Removing Barriers To Point-of-use Water Treatment Products Through Social Marketing And Entrepreneurship

A case study in Western Kenya

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Context

- Behavior change is a critical element in the successful implementation of point-of-use water quality interventions.
- Understanding barriers to behavior change is an important and sometimes overlooked step in the adoption of technology.
Background

• Safe Water System (SWS)
  – Point-of-use disinfection with sodium hypochlorite solution
  – Safe storage with narrow mouth, tap and lid
  – Behavior change

• CARE – Implemented the SWS in Southern Nyanza Province in 1999
  – Hypochlorite brand name: Klorin
  – Clay pots modified with narrow mouth, lid, and tap

• PSI – began SWS social marketing campaign in 2003
  – Brand name: WaterGuard
Background

• 2003: SWS evaluation in Kenya (Bratton, 2003)
  – Survey of Klorin adoption
  – Six project sites: CARE and non-CARE
  – Bondo District had highest adoption rate (14%)
    • Served by the Society for Women and AIDS in Kenya (SWAK)
SWAK

- Provides:
  - Trainings to CBOs
    - Health topics
    - Care of PLWA and orphans
    - SWS
  - Income generating activities
    - Klorin: initiated in 2002
    - PuR: initiated in September 2003
    - Other health products
  - Enhance self-esteem through empowerment and community service
Evaluation Objectives

• Determine adoption of hypochlorite solution in an area served by SWAK
• Identify socio-economic and behavioral barriers to awareness and adoption
Methods

• **Population**
  - Convenience sample of 8 SWAK groups
    • Actively involved in income generation
    • 1 to 4 villages served per group

• **Cross sectional survey**
  - Demographic characteristics
  - Household assets
  - Water sources and water, hygiene and sanitation practices

• **Water testing:** chlorine residual in stored water
Principal Component Analysis

- Developed by World Bank
- Values assigned to household assets
- Asset values summed
- Households grouped by asset score into quintiles standardized for Kenya from 1998 DHS
- For analysis, households grouped into quintiles of equal size
Results

- Number of respondents: 485
- Median age: 32 (range of medians 22-42)
- Females: 90%
- Literacy: 79%
- Secondary education: 24%
- Socioeconomic status (WB quintiles standardized for Kenya)
  - Poorest quintile – 62%
  - Wealthiest quintile – 28%
Results

• Water sources (dry season):
  – Surface water: 58% (range 5-92%)
  – Community piped or protected source: 33% (range 0-94%)
  – Rainwater catchment: 9% (range 0-24%)

• Store water in home: 98%
  – Narrow-mouthed (safe) vessel: 10%

• Soap observed in home: 96%

• Latrine observed: 74%
Water Treatment

- Heard of Klorin: 77%
  - Ever treated: 33%
- Heard of WaterGuard: 56%
  - Ever treated: 15%
  - Not sold by SWAK
- Heard of PUR: 25%
  - Ever treated: 10%

- Detectable Chlorine residual: 20%
  - Klorin: 17%
  - WaterGuard: 2%
  - PUR: 1%
Behavioral Barriers

• The water source is considered safe: 50%
  – It looks clean: 35%
  – Have used it for generations: 15%
  – Free from germs: 14%

• Why have you never tried Klorin?
  – Expensive: 16%
  – Don’t know where to buy it: 14%
  – Bad taste/smell: 10%
  – Don’t need it: 7%

• What do you not like about Klorin/WaterGuard?
  – Bad smell: 20%/Bad taste: 11%
  – Expensive: 12%
Percentage Of Respondents With Awareness and Use Of Klorin By Wealth Quintile

- Quintile 1: 72% (Heard of Klorin) - 7% (Detectable Chlorine Residual)
- Quintile 2: 66% (Heard of Klorin) - 22% (Detectable Chlorine Residual)
- Quintile 3: 86% (Heard of Klorin) - 24% (Detectable Chlorine Residual)
- Quintile 4: 73% (Heard of Klorin) - 16% (Detectable Chlorine Residual)
- Quintile 5: 85% (Heard of Klorin) - 30% (Detectable Chlorine Residual)
# Klorin Use by Literacy, Education and SES

Klorin use (detectable Chlorine residual) (N=485)

<table>
<thead>
<tr>
<th></th>
<th>Yes (n=99)</th>
<th>No (n=386)</th>
<th>RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy</td>
<td>91 (92%)</td>
<td>293 (76%)</td>
<td>3.00</td>
<td>1.50-5.96</td>
</tr>
<tr>
<td>&gt;2 education</td>
<td>41 (41%)</td>
<td>79 (21%)</td>
<td>1.28</td>
<td>1.11-1.46</td>
</tr>
<tr>
<td>Q1</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>23 (77%)</td>
<td>74 (45%)</td>
<td>1.22</td>
<td>1.07-1.38</td>
</tr>
<tr>
<td>Q3</td>
<td>23 (77%)</td>
<td>74 (45%)</td>
<td>1.22</td>
<td>1.07-1.38</td>
</tr>
<tr>
<td>Q4</td>
<td>16 (70%)</td>
<td>81 (47%)</td>
<td>1.11</td>
<td>1.00-1.23</td>
</tr>
<tr>
<td>Q5</td>
<td>30 (81%)</td>
<td>67 (43%)</td>
<td>1.34</td>
<td>1.16-1.55</td>
</tr>
</tbody>
</table>
### Multivariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Heard of Klorin (N=485)</th>
<th>Detectable CI Residual (N=485)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% confidence interval</td>
</tr>
<tr>
<td>At least some secondary education</td>
<td>2.32</td>
<td>1.22-4.42</td>
</tr>
<tr>
<td>Literate</td>
<td>2.47</td>
<td>1.51-4.04</td>
</tr>
</tbody>
</table>

- Statistically Significant predictors of Klorin awareness and use were included in the full model
- SES quintiles dropped out of model
Conclusions

• Klorin utilization similar across SES quintiles 2-5
  – SWAK intervention may have helped lower economic barriers to use

• Lower Klorin utilization in:
  – Poorest quintile
  – Persons with lower educational levels

• Additional barriers included:
  – Lack of knowledge of risk from water
  – Taste/smell of chlorine
  – Expense
  – Unaware of where to buy
Recommendations

• Target interventions to individuals with lower education and SES levels
  – Alternative pricing schemes
  – Promotional materials appropriate to educational level

• Assess the effectiveness of educational messages from SWAK trainers to members to the communities
  – About risks of unsafe water to health
  – About chlorine smell as cue for water safety
  – About other factors that motivate use of POU products
Acknowledgements

- Robert W. Woodruff Scholarship
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- Alie Eleveld and Paul Ogutu
- CARE-Kenya and SWAK staff
Knowledge and Use of Klorin

100% - Total Respondents

77% - Heard of Klorin

33% - Used Klorin at least once

17% - Chlorine residual in treated water
## Klorin awareness

### Klorin awareness (N=485)

<table>
<thead>
<tr>
<th></th>
<th>Yes (n=372)</th>
<th>No (n=113)</th>
<th>RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy</td>
<td>313 (84%)</td>
<td>71 (63%)</td>
<td>1.40</td>
<td>1.18-1.66</td>
</tr>
<tr>
<td>&gt;2 education</td>
<td>107 (29%)</td>
<td>13 (12%)</td>
<td>2.51</td>
<td>1.46-4.31</td>
</tr>
<tr>
<td>Q1</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>65 (48%)</td>
<td>32 (54%)</td>
<td>0.84</td>
<td>0.55-1.29</td>
</tr>
<tr>
<td>Q3</td>
<td>82 (54%)</td>
<td>15 (36%)</td>
<td>1.80</td>
<td>1.02-3.17</td>
</tr>
<tr>
<td>Q4</td>
<td>71 (51%)</td>
<td>25 (48%)</td>
<td>1.08</td>
<td>0.68-1.72</td>
</tr>
<tr>
<td>Q5</td>
<td>83 (54%)</td>
<td>14 (34%)</td>
<td>1.92</td>
<td>1.08-3.45</td>
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