Spot-checks to measure general hygiene practice

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Context

- 1.5 Million deaths of children in developing countries due to diarrheal disease (WHO, 2009)

- Diarrheal diseases can be prevented by improvements in water, sanitation and hygiene (WASH)

- What is an hygienic household and how can we measure it?
Introduction – Methods – Results – Conclusion
Clean and dirty households

Dirty households

• Unswept floor
• Open water
• Dirty clothing
• No shoes
• Waste lying around

Introduction – Methods – Results – Conclusion
Clean and dirty households

Clean households

- Swept floor
- Clean clothes
- Water in closed containers
- No waste lying around

Easily measured by short observations → spot checks

Introduction – Methods – Results – Conclusion
Research questions

- General impression of clean and dirty households: Existence of general hygiene practice?
- Measures of hygiene/cleanliness
- Relationship of hygiene practice to psychology?
Data gathering

- Household survey about water, sanitation and hygiene in 2012 in three rural provinces in Burundi
- 762 quantitative structured interviews, observations and spot-checks
- **Quantitative structured interviews**
  - Structured questionnaire translated in local language
  - Length about 60 minutes
- **Spot checks**
  - Rapid observations by the interviewer
  - Easy and fast to measure
  - Biases due to social desirability can be avoided
  - 3 point likert scale (-1 = dirty; 1 = clean)
  - Alternatively yes-or-no questions (-1 = no; 1 = yes)
Data gathering

*Spot-checks*

- Clear instructions to achieve objective ratings
- Example latrine cleanliness:

  - **Clean**: no dirt, no feces (1)
  - **mediocre**: some dirt, no feces (0)
  - **dirty**: feces on floor (-1)
## Variables used in analysis

<table>
<thead>
<tr>
<th>Variable Group</th>
<th>Variable Name</th>
<th>Variable Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child Hygiene</strong></td>
<td>Nails Child</td>
<td>How clean are the nails?</td>
</tr>
<tr>
<td></td>
<td>Hands Child</td>
<td>How clean are the hands?</td>
</tr>
<tr>
<td></td>
<td>Clothes Child</td>
<td>How clean are the clothes?</td>
</tr>
<tr>
<td><strong>Mother Hygiene</strong></td>
<td>Nails Mother</td>
<td>How clean are the nails?</td>
</tr>
<tr>
<td></td>
<td>Hands Mother</td>
<td>How clean are the hands?</td>
</tr>
<tr>
<td></td>
<td>Clothes Mother</td>
<td>How clean are the clothes?</td>
</tr>
<tr>
<td><strong>House Hygiene</strong></td>
<td>Garbage</td>
<td>Is there garbage around?</td>
</tr>
<tr>
<td></td>
<td>Floor</td>
<td>How clean is the floor in the house?</td>
</tr>
<tr>
<td><strong>Water Hygiene</strong></td>
<td>Water covered</td>
<td>Is the water covered?</td>
</tr>
<tr>
<td></td>
<td>Cont. outside</td>
<td>How clean is the water container outside?</td>
</tr>
<tr>
<td></td>
<td>Cont. inside</td>
<td>How clean is the water container inside?</td>
</tr>
</tbody>
</table>
## Variables used in analysis

<table>
<thead>
<tr>
<th>Variable Group</th>
<th>Variable Name</th>
<th>Variable Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Hygiene</td>
<td>Animal feces</td>
<td>Are there animal feces in the courtyard?</td>
</tr>
<tr>
<td></td>
<td>Animal cook</td>
<td>Are there animals near the cooking area?</td>
</tr>
<tr>
<td>Latrine Hygiene</td>
<td>Latrine</td>
<td>How clean is the latrine?</td>
</tr>
<tr>
<td>Child health</td>
<td>Eyes discharge</td>
<td>Does the child have eyes discharge?</td>
</tr>
<tr>
<td></td>
<td>Nose discharge</td>
<td>Does the child have nose discharge?</td>
</tr>
</tbody>
</table>

### Self-reported variables

<table>
<thead>
<tr>
<th>Commitment handwashing</th>
<th>Do you feel committed to wash your hands with soap and water?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment latrine cleaning</td>
<td>Do you feel committed to clean your latrine?</td>
</tr>
</tbody>
</table>
Statistical Analysis

Introduction – Methods – Results – Conclusion
Statistical Analysis

Relationship to psychology → commitment
Relationship to health → child health measures

Introduction – Methods – Results – Conclusion
Statistical Analysis

*Relationship to psychology*

- Correlation with commitment

*Relationship to child health*

- Correlation with measures of child health
General hygiene model

Introduction – Methods – **Results** – Conclusion
General hygiene model

- Good model fits ($\chi^2(68, N = 762) = 244, p < .001$; comparative fit index = .94; root mean square error of approximation = .058. * p < .001) → this means the model is a good representation of the reality (the data)
- The different hygiene practices are interrelated
- Most representative cluster: hygiene of the primary caregiver (mother hygiene)
- There is a “general hygiene practice”, which can be measured with spot-checks
Statistical Analysis

**Introduction – Methods – Results – Conclusion**

<table>
<thead>
<tr>
<th>Variable of interest</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child health</td>
<td>.42</td>
</tr>
<tr>
<td>Commitment</td>
<td>.62</td>
</tr>
</tbody>
</table>

### Diagram

- **Latrine hygiene**
  - latrine
  - cont. covered
  - cont. outside
  - cont. inside

- **Animal hygiene**
  - feces animals
  - animals near cooking area

- **General hygiene practice**
  - garbage
  - floor
  - mother
  - nails child
  - hands child
  - clothes child

- **Child hygiene**

Variable of interest:

- Child health: .42
- Commitment: .62
# Relationship with variables of interest

<table>
<thead>
<tr>
<th>Model</th>
<th>df</th>
<th>$\chi^2(N = 762)$</th>
<th>CFI</th>
<th>RMSEA</th>
<th>Variable in relationship</th>
<th>$r^{a}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81</td>
<td>262*</td>
<td>.94</td>
<td>.054</td>
<td>Handwashing self-report</td>
<td>.31*</td>
</tr>
<tr>
<td>2</td>
<td>81</td>
<td>259*</td>
<td>.94</td>
<td>.054</td>
<td>Handwashing observation</td>
<td>.35*</td>
</tr>
<tr>
<td>3</td>
<td>81</td>
<td>341*</td>
<td>.92</td>
<td>.065</td>
<td>Latrine cleaning self-report</td>
<td>.41*</td>
</tr>
<tr>
<td>4</td>
<td>94</td>
<td>310*</td>
<td>.93</td>
<td>.055</td>
<td>Child health</td>
<td>.42*</td>
</tr>
<tr>
<td>5</td>
<td>94</td>
<td>352*</td>
<td>.92</td>
<td>.060</td>
<td>Commitment</td>
<td>.62*</td>
</tr>
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</table>

*Note.* CFI = comparative fit index; RMSEA = root mean square error of approximation.

$^{a}$ correlation of the variable in relationship with general hygiene practice; * $p < .001$. 

Introduction – Methods – **Results** – Conclusion
Relationship with variables of interest

- Correlation with medium effect to child health
  - Shows relevance of general hygiene practice
- Correlation with strong effect to commitment
  - Psychological determinant commitment is important for general hygiene practice
  - General hygiene practice seems to be a mindset
Conclusion

- Hygiene practices are interrelated
- General hygiene practice exists
- Spot checks are fast and easy to measure general hygiene practice
- Hygiene of the mother is the most representative hygiene cluster
  - Short measure for general hygiene practice
- General hygiene practice seems to relate to a mindset
  - Interventions could try to tackle general hygiene practice directly and influence a lot of behaviors at the same time!
Measuring the general hygiene mindset

- Do you feel committed to being hygienic?
- How important is it to you to have a clean household?
- People should be much more careful about hygiene
Thank you very much for your attention

Side Event, Friday, October 17:

Effectively changing WASH behaviors: Identifying behavioral determinants, Selecting the right interventions and evaluating their effectiveness

Convened by Eawag, Environmental Sciences, Environmental and Health Psychology