Measuring intervention fidelity to assess implementation gaps in a sanitation intervention component of a randomized controlled trial

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WASH Benefits study: Bangladesh and Kenya
WASH Benefits Bangladesh Study Sites

4 rural districts: water chemistry (low iron), no similar WASH programs, no nutrition programs with supplements
WASH Benefits Study (washbenefits.net)

- **WASH+N Interventions:**
  - Intra-uterine to post delivery phase up to 24 months

- **Data Collection:**
  - Quantitative and qualitative data
  - Biological and environmental samples

- **Outcomes:**
  - Child growth
  - Cognitive development
  - Environmental enteropathy
  - Diarrhea

Ref: Arnold et al., 2013
Study Participants

- Enrolled pregnant women in second trimester

- Total participants enrolled: 5551 mothers

- Randomized by (cluster) group of ~8 households or compounds with a pregnant women served by local promoter
7 Arms

Control \[\times 2\] \[\text{[C]}\]
Water treatment \[\text{[W]}\]
Sanitation \[\text{[S]}\]
Hand washing \[\text{[H]}\]
Nutrition \[\text{[N]}\]
W + S + H \[\text{[WSH]}\]
H + S + H + N \[\text{[WSH+N]}\]
# Sanitation Intervention

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Code</th>
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<td>Control [X 2]</td>
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- Dual pit latrine
- Child Potty
- Sani-scoop
What is fidelity measurement?

- Assessing that an intervention was delivered in a comparable manner to all participants and is true to the theory and goals underlying the research\(^1\)

- Important to monitoring intervention uptake and effectiveness\(^2\)

- Provides decision-making data for corrective actions in project implementation\(^2\)

Ref: \(^1\)Moncher & Prinz, 1991; \(^2\)Mowbray et al., 2003
Objectives of Fidelity

- To identify the gaps in a sanitation implementation strategy
- To direct corrective measures to the implementation team

- Installations = 4,215
  - Dual pit latrines
    - Installations = 4,215
  - Potties and Sani-scoops
    - Potties = 3,900
    - Sani-scoop = 6,150
  - Community health workers
    - Total recruited & trained = 540
Sampling technique for fidelity assessment

10 Blocks

4 Blocks

12 Clusters
Monthly fidelity indicators

- Observation visits and structured questionnaire
  - Latrine use (wet floor/pan)
  - Water seal
  - Leaking of feces

Feces drainage to environment
Fidelity Assessment

**Focus**
- Was the hardware distributed to the appropriate households?
- Is the hardware functional?
- Is there objective evidence of uptake?

**Procedures**
- Data collection using smart phones
- Result analyzed monthly
- Compared to critical benchmarks
Critical Benchmarks

Each intervention arm has benchmark indicators

- 80% of households have a latrine with a functional water seal
- 65% of households have report safe disposal of child feces
- 80% of households have a sani-scoop easily accessible to mother
What did we do with the fidelity data?

- Generated monthly reports based on specific indicators
- Analyzed results and identified low performing areas
- Shared findings with investigators and field staff
- Developed action plan for corrective measures

Monthly fidelity report
What did we find in the 1st assessment?

Observation of hygienic latrine

Benchmark

- Sanitation: 30%
- WSH: 35%
- WSH+N: 60%
What steps were taken immediately?

- Discussed problems at fortnightly WASH Benefits logistics meetings
- Developed action plan
  - Qualitative assessment and communication with household
  - Developed education materials and model dual pit latrine for demonstration
  - Trained field staff and local promoters on education of hygienic latrine use and demonstration of model dual pit latrine
Fidelity assessment findings

- Continued usage of existing unhygienic latrine despite improved latrine due to long term habit

- Broken-water seal/unaccustomed with new technology

- Inadequate knowledge on hygienic use of latrine
Reasons for household non-compliance

- Unhygienic latrines were used for:
  - Visitors and outsiders
  - Neighboring, non-recipient households

- Water seals were broken before, during and after latrine installation: Why?
  - Perceived that the seal required a large amount of water and filled pits rapidly
  - Blocked easy flow of feces into the pit
  - Caused water to splash during defecation
Corrective measures taken

- Demonstrated the function of water seals and appropriate squatting posture to the participants

- Communicated benefits of hygienic use of latrine and its use

- Made technical changes to footrest position on the squatting slab to prevent water splashing
Corrective measures taken (Con.)

- Closed existing unhygienic latrines during installation of new latrines with the engagement of HH

- Engaged males, children and elderly groups to promote hygienic latrine use

- Behavioural reinforcements initiated through local promoters and field staff
What did we find in the 4th monthly assessment?

Observation of hygienic latrine (%)

- **Sanitation**: 33 (1st assessment), 83 (4th assessment), 95 (16th assessment)
- **WSH**: 35 (1st assessment), 94 (4th assessment), 99 (16th assessment)
- **WSH+N**: 60 (1st assessment), 95 (4th assessment), 96 (16th assessment)

Benchmark: 100%
Presence of hygienic latrine over 16 months

Observation of hygienic latrine (%)

Benchmark
Steps taken for subsequent blocks

- Assessed the existing status of latrine in the courtyard/compound
- Negotiated with the household head to demolish older unhygienic latrines
- Education on hygienic use of latrine including importance and function of water seal
- Latrine handover ceremony in presence of field staff and local elite
- Follow-up thru person to person counseling, mother’s meeting, male, elderly and children meeting
Further illustration of fidelity assessment in hand washing intervention
Findings hand washing: 1st assessment

% hand washing station with soap and water

- Hand washing: 89
- WSH: 27
- WSH+N: 46

Benchmark
Problems Identified

- Local promoters work overload on promoting multiple intervention
- Less attention of supervisor and reminder to household by promoters
- Fear of theft as latrine is not adjacent to households
- Low commitment to daily water refills
- Perceived lack of suitable space
- Unfamiliar with preparing soapy water
Corrective measures taken

- Trained field staff, increased households visits and improved reporting.
- Negotiation about placement of hand washing station
- Communicated benefits of hand washing
- Engaged males to refill water
- Trained household members to prepare soapy water
Findings hand washing : 3rd assessment

% of hand washing station with soap and water present

Hand washing
WSH
WSH+N

1st assessment
2nd assessment
3rd assessment

Benchmark
Conclusion

- Early fidelity assessment can lead to early detection of problems and minimize deviation from intervention plan.

- Simple observation-based surveys can be used to measure fidelity of large scale WASH interventions.

- Timely exploration of reasons for failure to reach benchmarks allowed for improved implementation.

- Provided insight on the quality of interventions, by arm and over time.
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QUESTIONS?

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