoride-free water by 20%. This showed that altering subjective perceptions of facts like prices or walking distances can change behavior even without changing objective circumstances.

Alexandra Huber and Hans-Joachim Mosler

Context

Around 200 million people worldwide rely on drinking water that is contaminated with excess fluoride. In Ethiopia, 8.5 million people are at risk of developing fluorosis due to excessive fluoride uptake from their water. Fluoride is a naturally occurring mineral that at elevated levels becomes a geogenic contaminant in groundwater. Because there is no effective medical treatment for the disease, the prevention of fluoride uptake is crucial.

Objectives

The main objective of this study was to compare the effectiveness of two behavior change strategies in promoting the consumption of safe water from a fluoride-removing community filter.

Activities

Step 1 & 2: Identify, measure and determine behavioral factors of fluoride free water use

- Data gathering started with a baseline assessment in September 2010.
- Differences between doers (100% use) and non-doers (less than 100% use) were compared in all behavioral factors.
- Perceived monetary costs were significantly higher in non-doers than in doers, meaning that the non-doers rated the fluoride free water as 1.5 times more expensive.
- No differences in perceived vulnerability were found, meaning that both groups assessed the risk of getting fluorosis in the same way.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to enhance fluoride free water use

- The behavior change technique (BCT) *inform about and assess costs and benefits* was selected to target perceived costs. The corresponding behavior change strategy first stressed that a higher price for a product means that this product is of higher quality. Second, a consumption and cost calculation was conducted with the household to define the real additional costs of purchasing fluoride free water solely for drinking and cooking. In this way, the household received realistic estimates of how much filtered water was required and how much money the household would have to spend per week. This calculation demonstrated that the additional costs are quite small.
- As a comparison intervention, a behavior change strategy was applied to raise risk awareness. It used the BCTs 'inform about and assess personal risk' and 'arouse fear'. First, the promoters asked for the names and ages of all children living in the household. Then, the promoter communicated individualized risk information for every child. The promoters showed pictures of children and adults with dental and skeletal fluorosis and indicated on a visualized scale how their risk could be reduced.

Step 4: Implement and evaluate behavior change strategies for fluoride free water use

- The behavior change strategies were evaluated through a before-after control trial.
- The local non-governmental organization implemented the interventions in October 2010.
- Half of the households received the cost persuasion strategy and the other half the risk-awareness strategy.
- A post-intervention survey was conducted in December 2010 to measure the behavioral factors and the consumption behavior.

Findings

- As expected from the baseline data, the behavior change strategy targeting health risk awareness had no effects.
- The cost persuasion strategy decreased the perceived costs by 50% and increased the consumption of fluoride-free water by 20%.

Conclusion

This project demonstrated that systematic behavior change strategies can change behavior by altering subjective perceptions of facts such as prices or walking distances even without changing objective circumstances.

Duration
2009 – 2011

Partners
Oromia Self-Help Organization (OSHO)

Funding
Swiss National Science Foundation (SNSF)
Swiss Agency for Development and Cooperation (SDC)

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
Huber, A. C., Tobias, R., & Mosler, H.-J. (2014). Evidence-based tailoring of behavior-change campaigns: increasing fluoride-free water consumption in rural Ethiopia with persuasion. Applied Psychology. Health and Well-Being, 6(1), 96–118. doi:10.1111/aphw.12018

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INTERVENTION FACT SHEET 3:
DATA-DRIVEN BEHAVIOR CHANGE • OCTOBER 2015

Increasing fluoride filter use in rural Ethiopia

High levels of fluoride concentrations in water can lead to fluorosis, which eventually cripples sufferers. Fluoride removal household filters are efficient in preventing it, but their effectiveness depends on adequate use. In a longitudinal study, based on the RANAS approach, behavioral factors of filter use were assessed and two behavior change strategies were developed aiming specifically at the critical behavioral factors. Both strategies, a planning and social-prompt intervention and an education workshop combined with pledging, were able to raise use to a level sufficient to prevent fluorosis. Mere provision of the fluoride removal filter led to insufficient use, but combining this with a behavior change technique led to more than 80% use of filtered water for drinking and cooking.

Ina Sonego, Alexandra Huber and Hans-Joachim Mosler

Context

In the northern Great Rift Valley in Ethiopia, fluoride concentrations in water are much higher than the guideline set by the World Health Organization. This can lead to fluorosis, with joint pain, limited joint movement, deformation of bones, and eventually physical disability. Use of fluoride removal filters can prevent symptoms effectively. However, practitioners have increasingly realized that the mere provision of infrastructure or equipment such as fluoride removal filters does not ensure that it is used sufficiently to achieve health benefits. Additional interventions to change behavior, termed behavior change techniques (BCTs) are needed. To be most effective, BCTs should be tailored to the behavioral factors steering a behavior.

Objectives

The project's main goal was to increase fluoride removal household filter use to a level sufficient for the prevention of fluorosis. We analyzed effects on behavior (fluoride removal filter use) and on psychological factors. The specific objectives were:

- To assess the behavioral factors that influence fluoride removal filter use.
- To design, implement and evaluate systematic behavior change strategies to promote the use of fluoride removal filter.
- To compare the strategies' effectiveness to the effectiveness of mere provision of fluoride removal household filters.

Activities

Step 1 & 2: Identify, measure and determine the behavioral factors determining use of fluoride removal filters:

- Partially subsidized fluoride removal household filters were provided in two rural villages in the northern Rift Valley.
- A baseline survey on filter use and behavioral determinants was conducted in September 2010 (N = 72).
- Analyses revealed the key behavioral factors affecting the use of fluoride removal filters to be habit, remembering, commitment, interpersonal communication, and health knowledge.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to increase use of fluoride removal filters:

- Several BCTs expected to enhance the key factors affecting use of fluoride removal filters were selected and combined in two behavior change strategies.
- The first strategy, a planning and social support intervention, was designed to target habit and remembering. In a promotional visit, the household's water use was assessed and suitable times for a particular member of the household to fill the filter were found and marked on a colored circle (Figure 1). A second member of the household was asked to support the first by providing a reminder.
- The second strategy, an educational workshop combined with public commitment, was designed to target commitment, interpersonal communication, and health knowledge (Figure 2). Women were invited to a three hours' workshop on fluorosis and its prevention. At the end, the women made a public commitment by raising their hands and saying aloud that they pledged to use the filter.

Step 4: Implement and evaluate behavior change strategies:

- The strategies' effectiveness was assessed through a before-after control trial.
- One of the villages studied was chosen as control village. In the other village, the intervention village, half of the households received the social support strategy and the other the public commitment strategy.
- The behavior change strategies were implemented by the local non-governmental organization, the Oromo Self Help Organization (OSHO).

- A follow-up survey was conducted in February to May 2011 to evaluate change in behavior and behavioral factors.

Findings

- The planning and social support intervention and the educational workshop combined with public commitment increased filter use substantially.
- Filter use for drinking and cooking water consumption increased to above 80% of total consumption in the intervention village – sufficient for the prevention of fluorosis.
- Filter use for drinking and cooking water consumption was below 60% in the control village, which had only received the filter – insufficient for the prevention of fluorosis.

Conclusion

Mere distribution of fluoride removal filters did not succeed in raising use to a level sufficient for the prevention of fluorosis. The systematic behavior change strategies were necessary to introduce the behavior change required to prevent fluorosis.

Figure 1: Daily routine planning circle.

Figure 2: Educational workshop combined with pledging.

Duration
2009 – 2012

Partners
Oromia Self-Help Organization (OSHO)

Funding
Swiss National Science Foundation (SNSF)
Swiss Agency for Development and Cooperation (SDC)

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
Sonego, I.L., Huber, A.C., Mosler, H.-J. (2013). Does the Implementation of Hardware Need Software? A Longitudinal Study on Fluoride-Removal Filter Use in Ethiopia. *Environmental Science & Technology, 47,* 12661−12668.

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INTERVENTION FACT SHEET 4:
DATA-DRIVEN BEHAVIOR CHANGE • OCTOBER 2015

Changing handwashing behavior in southern Ethiopia through infrastructural and commitment interventions

Regular handwashing is the single most effective prevention against diarrheal disease. However, handwashing rates are low in many developing countries, including Ethiopia. A handwashing promotion project in the Borena Zone of southern Ethiopia aimed to increase handwashing rates in communities through systematic behavior change strategies. The strategies applied, especially the tippy tap promotion, proved to be more effective than a standard educational approach: 95% of intervention households were successfully motivated to construct a tippy tap. Three months after the intervention had ended, water and soap were present at the tippy tap in 50% - 80% of the households.

Nadja Contzen

Context

Handwashing with soap efficiently prevents diarrhea, one of the leading causes of disease burden globally. As in many other developing countries, handwashing rates are low in Ethiopia. Increased handwashing rates are thus the goal of many hygiene projects run by governmental and non-governmental organizations. However, the effectiveness of these projects has seldom been verified. It is expected that systematic behavior change strategies are more effective than standard approaches, which have often been limited to awareness-raising and knowledge transfer.

Objectives

The main goal of this project was to promote handwashing with soap at key times in a rural area in southern Ethiopia by means of systematic behavior change strategies. Specific objectives were

- To assess current handwashing practices and the behavioral factors determining these practices.
- To design, implement, and evaluate systematic behavior change strategies to promote handwashing.

Activities

Step 1 & 2: Identify, measure, and determine behavioral factors of handwashing:

- Qualitative research was conducted to identify potential behavioral factors.
- A baseline survey on handwashing practices and behavioral determinants of handwashing was conducted in 462 households in February and March 2012.
- The behavioral factors influencing handwashing were specified by means of regression analyses. These were others' behavior and others' approval, confidence in performance, continuation and recovering, and impediments. In addition, observations suggested that a lack of handwashing infrastructure and forgetting to wash hands were major constraints on regular handwashing.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to promote handwashing:

- Three BCTs expected to promote the key factors of handwashing were selected. These were (1) using memory aids and environmental prompts, (2) providing infrastructure, and (3) prompting public commitment.
- The BCTs were combined in two behavior change strategies, a tippy tap promotion and a public commitment session, and implemented in combination with a standard education approach.

Step 4: Implement and evaluate behavior change strategies:

- The strategies' effectiveness was assessed through a before-after control trial.
- The behavior change strategies were implemented in three intervention villages by the local non-governmental organization, the Gayo Pastoral Development Initiative.
- The strategies were compared to a control village that only received the standard education approach (an f-diagram exercise).
- A follow-up survey on handwashing practices, behavioral determinants and the strategies' evaluation was conducted in 514 households in February and March 2013.

Findings

- 95% of intervention households were successfully motivated to construct a tippy tap.

- Three months after the intervention had ended, water and soap were present at the tippy tap in 50% - 80% of the households.
- The systematic behavior change strategies, and especially the tippy tap promotion, changed behavior more successfully than the standard education approach.
- This was because they successfully changed the critical behavioral factors of handwashing, especially others' behavior, impediments, and remembering.

Conclusion

To increase effectiveness, handwashing interventions should be based on theory and driven by data.

Figure: A tippy tap constructed in one of the villages studied.

Duration
January 2012 to September 2013

Partners
Oxfam America (OA)
Gayo Pastoral Development Initiative (GPDI)

Funding
Oxfam America

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
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INTERVENTION FACT SHEET 5:
DATA-DRIVEN BEHAVIOR CHANGE • OCTOBER 2015

Increasing shared toilet users' cleaning behavior: The case of urban slums in Kampala, Uganda

Access to shared toilets is the most common on-site mode of sanitation in urban informal settlements. However, their maintenance depends on users' appropriate usage and cleaning behavior. A user-driven sanitation (UDS) project in Kampala's urban slums aimed to increase shared toilet users' cleaning behavior. Group discussions between users of a shared toilet were applied in combination with public commitment as a behavior change strategy. The strategy increased cleaning behavior by up to 30%.

Innocent K. Tumwebaze and Hans-Joachim Mosler

Context

In Uganda, around 50 % of the urban population relies on shared sanitation, and this percentage is even higher in Kampala's slums. However, the management of shared toilets (defined as facilities jointly used by different families, mostly known to each other or sharing a compound house) is poor, and most of these toilets are in an unhygienic condition.

Objectives

The overall goal of this research project was to promote the cleaning of shared toilets among their users to ensure good hygiene. Specific objectives included

- assessing the cleanliness of shared toilets and the behavioral and social dilemma factors that influence users' cleaning behavior, and
- designing, implementing, and evaluating the effectiveness of behavior change strategies in increasing the cleaning behavior of shared toilet users.

Activities

Step 1 & 2: Identify, measure and determine behavioral factors of shared toilet cleaning

- A baseline survey on shared toilets' cleanliness and the psychological and social dilemma factors influencing collective cleaning behavior was conducted between December 2012 and January 2013 in three slums.
- The survey revealed that attitudes, norms, ability, and self-regulating factors had to be targeted.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to increase shared toilet cleaning

- Two BCTs were selected, the 'prompt to talk to others', delivered through group discussions, and written public commitment.
- Interventions targeted respondents with dirty toilets, that is, non-frequent cleaners.

Step 4: Implement and evaluate behavior change strategies of shared toilet cleaning

- The strategies' effectiveness was assessed through a before-after control trial.
- They were implemented by the NGO Sustainable Sanitation and Water Renewal Systems (SSWARS).
- Half of the intervention households received only the group discussions.
- The other half received the group discussions in combination with the written public commitment.
- Additional households served as a control group.
- A follow-up survey on cleaning behavior and behavioral factors was conducted between August and September 2013.

Findings

- Cleaning behavior in intervention groups increased by up to 30% compared to 8% in the groups with no discussions (control).
- Discussions combined with a written public commitment were most effective in increasing the cleaning behavior of shared toilet users.
- Discussions effectively changed behavior as they increased a number of behavioral factors: others' approval of cleaning, personal importance of cleaning, feelings (liking to clean), and reduced barriers to cleaning.

Figure: Group discussion session in Kironde zone, Rubaga Municipal Council.

Conclusion

Improved sanitation, even of shared toilets, can be achieved through systematic behavior change strategies, specifically a group discussion supplemented with written public commitment. Applying this strategy at a larger scale would change the sanitation situation in developing countries dramatically.

Duration
February 2010 to September 2013

Partners
Sustainable Sanitation and Water Renewal Systems (SSWARS)

Funding
Swiss National Centre of Competence in Research (NCCR) North-South

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
Tumwebaze,Innocent Kamara; Mosler,H.J. (2015) Effectiveness of group discussions and commitment in improving cleaning behaviour of shared sanitation users in Kampala, Uganda slums, Social Science and Medicine, 147, 72-79, mdoi:10.1016/j.socscimed.2015.10.059

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INTERVENTION FACT SHEET 6:
DATA-DRIVEN BEHAVIOR CHANGE • February 2016

Promoting long-term arsenic-safe water consumption in Bangladesh through commitment-enhancing interventions

Naturally occurring arsenic in drinking water poses a threat to human health, especially in Bangladesh. Although sufficient safe water sources have been installed, many households continue to use contaminated shallow wells. This project aimed at improving the effectiveness of an information intervention to promote the use of existing safe water sources with systematic behavior change techniques. At 1-month follow-up, the commitment-enhancing techniques (memory aids, specific planning, and public commitment) resulted in up to 65% new users of safe water, whereas information alone achieved only 18%. The interventions' effects were mediated by increased commitment strength. Behavior change was sustainable: at 9-month follow-up, up to 46% of the intervention groups were still using a safe source.

Jennifer Inauen and Hans-Joachim Mosler

Context

Geogenic contamination of drinking water, such as with arsenic, is associated with chronic disease and increased mortality. Nowhere is the issue as severe as in Bangladesh, where millions of shallow wells are contaminated with arsenic. Approximately 20 million Bangladeshi are at risk of drinking water with elevated arsenic relative to the national standard of 50 micrograms per liter. Although safe water options (e.g. deep wells) are often in walking distance, and well-sharing among neighbors with safe shallow wells has been encouraged, many people still drink water from contaminated or untested shallow wells.

Objectives

The main goal of this project was to promote safe water consumption with systematic behavior change techniques (BCTs). Specific objectives were

- to assess current water consumption practices and the behavioral factors associated with these practices and
- to design, implement, and evaluate systematic BCTs to promote safe water consumption.

Activities

Step 1 & 2: Identify, measure, and determine behavioral factors of safe water consumption.

- A baseline survey about safe water consumption practices and its behavioral determinants was conducted in 710 households in November and December 2010 in several villages of Manikganj and Monoharganj, Bangladesh.
- Manikganj has lower rates of contaminated wells, so use of neighboring arsenic-safe shallow wells was the desired behavior. In Monoharganj, where there are almost no safe shallow wells, the use of arsenic-safe deep wells was advisable.
- The behavioral factors influencing the use (vs. non-use) of arsenic-safe water options were estimated by logistic regression. The strongest associations were found for commitment strength to use safe water options and perceptions of how many others collect safe water.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to promote safe water consumption.

- Only households which had access to arsenic safe wells but did not use them were included in the field experiments.
- Three BCTs expected to promote the key factors of safe water consumption, commitment strength and the perceived behavior of others, were selected. These were (1) *memory aids*, (2) *specific planning* (a concrete plan, when and where to collect safe water), and (3) *public commitment* (see Figure 1).
- The BCTs were combined in three interventions conjointly with information about arsenic:
  1. Information + memory aids
  2. Information + memory aids + specific planning
  3. Information + memory aids + specific planning + public commitment
- They were compared to a control group that received information alone.

Step 4: Implement and evaluate behavior change strategies:

- The interventions were delivered by trained health promoters of our partner organizations.

- The interventions' effectiveness was assessed through two cluster-randomized controlled trials (one in Manikganj, one in Monoharganj).
- 1-month and 9-month follow-up surveys were conducted on safe water consumption practices, behavioral factors and the interventions' evaluation with the same households as at baseline in April and November/December 2011.

Figure 1. Public commitment meeting in one of the villages studied

Findings

- **Up to 65% switching to arsenic-safe wells** was observed in the intervention groups compared to just 18% well-switching in the information-only group.
- The more commitment-enhancing BCTs had been applied, the higher were the behavior change effects.
- The intervention effects on behavior change were evoked through increases in commitment strength.
- The results for public commitment were ambiguous. Although the intervention that included this BCT was the most effective in promoting a switch to deep wells, it was not more successful than information alone in promoting sharing of neighboring safe wells.
- At 9-month follow-up, the intervention groups still showed up to 46% safe water users, compared to 15% in the control group with information alone.
- Arsenic tests of household drinking water corresponded well with the self-reported use of safe water options (r=.85).

Conclusion

Commitment-enhancing interventions can substantially increase the effectiveness of information in promoting safe water consumption.

Duration
October 2010 to December 2011

Partners
UNICEF Bangladesh
Christian Commission for Development in Bangladesh (CCDB)
Village Education Resource Center (VERC) Bangladesh

Funding
Eawag Discretionary Funds

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

Publications
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INTERVENTION FACT SHEET 7:
DATA-DRIVEN BEHAVIOR CHANGE • August 2016

Changing handwashing behavior in schools and households in urban Zimbabwe

Handwashing with soap at key handwashing times substantially reduces diarrheal disease, but handwashing rates in many countries remain low. This fact sheet describes the content and effects of a systematic handwashing behavior change campaign that was implemented in Harare, Zimbabwe. The campaign aimed to promote frequent and effective handwashing at key times among primary school children at school and their caregivers at home. Handwashing frequency of caregivers at key handwashing times increased to 28%, and caregivers performed up to 7 out of 8 recommended handwashing steps at follow-up 6 weeks after the campaign. In schools, approximately half the classrooms had handwashing stations with soap and water available. Handwashing frequency among children before lunchbreaks increased to 42% in classrooms where soap and water were available and to 23% over all classrooms.

Max Friedrich and Hans-Joachim Mosler

Context

Domestic handwashing with soap reduces diarrhea morbidity and mortality considerably. Handwashing with soap at key times, namely after contact with feces and before contact with food, is being intensively promoted worldwide. However, despite ongoing promotion efforts, handwashing rates around the globe remain low.

Objectives

The main goal of this project was to promote frequent handwashing at key times and effective handwashing technique in areas of high population density in Harare, Zimbabwe. Specific objectives were

- to assess current handwashing practices and the behavioral factors determining these practices among adults and primary school children and
- to design, implement, and evaluate systematic behavior change strategies in households and schools to promote handwashing.

Activities

Step 1 & 2: Identify, measure, and determine behavioral factors steering handwashing.

- Qualitative research was conducted to identify potential behavioral factors.
- Additional potential behavioral factors were derived from the RANAS Model
- A baseline survey on handwashing practices and behavioral determinants of handwashing was conducted with 600 primary school children and their caregivers in June and July 2014.
- For caregivers, the behavioral factors influencing handwashing frequency and technique were identified by bivariate correlations. Behavioral factors steering handwashing frequency were *Disgust, Others' behavior, Others' approval, Confidence in performance and Continuation, Action control, Remembering, and Hindrances*. Additional behavioral factors of handwashing technique were *How-to-do knowledge and Action planning.*
- For children, the behavioral factors influencing handwashing frequency were *Vulnerability, Others' behavior, Confidence in performance and continuation, Action control, and Remembering.* In most schools, functioning handwashing stations and soap were not available.

Figure 1: Interview with a primary caregiver.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to promote handwashing:

- For caregivers, six BCTs were selected. These were (1) *Describe feelings about performing and about consequences of the behavior*, (2) *Prompt public commitment,* (3) *Prompt guided practice,* (4) *Organize social support*, (5) *Prompt specific planning*, and (6) *Prompt self-monitoring of behavior.*
- For children, six BCTs were selected. These were (1) *Inform about and assess personal risk*,

(2) *Prompt public commitment*, (3) *Provide infrastructure*, (4) *Organize social support*, (5) *Prompt self-monitoring of behavior*, and (6) *Use memory aids and environmental prompts.*

- The BCTs were combined in behavior change strategies for caregivers and children.
- For caregivers, the strategies comprised (1) a handwashing exercise to visualize dirt on hands and attach the feeling of disgust to not washing hands with soap at key times, (2) planning of when, where and how to wash hands and documentation of plans, (3) filling of a self-monitoring calendar, (4) household discussion how household members can support each other to wash hands with soap at key times, (5) a handwashing song including critical times and recommended technique for handwashing, and (6) a public commitment ceremony.
- For children, the strategies comprised (1) a handwashing exercise to visualize dirt on hands and highlight risks when not washing hands with soap at key times, (2) installation of handwashing stations in classrooms and planning how children maintain them, (3) a handwashing song including critical times and recommended technique for handwashing, (4) filling of self-monitoring calendar, and (5) public commitment of classes through a poster.

Step 4: Implement and evaluate behavior change strategies:

- The strategies' effectiveness was assessed through a before-after control trial.
- The behavior change strategies were implemented by local health center staff and primary school teachers under the supervision of the local NGO, ActionAid Zimbabwe.
- The school intervention (including the strategies for children), the community intervention (including the strategies for caregivers), and a combination of both were each implemented in areas which were spatially separated from areas receiving other treatments.
- The strategies were compared to control areas that received no intervention.
- A follow-up survey on handwashing practices and their behavioral determinants was conducted in 422 households and 20 schools six weeks after the campaign.

Findings

- Among caregivers, observed handwashing frequency after the campaign was highest in the household and combined intervention groups (see Figure 2).

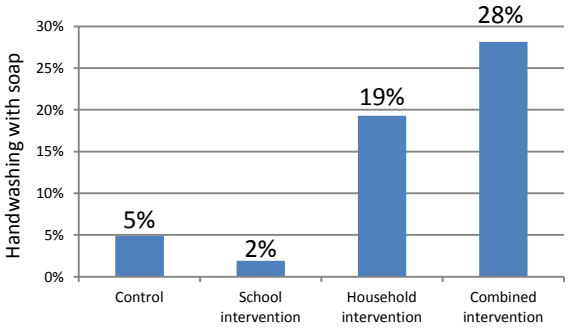

Figure 2: Observed handwashing frequency of primary caregivers at follow-up.

- Handwashing technique, measured as the number of correctly performed handwashing steps, improved from, on average, 5 correctly performed steps to 7 in the combined intervention group and to an average of 6.5 performed steps in the community intervention group.
- In intervention schools, 62% of classrooms had a handwashing facility with water and 55% of classrooms had a handwashing facility with soap six weeks after intervention.
- Handwashing frequency of children before the lunch break increased to 42% in classrooms where soap and water were present.
- Interventions were only partly implemented as planned. Effects are expected to be larger after a completely implemented intervention.

Conclusion

The data-driven and population-tailored campaign substantially changed

- handwashing frequency and technique of primary caregivers at home;
- availability and maintenance of handwashing stations at classrooms; and
- handwashing frequency of school children before lunchbreaks.

Duration
October 2013 to February 2016

Partners
ActionAid Zimbabwe, Government of Zimbabwe, Ministry of Primary and Secondary Education, Government of Zimbabwe, Ministry of Health and Child Welfare

Funding
Swiss Agency for Development and Cooperation

Further information
http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy

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INTERVENTION FACT SHEET 8:
DATA-DRIVEN BEHAVIOR CHANGE • December 2017

Increasing chlorination of drinking water in Chad

In this study the effects of a behavior change campaign promoting the uptake of household drinking water chlorination in communities along the Chari and Logone rivers in Chad were evaluated. The campaign was based on formative research using the RANAS model and targeted several behavioral factors identified as relevant. Results show that 64% of the intervention participants reported to chlorinate their drinking water. The campaign's effect on water treatment was mainly created through improvements in health knowledge, changes in norms, and self-efficacy convictions. The findings imply that water treatment behavior can be successfully promoted using a systematic behavior change approach.

Jonathan Lilje and Hans-Joachim Mosler

Context

Cholera is still one of the most serious diarrheal diseases, with fluctuating case numbers around the globe possibly underrated and under-reported. In 2015, 42 countries reported 172,454 cases and 1304 cholera-related deaths, with most cases and deaths occurring in African countries. The number of cholera cases rose to over 60,000 in 2010 and 2011 together for Chad and Cameroon alone. The Lake Chad Basin is a hotspot that is frequently hit by cholera outbreaks that quickly spread across the region's porous borders. Consequently, the governments of Chad and Cameroon and the World Health Organization (WHO) are trying to establish a strategy of quick response and prevention for cholera and other diarrheal diseases in the region. As part of this strategy, a campaign was developed and implemented at the household level to promote drinking water disinfection using chlorine in several communities along the Chari and Logone river beds.

Objectives

The objectives of this evaluation study were to examine the effects of the interventions on participants' water treatment behavior and changes in their psychological mindset concerning the target behavior. The following research questions were addressed:

1. Did the campaign have a positive impact on water treatment among intervention participants?
2. Did the campaign affect psychological factors for drinking water treatment that were targeted by the campaign?
3. Which of these psychological factors mediated the effects of the campaign on behavior?

Activities

Step 1 & 2: Identify, measure and determine the behavioral factors determining use of fluoride removal filters:

The intervention strategies were informed by a formative baseline study in December 2013 and May 2014 among 1016 primary caregivers of children under the age of five. These surveys identified the psychological factors relevant to household water treatment, which were then recommended as the targets of promotional efforts to increase the uptake of water chlorination. Interventions were developed specifically targeting the following psychological factors: perceived vulnerability and health knowledge, perceived behavior of others, social support and social discourse, as well as perceived self-efficacy and action knowledge.

Step 3: Select behavior change techniques (BCTs) and design behavior change strategies to increase use of fluoride removal filters:

The first element of the intervention was a pre-recorded audio advert which introduced several arguments and personal statements about water treatment. These statements were inspired by interview responses given during the baseline surveys. Several BCTs were incorporated in this recording, such as “Inform about personal risk” (BCT 3), “Inform about and assess costs and benefits” (BCT 5), “Provide instruction” (BCT 15) targeting risk, attitude, ability, and norm factors. The statements in the recording were mixed so that positive stances outweighed negative stances. This fed the impression that more people were engaged in the behavior than those who were not and served as a means to target the perception of others' behavior and others' approval (“Inform about others' behavior”, BCT 9; “Inform about others' approval/disapproval”, BCT 11).

The second element was a poster communicating information on where and how diarrhea is contracted and what can be done to prevent it. It was an adaptation of the F-diagram which graphically depicts several pathways of diarrhea propagation and how those pathways can be interrupted. The poster used BCT 1 (“Present facts”), targeting health knowledge and explaining to participants where and why they are at risk. Participants were encouraged to discuss the contents of the poster among them to spark social

discourse on the topic (BCT 7: "Prompt to talk to others").

The third element was a practical demonstration mainly targeting how-to-do knowledge ("Provide instruction", BCT 15) and confidence in performance ("Demonstrate and model behavior", BCT 17). Promoters demonstrated to participants how to correctly apply chlorine products for drinking water disinfection, including how to calculate the dosage needed.

The fourth element, which concluded each session, was a public commitment appeal (BCT 10: "Prompt public commitment"). Participants were encouraged to make a public pledge in front of the assembled audience to treat their household's drinking water. Caregivers who were not heads of households were prompted to seek support from their heads of household (BCT 21: "Organize social support"). Participants committing to treating their household's drinking water received a commitment sign. This was a piece of blue cloth to be displayed on the participant's house.

Step 4: Implement and evaluate behavior change strategies:

The strategies were implemented by the Ministry of Public Health (MSP) in collaboration with the NGO CSSI. The strategies' effectiveness was assessed by a follow-up survey which was conducted in July 2016 to evaluate change in behavior and behavioral factors. 162 of the 220 interviewed caregivers confirmed having visited at least one session and remembered information received on household water treatment. Recall of intervention elements and materials was good, with 95% of intervention participants remembering the poster, the demonstration session, and the public commitment element, while the audio recording was recalled only by 83% of participants.

Findings

64% of intervention participants who had attended one or several of the intervention sessions reported to chlorinate their drinking water compared to 42% of non-participants and 30% in the baseline sample before the intervention.

Interventions heightened the perception of subjective vulnerability, perceived severity, health knowledge, perceived benefits, the descriptive norm, social support, action knowledge, and self-efficacy.

Conclusion

Water treatment rates were significantly higher in households after participating in an intervention campaign. Providing health knowledge paired with practical advice on how to implement it, such as the demonstration on how to treat water, proved to be a strong lever for behavior change. In addition, the organization of social support strategies within households helped. The strongest influence between intervention and behavior was participants' increased trust in their own abilities to perform and continue to do so.

"I went to buy "eau de javel" (liquid chlorine solution) at the local market, the price is about the same as for a pack of salt or sugar and it serves to treat the drinking water for our family for a whole month. Some people say it is too expensive or that they don't have the money for that. But if you think about the costs to buy medication each time when your kids fall sick, it is actually not that much money".

Figure 1: An exemplary statement played during the audio recording targeting perceived costs and benefits (BCT 5, translated from French).

Figure 2: Practical demonstration of chlorination procedure during an intervention session.

Project duration: 2013 – 2016
Partners: World Health Organization (WHO); Ministry of Public Health (MSP) in Chad;
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Further information: http://www.eawag.ch/en/department/ess/main-focus/environmental-and-health-psychology-ehpsy
Publications:
Lilje, J., Kessely, H., & Mosler, H.-J. (2015). Factors Determining Water Treatment Behavior for the Prevention of Cholera in Chad. The American Journal of Tropical Medicine and Hygiene, 14-0613. https://doi.org/10.4269/ajtmh.14-0613
Lilje, J., & Mosler, H.-J. (2016). Continuation of Health Behaviors: Psychosocial Factors Sustaining Drinking Water Chlorination in a Longitudinal Study from Chad. Sustainability, 8(11), 1149. https://doi.org/10.3390/su8111149
Lilje, J., & Mosler, H.-J. (2017). Effects of a behavior change campaign on household drinking water disinfection in the Lake Chad basin using the RANAS approach. Science of The Total Environment. https://doi.org/10.1016/j.scitotenv.2017.10.142
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