Acceptability of using and paying for shared water points and a passive water chlorination device among low-income urban communities of Dhaka

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Background

- Lack of access to safe drinking water supplies causes waterborne diseases and deaths in low-income countries (Prüss-Ustün 2014)

- Bangladesh bears a large burden of diarrheal diseases, especially among children aged <5 years (Corner et al. 2013)

- Breakages in water and sewerage pipes allow water to contact human feces, undermining effectiveness of efforts by utilities to supply clean water
Shared water points

• Urban poor lack potable water supplies

• Legally connected, shared water points for some low-income urban communities:
  – Initiated by NGO Dustho Sasthyo Kendra (DSK) in 2005
  – Authorized by Dhaka Water Supply and Sewerage Authority (WASA) with billing systems
  – Funded by WaterAid
Household level water treatment methods

- Chlorination
- Solar disinfection
- Ceramic filtration
- Aqua tabs

Photo credit: Abu Naser, Shaila Arman, Swiss Federal Institute
Barriers to household level water treatment

• Interventions with liquid chlorine were successful in some settings to reduce diarrhea (Arnold and Colford, 2007)

• However, less than 10% of households at risk of child death treat water consistently worldwide

• Barriers include cost, time and maintenance, water smell and temperature
Passive water chlorination device

• An alternative recommended water treatment technology:
  – Automatically adds an appropriate dose of chlorine at the last stage of water collection
  – Improves the microbiological quality of drinking water
Objectives

• To explore the perceived benefits and barriers of using shared water points

• To understand why the users pay or do not pay for legal access of water from shared water points

• To explore community interest and willingness to pay for provision of safe water supplied by a passive water chlorination device
Methods

- Study site:
  Kallyanpur community, urban Dhaka

- Study period:
  January - May 2013

- Eligibility criteria:
  Use of a shared water point
## Data collection techniques

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Type of respondents</th>
<th>N = 30</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-depth Interviews</strong></td>
<td>Paying users</td>
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<td>Non-paying users</td>
<td>10</td>
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<td></td>
<td>Community-based organization members</td>
<td>4</td>
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<tr>
<td></td>
<td>NGO (DSK) representative</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Water utility (WASA) representative</td>
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<tr>
<td><strong>Group Discussions</strong></td>
<td>Local elites: Paying users</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Local elites: Non-paying users</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Landlords: Paying users</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Landlords: Non-paying users</td>
<td>1</td>
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</tbody>
</table>
Data collection techniques

Group discussions with the landlords: paying users

In-depth interview with a CBO member
### History of water source types in Kallyanpur

<table>
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<tr>
<th>Period</th>
<th>Water sources type</th>
<th>Involved stakeholders</th>
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<td>1988-1997</td>
<td>Nearby ponds, markets and illegal sources</td>
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<tr>
<td>1997-2004</td>
<td>Shallow tube-well water and latrine facilities</td>
<td>Dhaka City Corporation</td>
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<td>Deep tube-wells and latrines</td>
<td>NGO Phulki</td>
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<td></td>
<td>3 legal water points</td>
<td>DSK and Plan Bangladesh</td>
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<td></td>
<td>Slum fire forced use and collection of water from illegal sources</td>
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<td>2004-2006</td>
<td>Mobile water collection and distribution system</td>
<td>DSK and WASA</td>
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<tr>
<td>2005-2013</td>
<td>79 shared water points and latrines (intermittent supply during summer)</td>
<td>DSK and WASA</td>
</tr>
</tbody>
</table>
History of water source types in *Kallyanpur*

- **Dugwells**
- **Latrine facilities**
Shared water point system in *Kallyanpur*

- **79 water point for nearly 2600 households**
- **1 water point for 4 to 40 households**
- WASA installed electronic meters of billing system based on the use of water
  - Maintenance Committee for each water points
  - Purchase Committee (non-functional)
  - Community based organizations (CBO)
  - Formation of WASH funds (non-functional)
Perceived benefits to using shared water points

• Government-authorized piped water system

• Created communal ownership among residents

• Less expensive (0.25 US$) and more access to obtain water

• Saved time and physical effort collecting water from distant points

• WASA reported of being benefited in reducing the 35% of illegal water connections in slums to 30% in 2007
Perceived barriers to using supplied water from the shared water points

- Poor water quality, smelled bad and had visible dirt and feces
- Water was responsible for diarrheal diseases
- Water needed treatment: high cost to boil, chlorinate, or filter
Factors related to non-payment

- Payment schemes were undermined by:
  - Discord from sharing common water points during peak hours
  - Theft or no provision of electronic meters
  - Theft of pump handles
  - Inaccurate billing

- Illegal connections to the shared water points by politically powerful community members in order to avoid payments
Perceived benefits of passive water chlorination device

We described the device automatically chlorinates and provides safe drinking water

Therefore, community perceived the device has potential to provide:

- Accessibility to safe water
- Physical and financial benefits by saving money on medication and hospitalization

Can reduce extra effort and cost from boiling, filtering, treating and purchasing water

WASA would not need to repair breaks in the water pipes
Willingness to pay for passive water chlorination device

- The majority of the community would support and continue to provide supplies since they already have a system to pay for shared water points.

- However, the introduction of a passive chlorination device needs:
  - To reduce strong smell of bleach
  - Communal agreement and acceptability
  - Low cost (per household 0.07 to 0.13 US$ monthly) and motivation to encourage successful payments
Conclusions

- Introduction of shared water points was an improvement in providing accessible and legal piped water to low-income urban communities.

- However, they continue to experience diarrheal diseases and do not regularly treat drinking water due to high cost.

- The passive water chlorination would be acceptable if cost was low enough.
Recommendations

• Pilot testing of the device to understand the actual willingness to pay

• Consider introducing the passive water chlorination device to:
  – Be integrated into the current system of managing water points
  – Prevent excessive or inadequate addition of chlorine that can occur with point of use water chlorination systems
  – Reduce the need to change behavior compared to point of use water chlorination
  – Reduce the diarrheal disease burden in low-income communities in Dhaka
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