Appendices

Appendix 3.1. PRISMA 2009 checklist1

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	

[1] 1. Moher, D., et al., *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement.* British medical journal, 2009. **339**.

Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	

Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

Appendix 3.2. Cochrane CENTRAL, Pubmed, and Medline full electronic search strategies

Cochrane CENTRAL

ID	Search	Hits
#1	MeSH descriptor: [Hand Disinfection] explode all trees	341
#2	MeSH descriptor: [Hand Hygiene] explode all trees	382
#3	"handwashing"	349
#4	"hand wash*"	38
#5	"hand clean*"	2
#6	**#1 OR #2 OR #3 OR #4 OR #5**	**619**
#7	MeSH descriptor: [Soaps] explode all trees	209
#8	"behavior change"	4539
#9	"behaviour change"	4549
#10	#8 OR #9	4551
#11	#6 AND #7	84
#12	#6 AND #10	48
#13	#11 AND #12	7
#14	"school based"	2855
#15	#6 AND #14	32
#16	"behavior"	65304
#17	#6 AND #16	155
#18	MeSH descriptor: [Health Education] explode all trees	17136
#19	#6 AND #18	78
#20	MeSH descriptor: [Schools] explode all trees	2514
#21	#6 AND #20	33
#22	MeSH descriptor: [Hygiene] explode all trees	1915
#23	#22 AND #18	356
#24	MeSH descriptor: [Diarrhea] explode all trees	3101
#25	#6 AND #24	50
#26	#6 AND #22	391

Pubmed

((((((hand disinfection[MeSH Terms]) OR "handwashing") OR "handwash*") OR "hand-wash*") OR "hand hygiene")) AND (((randomized controlled trial[MeSH Terms]) OR "randomised controlled trial*") OR trial*)

Medline

1. exp Hand Disinfection/
2. handwashing.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
3. "hand-wash".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
4. "handwash*".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5. "hand-clean*".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
6. 1 or 2 or 3 or 4 or 5
7. limit 6 to (humans and (meta analysis or randomized controlled trial or systematic reviews))
8. exp Soaps/
9. 7 and 8
10. exp BEHAVIOR/
11. "behavio?r".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
12. 10 or 11
13. 7 and 12
14. exp Schools/
15. 7 and 14
16. exp Health Education/
17. 7 and 16
18. exp HYGIENE/
19. 7 and 18
20. limit 6 to (humans and (randomized controlled trial or systematic reviews))

Appendix 3.3. Cochrane's Risk of Bias Assessment Tool and criteria to judge risk of bias[2]

RANDOM SEQUENCE GENERATION **Selection bias (biased allocation to interventions) due to inadequate generation of a randomised sequence.**	
Criteria for a judgement of 'Low risk' of bias.	The investigators describe a random component in the sequence generation process such as: • Referring to a random number table; • Using a computer random number generator; • Coin tossing; • Shuffling cards or envelopes; • Throwing dice; • Drawing of lots; • Minimization*. *Minimization may be implemented without a random element, and this is considered to be equivalent to being random.
Criteria for the judgement of 'High risk' of bias.	The investigators describe a non-random component in the sequence generation process. Usually, the description would involve some systematic, non-random approach, for example: • Sequence generated by odd or even date of birth; • Sequence generated by some rule based on date (or day) of admission; • Sequence generated by some rule based on hospital or clinic record number. Other non-random approaches happen much less frequently than the systematic approaches mentioned above and tend to be obvious. They usually involve judgement or some method of non-random categorization of participants, for example: • Allocation by judgement of the clinician; • Allocation by preference of the participant; • Allocation based on the results of a laboratory test or a series of tests; • Allocation by availability of the intervention.
Criteria for the judgement of 'Unclear risk' of bias.	Insufficient information about the sequence generation process to permit judgement of 'Low risk' or 'High risk'.
ALLOCATION CONCEALMENT **Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment.**	
Criteria for a judgement of 'Low risk' of bias.	Participants and investigators enrolling participants could not foresee assignment because one of the following, or an equivalent method, was used to conceal allocation: • Central allocation (including telephone, web-based and pharmacy-controlled randomization); • Sequentially numbered drug containers of identical appearance; • Sequentially numbered, opaque, sealed envelopes.

[2] 2. Cochrane, *Criteria for judging risk of bias in the 'Risk of bias' assessment tool*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

Cochrane's Risk of Bias Assessment Tool *(Continued)*

Criteria for the judgement of 'High risk' of bias.	Participants or investigators enrolling participants could possibly foresee assignments and thus introduce selection bias, such as allocation based on: • Using an open random allocation schedule (e.g. a list of random numbers); • Assignment envelopes were used without appropriate safeguards (e.g. if envelopes were unsealed or nonopaque or not sequentially numbered); • Alternation or rotation; • Date of birth; • Case record number; • Any other explicitly unconcealed procedure.
Criteria for the judgement of 'Unclear risk' of bias.	Insufficient information to permit judgement of 'Low risk' or 'High risk'. This is usually the case if the method of concealment is not described or not described in sufficient detail to allow a definite judgement – for example if the use of assignment envelopes is described, but it remains unclear whether envelopes were sequentially numbered, opaque and sealed.
BLINDING OF PARTICIPANTS AND PERSONNEL **Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.**	
Criteria for a judgement of 'Low risk' of bias.	Any one of the following: • No blinding or incomplete blinding, but the review authors judge that the outcome is not likely to be influenced by lack of blinding; • Blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken.
Criteria for the judgement of 'High risk' of bias.	Any one of the following: • No blinding or incomplete blinding, and the outcome is likely to be influenced by lack of blinding; • Blinding of key study participants and personnel attempted, but likely that the blinding could have been broken, and the outcome is likely to be influenced by lack of blinding.
Criteria for the judgement of 'Unclear risk' of bias.	Any one of the following: • Insufficient information to permit judgement of 'Low risk' or 'High risk'; • The study did not address this outcome.
BLINDING OF OUTCOME ASSESSMENT **Detection bias due to knowledge of the allocated interventions by outcome assessors.**	
Criteria for a judgement of 'Low risk' of bias.	Any one of the following: • No blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding; • Blinding of outcome assessment ensured, and unlikely that the blinding could have been broken.
Criteria for the judgement of 'High risk' of bias.	Any one of the following: • No blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding; • Blinding of outcome assessment, but likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding.
Criteria for the judgement of 'Unclear risk' of bias.	Any one of the following: • Insufficient information to permit judgement of 'Low risk' or 'High risk'; • The study did not address this outcome.

Cochrane's Risk of Bias Assessment Tool *(Continued)*

INCOMPLETE OUTCOME DATA **Attrition bias due to amount, nature or handling of incomplete outcome data.**	
Criteria for a judgement of 'Low risk' of bias.	Any one of the following: • No missing outcome data; • Reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias); • Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; • For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate; • For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size; • Missing data have been imputed using appropriate methods.
Criteria for the judgement of 'High risk' of bias.	Any one of the following: • Reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups; • For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk enough to induce clinically relevant bias in intervention effect estimate; • For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size; • 'As-treated' analysis done with substantial departure of the intervention received from that assigned at randomization; • Potentially inappropriate application of simple imputation.
Criteria for the judgement of Unclear risk' of bias.	Any one of the following: • Insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. number randomized not stated, no reasons for missing data provided); • The study did not address this outcome.
SELECTIVE REPORTING **Reporting bias due to selective outcome reporting.**	
Criteria for a judgement of 'Low risk' of bias.	Any of the following: • The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way; • The study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon).

Cochrane's Risk of Bias Assessment Tool *(Continued)*

Criteria for the judgement of 'High risk' of bias.	Any one of the following: • Not all of the study's pre-specified primary outcomes have been reported; • One or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g. subscales) that were not pre-specified; • One or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided, such as an unexpected adverse effect); • One or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; • The study report fails to include results for a key outcome that would be expected to have been reported for such a study.
Criteria for the judgement of 'Unclear risk' of bias.	Insufficient information to permit judgement of 'Low risk' or 'High risk'. It is likely that the majority of studies will fall into this category.
OTHER BIAS **Bias due to problems not covered elsewhere in the table.**	
Criteria for a judgement of 'Low risk' of bias.	The study appears to be free of other sources of bias.
Criteria for the judgement of 'High risk' of bias.	There is at least one important risk of bias. For example, the study: • Had a potential source of bias related to the specific study design used; or • Has been claimed to have been fraudulent; or • Had some other problem.
Criteria for the judgement of Unclear risk' of bias.	There may be a risk of bias, but there is either: • Insufficient information to assess whether an important risk of bias exists; or • Insufficient rationale or evidence that an identified problem will introduce bias.

Appendix 3.4. Synthesis of results methods

For the studies included in the systematic review which did not report risk ratios (RRs), we used the available information to compute these estimates. When count data with handwashing frequency were provided, the RRs, SEs of the log RRs (ln(RR)), and 95% CIs of the log RRs were computed *(procedure 1)*.

To calculate the RRs, SEs of the log RRs, and 95% CIs of the ln(RRs), we used the following formulas, as per Altman (1991) [3][3] [4]:

Risk ratio:

$$RR = \frac{a/(a+b)}{c/(c+d)}$$

With:

	Intervention group	Control group
Number of HWWS events after toilets use	a	b
Number of non-HWWS events after toilets use	c	d

Standard error of the log of the risk ratio {ln (RR):

$$SE\{\ln(RR)\} = \left(\sqrt{\frac{1}{a} + \frac{1}{c} - \frac{1}{a+b} - \frac{1}{c+d}}\right)$$

(0.5 was added to all cells (i.e. a, b, c, d) to compute the RRs, when there were intervention groups with no observation) [5].

[3] As cited in 4. MEDCALC. *Relative risk calculator*. 2019 [cited 2018.

95% confidence interval (CI) of {ln (RR)}:

$$95\%\ CI = (\ln(RR) - 1.96 \times SE\{\ln(RR)\}\ to\ \ln(RR) - 1.96 \times SE\{\ln(RR)\})$$

When handwashing frequency alone with a p-value were provided, we computed the RRs, and used the reported p-values to estimate the corresponding z-statistic. We then used the following formula to calculate the SEs{ln(RRs)} *(procedure 2)* [6]:

$$\mathrm{SE} = \frac{\ln(RR)}{z}$$

The 95% CI of the ln(RR) was then computed using the formula described in *procedure 1*.

When handwashing frequency and SEs were provided, we used the following formula to calculate the total number of observations (*procedure 3*).

$$SE = \sqrt{\frac{p(1-p)}{N}}$$

SE: Standard error; p: Point estimate; N: Sample size

We used the handwashing frequency and computed *N* to find the count data *(n)* for the outcome measure. With *n* and *N* obtained, we then used *procedure 1* to compute the RRs, SEs of the log RRs (ln(RRs)), and 95% CIs of the log RRs.

When handwashing frequency were provided and that the authors reported no evidence of an intervention effect without reporting the p-values, we assumed P=0.05. Similarly, when handwashing frequency were reported but that their exact corresponding p-values were presented as inequalities, we set the p-values as equal to the value in the inequality (e.g. P=0.05 for P<0.05 and P>0.05) [7]. As such approach would either produce wider or narrower confidence intervals than actual values, we took this into account when assessing the evidence [7]. We then used *procedures 1* and *2* to compute the RRs, cluster-adjusted SEs and cluster-adjusted 95% CIs.

We then used the reported p-value to find the two-tailed z-score using the two-tailed z-score table. The SE{ln(RR)} was computed using the formula in *procedure 2*, and the 95%CI was calculated, using the formula in *procedure 1*.

Appendix 3.5. Characteristics of the excluded studies and reasons for exclusion

Study	Reason for exclusion
Arikpo 2018	Systematic review with hygiene outcome aggregated (e.g. handwashing, water sanitation and food preparation and storage practices)
Arnold 2009	Non-randomised controlled study
Biswas 2017	Households randomly selected but do not seem to have been randomly assigned to intervention groups (study group allocation not explained)
Curtis 2001	Non-randomised controlled study
Freeman 2014	Systematic review of the frequency of HWWS (baseline rates) and HWWS interventions effect on diarrhoea
Huda 2012	Non-randomised controlled study
Hulland 2013	Design of a handwashing station. Handwashing not an outcome measure
Jannat 2015	Conference paper with no full text paper
Kaewchana 2012	Handwashing for prevention of influenza transmission
Kamm 2012	Conference paper with no full text paper
Kamm 2016	Non-randomised controlled study
Ram 2015	Handwashing for prevention of influenza transmission
Ram 2015	Conference paper with no full text paper
Schlegelmilch 2016	Before-after randomised trial
Vindigni 2011	Systematic review with handwashing behaviour change not an outcome
Waterkeyn 2005	Non-randomised controlled study
Watson 2017	Systematic review with all included studies but 1 conducted in school-settings.

Appendix 3.6. Characteristics of included studies *(ordered by study ID)*

Study: Biran 2009, India. *Unknown trial registration status*

		Comments
Methods	Pre-post cluster-RCT Method of allocation sequence: unspecified Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[4] Blinding: not possible Inclusion of participants in the analysis: unclear Length of follow-up: within 6 weeks of end of intervention (total study duration was 4 months and it is unclear when intervention delivery started and ended). Cluster-adjustment method: ANOVA model weighted according to number of events observed at follow-up (for village-level comparison)	
Participants	Number: 10 villages (5 intervention and 5 control), with 288 households (143 intervention, 145 control) Inclusion criteria: Households with at least one child registered at primary school and at least one other child aged less than 6 years old (the latter criteria was later dropped due to the small number of qualifying households) Exclusion criteria: not stated Age: children aged between 8 and 13 years old and mothers (age unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> School visits (mothers and children) and opinion leaders' meetings 1. Flipchart 2. Glo germ demonstration 3. Discussion and quiz 4. Children's rally 5. Games 6. Site clean-up 7. [Soap] wrapper redemption and prizes	

[4] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

	8. Height and weight check 9. Songs, stories 10. Flag waving 11. Tree planting <u>Control</u> 1. No intervention	
Outcomes	1. Observed HWWS after faecal contact and before eating or feeding a child	Point estimate based on comparison between interventions groups
Notes	Location: Mahbubbnagar district, India (rural) Duration: 4 months	

Study: Biran 2014, India. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: Computer random number generator using Microsoft Excel Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[5] Blinding: not totally possible, but considerable efforts made towards masking participants and outcome assessors Inclusion of participants in the analysis: All villages available for follow-up. Interventions delivered to villages as intended Length of follow-up: 12 months, but 6-week measures used for the outcome estimate[1]. Cluster-adjustment method: Not clearly specified, but clustering accounted for at Foundation for Community Work (FCW) community workers' level.	[1]Follow-up was conducted at 6 weeks, 6 months and 12 months. However, the data as reported only allowed us to compute risk ratios for the 6 weeks follow-up. This is due to the fact that behavioural outcomes were partially reported at the 6 months and 12 months follow-ups.
Participants	Number: 14 villages (7 intervention and 7 control), with 348 households (175 intervention, 173 control) Inclusion criteria: villages with a population between 700 and 2000 inhabitants; with a state-run primary school attended by children between 8 and 13 years old; and having a preschool attended by children <5 years old. Exclusion criteria: not stated Age: unspecified (adults and children)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Community and school-based events 1. Animated film 2. Skits 3. Public pledging ceremonies 4. Posters 5. Intervention branded goods (e.g. badge, cut-out model of SuperAmma <u>Control</u> 1. Shortened intervention version received after the second follow-up point (after 6 months post intervention delivery).	

[5] 8. Ibid.

Outcomes	1. Observed HWWS behavioural outcome combined (after faecal contact and before handling food). 2. Observed HWWS after faecal contact (i.e. defecation and cleaning a child's bottom) 3. Observed HWWS before handling food (i.e. eating and food preparation)	Point estimate was only computed for the first outcome, for the reasons given above.
Notes	Location: Chittoor district, India (rural) Duration: From May 2011 to September 2012	

Study: Biswas 2012, Bangladesh. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: unspecified Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[6] Blinding: not possible Inclusion of participants in the analysis: unclear (no information provided on attrition). Intention to treat used. Length of follow-up: 13 months. Cluster-adjustment method: Data analysed using the proportion test. Cluster design does not seem to have been accounted for	
Participants	Number: 90 clusters (30 vaccine and handwashing and water treatment intervention, 30 Vaccine-only intervention, and 30 control), with 400 households randomly sampled for structured observations Inclusion criteria: Housing compounds (not clearly specified) Exclusion criteria: not stated Age: not specified	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> (handwashing components) 1. Handwashing station supply (a stand, a bucket with tap, a basin, and a 1.5-liter plastic bottle to make soapy water). 2. Meetings 3. Flipcharts 4. Cue cards <u>Control</u> 1. No intervention	
Outcomes	1. Observed HWWS after defecation, cleaning a child's bottom, and before food preparation	
Notes	Location: Mirpur (Dhaka), Bangladesh (urban) Duration: 15 months	

[6] 8. Ibid.

Study: Bowen 2013, Pakistan. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer generated random number Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[7] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 5 years Cluster-adjustment method: survey methods accounting for clustering (unspecified methods)	- Initially a 5-arm study (handwashing, handwashing combined with water treatment, bleach water treatment, locculent-disinfectant water treatment and control) conducted in 2003 - 5 years post intervention, follow-up conducted and restricted to both handwashing groups vs. control - No handwashing sample size calculation reported
Participants	Number: 28 neighbourhood clusters (9 handwashing intervention, 10 handwashing and water treatment intervention, and 9 control), with 461 households (141 handwashing intervention, 160 handwashing and water treatment intervention, and 160 control) Inclusion criteria: household clusters part of the 2005 follow-up study of the initial 2003 study Exclusion criteria: not stated Age: Women (age unspecified) and 30 months < persons < 96 months	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention (handwashing intervention)</u> Handwashing health education 1. Slide shows 2. Videos 3. Pamphlets 4. Supply of soap bars <u>Control</u> 1. Supply of children's books and school stationaries	
Outcomes	1. Self-reported HWWS behavioural outcome after toilets use, before cooking, before eating or feeding a child, and after cleaning a child's bottom 2. Observed handwashing technique	

[7] 8. Ibid.

	3. Observed presence of water and soap at handwashing station 4. Self-reported list of occasions when hands should be washed
Notes	Location: Karachi, Pakistan (urban) Duration: conducted in 2009 (lasted 6 months, but duration of full study was from 2003 to 2009)

Study: Burns 2018, South Africa. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: STATA 14 (assuming computer random number generator) Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[8] Blinding: not totally possible, but considerable efforts made towards it. Inclusion of participants in the analysis: Unclear (no information provided on attrition). Length of follow-up: 6 weeks Cluster-adjustment method: Not clearly specified, but clustering accounted for at Foundation for Community Work (FCW) community workers' level.	- Imbalances at baseline accounted for in analysis (regarding the proportion of children who could not open the water tap). - No handwashing sample size calculation reported
Participants	Number: 229 households (123 intervention and 106 control) Inclusion criteria: caregiver participating in FCW Family-in-Focus programme; caregiver with at least one child aged between 3 and 9 years old in the programme; eligible children not involved in any early childhood development programme Exclusion criteria: not stated Age: 3 to 9 years old	- Initially randomised 203 households. However, discovered that some households contained distinct households within the same household, hence new sample size of 229 households.
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Supply of colourful and translucent soap bar (Hope Soap©) with a toy embedded in the centre of the soap bar. 2. Provision of a single standard hygiene and health lesson. <u>Control</u> 1. Supply of bar soap more colourful than usual soap, with a toy supplied along side the soap bar. 2. Provision of a single standard hygiene and health lesson.	
Outcomes	1. Observed handwashing behavioural outcome before meals (snack test conducted). 2. Self-reported handwashing after using the toilets and before meals. 3. Self-reported handwashing soap use frequency 4. Self-reported child health outcomes	- Authors considered p<0.1 as showing some evidence of intervention effect.

[8] 8. Ibid.

Notes	Location: Delft community, Western Cape, South Africa (urban) Duration: From September to December 2014

Study: Briceño 2017, Tanzania. *Trial registered*

Methods	Cluster-RCT Method of allocation sequence: unclear Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[9] Blinding: not totally possible but some measures taken to mask participants and enumerators Inclusion of participants in the analysis: All non-redistricted wards available for follow-up. Intention to treat analysis used. Length of follow-up: >12 months (endline survey implemented about 1 year post programme implementation) Cluster-adjustment method: Robust standard errors	Comment: - No baseline (aborted due to logistical challenges), but control baseline data and retrospective baseline data collected at endline. - Imbalances at baseline accounted for in analysis (HWWS intervention-only group more likely to have cemented-floor and piped water connection, and combined intervention group more likely to listen to radio and have slightly older household members. - 4-arm trial (HWWS, Sanitation, HWWS and sanitation combined, control)
Participants	Number: 181 wards (including 45 handwashing intervention, 46 combined handwashing and sanitation, and 46 control), with 724 households randomly sampled for structured observations Inclusion criteria: largest wards by population size selected, and households having lived in the village since the beginning of 2009 or earlier, and with at least one child under five years old. Exclusion criteria: not stated Age: Unspecified (child caregiver)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intensive social marketing intervention</u> 1. Mass radio campaigns 2. Face-to-face interactions 3. Household visits 4. Travelling road shows 5. Entertaining performances 6. Distribution of promotional material 7. Handwashing promotion with women on days of market, pre-natal clinic visits', meetings in the village 8. Provision of technical assistance to build tippy taps <u>Control</u>	- Unclear key motive used due to how intervention is described. So contacted corresponding author who kindly responded

[9] 8. Ibid.

	1. No intervention	
Outcomes	1. Observed HWWS behavioural outcome after faecal contact (defaecating, toileting, cleaning a child's bottom) and before handling food (before cooking, eating, serving food, breastfeeding) 2. Handwashing knowledge index (questionnaire) 3. Observed child cleanliness (including hands and fingernails) 4. Observed caregiver hand cleanliness (including nails, palms and fingerpads)	- Authors considered $p<0.1$ as showing some evidence of intervention effect.
Notes	Location: Tanzania (rural) Duration: From early 2009 to November 2012	

Study: Chase 2012, Vietnam. *Not peer-reviewed*

		Comments
Methods	Cluster-RCT Method of allocation sequence: unspecified Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[10] Blinding: not possible Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 12 months Cluster-adjustment method: Robust standard error clustered at commune level	- No handwashing sample size calculation reported
Participants	Number: 210 communes (140 intervention, 70 control), with 600 households randomly sampled for structured observations Inclusion criteria: Households with at least one child under the age of two years old at baseline. Exclusion criteria: not stated Age: mothers of children under five years old and other caregivers of young children, such as grandparents (age not specified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Mass media campaign combined with interpersonal communication component <u>Mass media campaign</u> 1. TV ad (with proverbs and songs) 2. Posters 3. Paper handout 4. Intervention branded goods and with tagline (e.g. hand clappers, washcloths, and stickers) <u>Interpersonal communication component (IPC)</u> 1. Group meetings (with mothers of children under five years old, grandparents and women aged between 18 and 49 years old) 2. Market meetings 3. Household visits 4. Loudspeaker announcements 5. Women's Union club meetings	

[10] 8. Ibid.

	6. Cooking competition 7. HWWS festivals 8. Distribution of HWWS promotional materials and information at strategic locations in the village. <u>Mass Media campaign-only (without IPC component)</u> See above	
Outcomes	1. Self-reported HWWS after faecal contact, before food preparation and before feeding a child 2. Observed presence of water and soap at handwashing location 3. Observed hand cleanliness	- Structured observation also conducted. However, data reported does not enable us to compute risk ratio - Authors considered $p<0.1$ as showing some evidence of intervention effect.
Notes	Location: North, central and southern regions of Vietnam (rural and urban) Duration: September 2009 to March 2011	

Study: Christensen 2015, Kakamega, Kenya. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer random generated number Allocation concealment: not concealed *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[11] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 4 months Cluster-adjustment method: ordinary least squares regression, with standard errors clustered at village level (cluster adjustment method not clearly stated)	- In-text, authors reported intervention effect on handwashing by reporting only one of the outcomes used to assess intervention (i.e. presence of soap at handwashing location). - No handwashing sample size calculation reported
Participants	Number: 38 villages (including 9 water, sanitation and hygiene (WASH), 10 WASH and nutrition, and 10 control), with 367 households (including 90 WASH, 87 WASH and nutrition and 101 control) Inclusion criteria: caregivers of children aged 4-16-month old Exclusion criteria: not stated Age: not specified	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap), with powdered soap packs <u>Control</u> 1. Child growth monitoring	- Multiple behavior change intervention including handwashing promotion
Outcomes	<u>Handwashing-related</u> 1. Self-reported HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child) 2. Observed dedicated handwashing location 3. Observed availability of soap at handwashing location	- Outcomes not pre-specified - Authors considered p<0.1 as showing some evidence of intervention effect.

[11] 8. Ibid.

	4. Observed presence of visible dirt on mother's hands, and on child's hands
Notes	Location: Kakamega, Kenya (rural) Duration: conducted from November 2011 to November 2012

Study: Christensen 2015, Bungoma, Kenya. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer random generated number Allocation concealment: not concealed *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[12] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 4 months Cluster-adjustment method: ordinary least squares regression, with standard errors clustered at village level (cluster adjustment method not clearly stated)	- In-text, authors reported intervention effect on handwashing by reporting only one of the outcomes used to assess intervention (i.e. presence of soap at handwashing location). - No handwashing sample size calculation reported
Participants	Number: 34 villages (including 8 hygiene and 9 control), with 132 households (including 33 hygiene and 30 control) Inclusion criteria: pregnant women in their second or third trimester, and caregivers of 3 month old children Exclusion criteria: not stated Age: not specified	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap), with powdered soap packs <u>Control</u> 1. Child growth monitoring	
Outcomes	<u>Handwashing-related</u> 1. Self-reported HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child) 2. Observed dedicated handwashing location 3. Observed availability of soap at handwashing location	- Outcomes not pre-specified - Authors considered p<0.1 as showing some evidence of intervention effect.

[12] 8. Ibid.

	4. Observed presence of visible dirt on mother's hands, and on child's hands
Notes	Location: Bungoma, Kenya (rural) Duration: conducted from November 2011 to November 2012

Study: Friedrich 2018, Zimbabwe . *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer random number generator Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[13] Blinding: not possible. Inclusion of participants in the analysis: No cluster lost to follow-up. Information provided on attrition. Length of follow-up: 3 months Cluster-adjustment method: exchangeable correlation matrix	- Imbalances at baseline which do not seem to have been accounted for (higher HWWS practices in the direct and indirect intervention groups than in the combined intervention group and control group; great differences between clusters regarding the availability of water taps which were functioning (this latter difference not judged to be significant by reviewer). - 4-arm trial (direct, indirect, combined and control arms HWWS, Sanitation, combined, control)
Participants	Number: 20 areas (5 direct intervention, 5 indirect intervention, 5 direct and indirect combined intervention, and 5 control), with 600 households (150 direct intervention, indirect intervention, direct and indirect combined intervention, and control respectively) Inclusion criteria: areas had to be in a local primary school area and spatially separated from other areas part of the study to minimize spill-over Exclusion criteria: not stated Age: Unspecified (child's primary caregiver)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Intervention directly targeting, indirectly targeting (via school children), or a combination of both, children's caregivers. <u>Direct intervention</u> 1. Community meetings (small drama performances, pledging, participation certificate distribution and handwashing self-monitoring calendar distribution)	The intervention was meant to be a mixed-motive health and disgust intervention. However, due to a deviation from protocol during intervention implementation, the disgust intervention message was not implemented.

[13] 8. Ibid.

	2. Household visits (Planning when, where and how to wash hands; distribution of self-monitoring calendars to record when hands are washed after key occasions) <u>Indirect intervention</u> 1. Classroom activities (health education on spread of diarrhoea, and mode of prevention, including oral-faecal route poster discussion, handwashing station maintenance, distribution of handwashing self-monitoring calendars controlled by teachers, handwashing pledging and posters design. 2. School events (Existing handwashing stations repair; design of new handwashing stations and soap dispensers; handwashing station maintenance). <u>Control</u> 1. No intervention	
Outcomes	1. Observed HWWS behavioural outcome at combined faecal contact (i.e. cleaning or using the toilets and cleaning a child's bottom) and food handling occasions (i.e. food preparation and eating). 2. Observed handwashing technique 3. Measured hand contamination before handwashing (E.coli colony forming units per hand (CFU/hand) 4. Measured hand contamination after handwashing (E.coli colony forming units per hand (CFU/hand)	- Only one p-value provided for the observed HWWS practices.
Notes	Location: Harare, Zimbabwe (urban) Duration: From July 2014 to February 2016	

Study: Gautam 2017, Nepal. *Unknown trial registration status*

Methods	Cluster-RCT Method of allocation sequence: unspecified Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[14] Blinding: not possible Inclusion of participants in the analysis: unclear Length of follow-up: approximately 4 months (45 days after completion of the 3-month period of intervention) Cluster-adjustment method: cluster-level analysis with 1.29 design effect for village clustering	
Participants	Number: 8 villages (4 intervention and 4 control), with 239 households (120 intervention, 119 control) Inclusion criteria: wards with heterogeneous population, geographically separated with 30 households with a child between 6 to 59 months, and with low sanitation coverage and high diarrhoea prevalence Exclusion criteria: not stated Age: mothers (unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Promotion package made of 6 [community] events and 6 household visits 1. Games 2. Family drama 3. Peer review 4. Cookery demonstration 5. Glo Germ demonstration 6. Public pledging and display of 'ideal mothers' pictures 7. Declaration of safe food zone 8. Songs 9. Intervention branded goods (e.g. fan, badge, flags, bibs) 10. Plastic buckets supply for handwashing <u>Control</u> 1. No intervention	- Food hygiene intervention including handwashing promotion
Outcomes	<u>Handwashing-related</u>	

[14] 8. Ibid.

	1. Observed HWWS before feeding a child and washing child's hands before eating
Notes	Location: Nepal (rural) Duration: conducted from October 2012 to December 2013

Study: Greenland 2016, Zambia. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: random number table Allocation concealment: concealed from study team until baseline data collection was completed *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[15] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 7 months Cluster-adjustment method: Hayes and Moulton (2009) cluster adjustment method for trial with few number of clusters [9] (cluster proportions replaced by baseline adjusted residuals and p-values and 95% confidence intervals adjusted through reducing the degree of freedom by 1)	- Independent random sample used to measure outcome at baseline and follow-up as likely that caregivers of baseline's eligible children would not have been eligible at follow-up.
Participants	Number: 16 health centre-catchment areas (clusters) (8 intervention and 8 control), with structured observation conducted in 373 households at follow-up (217 intervention, 156 control) Inclusion criteria: government clinics (not explicitly stated) Exclusion criteria: not stated Age: primary caregiver of child less than 5 years old with (with mothers of infant less than 6 months, for handwashing and exclusive breastfeeding outcomes assessment; and primary caregiver of child less than 5 years old with recent diarrhoea, for oral rehydration solution and zinc outcome assessment)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Radio adverts and call-in show 2. Role play 3. Skills demonstration 4. Strong emotion eliciting demonstrations (i.e. disgust and nurture) 5. Discussions 6. Quizzes 7. Video adverts 8. Dance 9. Giving of prize	- Multiple behaviour change intervention with handwashing component

[15] 8. Ibid.

	10. Intervention branded goods (i.e. hats, banners, certificates, stickers, branded bus) Control 1. Standard care at clinics
Outcomes	Handwashing-related 1. Observed HWWS after faecal contact (i.e. toilets use and cleaning a child's bottom or disposing of a child's stool) (primary) 2. Observed HWWS combined (after faecal contact and before food-handling occasions) (secondary handwashing outcome)
Notes	Location: Lusaka province, Zambia (peri-urban and rural) Duration: conducted from January to November 2014

Study: Guiteras 2016, Bangladesh. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: unspecified Allocation concealment: optimal sequential Atkinson's method - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[16] Blinding: attempted for participants Inclusion of participants in the analysis: intention-to-treat analysis Length of follow-up: about 2 months (not totally clear. Authors stated that follow-up took place 2 months after the promotion and beginning of the free soap trial) Cluster-adjustment method: standard errors of household-level data estimates clustered at compound-level	- No handwashing sample size calculation reported
Participants	Number: 434 compounds (217 water treatment intervention and 217 control, and with two-thirds of intervention compounds (97) further randomised to handwashing promotion message). Compounds had between 4 to 18 households (over 2000 households in total, with 388 to 1,746 households in the handwashing intervention group) Inclusion criteria: communities with poor water quality, elevated levels of water-borne disease, and high density of population, and with water collection and handwashing after toilets use easy to observe Exclusion criteria: not stated Age: unspecified	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Promotional meetings 1. Presentation with flipcharts *or* Germs transmission messages and link between handwashing and illness 3. Glo Germ *(disgust arm-only)* 4. Plastic bottle supply with small detergent packs <u>Control</u> 1. Water chlorine treatment intervention	
Outcomes	1. Observed HWWS after toilets use	- Authors considered p<0.1 as showing some evidence of intervention effect.

[16] 8. Ibid.

Notes	Location: Dhaka, Bangladesh (urban) Duration: approximately 7 months

Study: Langford 2013, Nepal. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: unclear Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[17] Blinding: not totally possible but some measures taken to mask participants Inclusion of participants in the analysis: unclear Length of follow-up: <6 months Cluster-adjustment method: quantitative data analysis methods not provided. Cluster design does not seem to have been accounted for.	- No handwashing sample size calculation reported
Participants	Number: 8 slums (sample size per arm not provided), with 88 mother-infant pairs (households) (45 intervention and 43 control) Inclusion criteria: mothers caring for infant aged 3 to 12 months Exclusion criteria: not stated Age: mothers (age unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Community-level, household-level and small group activities and meetings 2. Provision of posters 3. Supply of bar soap <u>Control</u> 1. No intervention	
Outcomes	1. Self reported HWWS behavioural outcome after toilets use, after cleaning a child's bottom, before cooking, before feeding a child, before eating.	- Quantitative data analysis methods not provided in text. Only mentioned as footnote under table of results. - Structured observation only conducted at baseline.
Notes	Location: Kathmandu, Nepal (urban) Duration: In 2005 (for at least 10 months)	

[17] 8. Ibid.

Study: Luby 2009, Pakistan. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer generated random number Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[18] Blinding: not masked Inclusion of participants in the analysis: some information on attrition/exclusion provided. Length of follow-up: 18 months Cluster-adjustment method: Generalised estimating equation	-- Initially a 5-arm study (handwashing, handwashing combined with water treatment, bleach water treatment, locculent-disinfectant water treatment and control) conducted in 2003 - 18 months post intervention, follow-up conducted and restricted to both handwashing groups vs. control - Re-enrolled households more likely to have been assigned to the HWWS promotion group and owning a refrigerator and television. - No handwashing sample size calculation reported
Participants	Number: 28 neighbourhood clusters (9 handwashing intervention, 10 handwashing and water treatment, and 9 control), with 576 households (186 handwashing intervention, 195 handwashing and water treatment, and 195 control) Inclusion criteria: household clusters part of the original 2003 study assigned to either of the handwashing intervention group or control group Exclusion criteria: not stated Age: mothers of the household (age unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention (handwashing intervention)</u> Neighbourhood meetings 1. Slide shows. Videotapes and pamphlets 2. Visits at least twice a week to reinforce intervention message 3. Soap supply <u>Control</u> 1. Supply of children's books and school stationaries	

[18] 8. Ibid.

Outcomes	(As proxy for HWWS after defecation, after cleaning a child's bottom, before food preparation, before eating and before feeding a child) 1. Observed presence of handwashing location with water and soap 2. Observed handwashing technique 3. Observed presence of soap in the house 4. Self-reported soap bar purchased in last month 5. Self-reported quantity of soap bar purchased 6. Self-reported amount of soap bar used per week/capita	- Use of proxy measures- only to assess handwashing with soap practices
Notes	Location: Karachi, Pakistan (urban) Duration: conducted between July 2005 and September 2006 (As part of a study starting in 2003 and ending in 2009)	

Study: Luby 2010, Bangladesh. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: computer generated random number Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[19] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: 1 month Cluster-adjustment method: cluster-effect-adjusted standard error (exact method not specified)	
Participants	Number: 30 housing compounds clusters (10 soap, 10 waterless hand sanitiser, and 10 control), with 692 residents (234 soap, 211 waterless hand sanitiser and 247 control) Inclusion criteria: compounds with at least 4 children under 15 years of age and one child under 5 years old. Exclusion criteria: not stated Age: mothers (age not specified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Stages of change theory 1. Show summary findings of HWWS frequency at key occasions and petri dishes showing bacterial growth and no growth, and discussions about link between handwashing practices and child health 2. Bar soap or waterless hand sanitizer supply and demonstration on how to use it 3. Mothers' HWWS support group 4. Posters 5. Household stickers as social recognition prize <u>Control</u> 1. No intervention	
Outcomes	1. Observed HWWS behavioural outcome after toilets use, after cleaning a child's bottom, before cooking, before eating and before feeding an infant 2. Hand rinse sample	

[19] 8. Ibid.

Notes	Location: Bangladesh (urban) Duration: conducted from January 2008 to approximately September 2008

Study: Nicholson 2014, India. *Unknown trial registration status*

		Comments
Methods	Cluster-RCT Method of allocation sequence: coin toss Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[20] Blinding: not masked Inclusion of participants in the analysis: information on attrition/exclusion provided. Length of follow-up: over 6 months (not clearly specified) Cluster-adjustment method: none	- No handwashing sample size calculation reported
Participants	Number: 70 communities organised in 35 pairs (35 communities per intervention group), with 2,155 households (1,098 handwashing intervention, 1,057 control) Inclusion criteria: geographically distinct communities with a common leadership, and households made up of one 'target' child (i.e. "children in the first standard of a community school"). Exclusion criteria: not stated Age: children typically aged 5 with some aged up to 7	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention (handwashing intervention)</u> Social marketing programme (in classrooms and home visits) 1. Soap supply (with Lifebuoy branding) 2. Health education 3. Environmental cues (wall hanger, danglers) 4. Rewards (coins, stickers, toy animals) 5. Songs, poems, stories Mother's help enlisted 2. Home visits 3. Parents' evenings 4. 'Good mums' club creation 5. Pledging (children and mothers) <u>Control</u> 1. No intervention	

[20] 8. Ibid.

Outcomes	1. Collection of soap wrappers (as proxy of HWWS after defecation, before handling food and during bathing) 2. Self-reported illnesses and school absenteeism	- - Use of proxy measures- only to assess handwashing with soap practices - Wrappers used to estimate quantity (in gram) of soap used per intervention group - Handwashing behaviour change was not a key outcome measure (whether primary or secondary). Thus, the difference between groups was not subjected to statistical test.
Notes	Location: Mumbai, India (urban) Duration: conducted between October 2007 and August 2008	

Study: Parvez 2018, Bangladesh. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: unclear Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[21] Blinding: unclear Inclusion of participants in the analysis: unclear Length of follow-up: 15 months (structured observation); 20 months (spot checks) Cluster-adjustment method: cluster sandwich estimator for cluster adjustment	- No handwashing sample size calculation reported
Participants	Number: 720 clusters of pregnant women; Observations conducted on 324 clusters, including 161 handwashing-related clusters (i.e. 53 handwashing, 53 water, sanitation and handwashing (WASH), 55 nutrition combined with WASH and 108 control), with 5,551 households (including 688 handwashing, 703 WASH, 686 nutrition combined with WASH, and 1,382 control) Inclusion criteria: pregnant women in their second and third trimester Exclusion criteria: not stated Age: unspecified (pregnant women)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention (handwashing intervention)</u> 1. Discussions with mothers on how to solve the issue of practicing the targeted behaviour 2. Storytelling, songs 3. Handwashing station supply with bottles and detergent sachet 4. Training on hardware maintenance <u>Control</u> 1. No intervention	- 7-arm study (handwashing, sanitation, water treatment, nutrition, and water treatment, sanitation and handwashing-combined, handwashing combined with nutrition and control)
Outcomes	1. Observed HWWS behavioural outcome after toilets use, after cleaning a child's bottom, before food preparation, before eating, and before feeding a child 2. Observed presence of water and soap at handwashing location	
Notes	Location: Bangladesh (urban) Duration: From October 2010 to at least October 2011	

[21] 8. Ibid.

Study: Ram 2017, Bangladesh. *Trial registered*

		Comments
Methods	Cluster-RCT Method of allocation sequence: Assignment table Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[22] Blinding: not possible Inclusion of participants in the analysis: Information provided on censored participants. Analysis conducted using Intention-to-treat Length of follow-up: About 6 weeks Cluster-adjustment method: log binomial regression, accounting for repeated measures at caregiver level to adjust standard errors	
Participants	Number: 253 women (including 127 intervention and 126 control) Inclusion criteria: primiparous women not enrolled other in any study, and with due date between December 1st 2010 and December 1st 2011, planning to remain in study area for a minimum of one month before and one month post delivery, with no other woman living in the same household having previously partaken in the study or qualitative study part in the neonatal period Exclusion criteria: not stated Age: Primiparous women (unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> Interactive approach 1. Discussions with mothers and family members so they identify their own perceived handwashing barriers, to then find behavioural solutions 2. Verbal reminders to wash hands and cue cards 3. Facilitate handwashing via the supply of handwashing stations and soap 4. Maternal and neonatal health counselling <u>Control</u> 1. Maternal and neonatal health counselling	
Outcomes	1. Structured observation of presence of water and soap at designated handwashing location 2. Observed HWWS behavioural outcome before breastfeeding, after faecal contact, after respiratory secretion contact, and before food preparation	- Structured observation only conducted at follow-up.

[8] 8. Ibid.

Notes	Location: Matlab, Bangladesh (rural) Duration: From October 2010 to at least October 2011

Study: Stanton 1987, Bangladesh. *Unknown trial registration status*

Methods	Cluster-RCT Method of allocation sequence: random number table Allocation concealment: unclear - *Comment*: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[23] Blinding: unspecified Inclusion of participants in the analysis: some information on attrition/exclusion provided. Length of follow-up: 2 weeks Cluster-adjustment method: unspecified. However, cluster sampling design taken into account when computing incidence rates of diarrhoea for intervention and control groups, by treating incidence rate for each community as single observation. We can assume that this was also applied to structured observation data.	Methods to analyse handwashing structured observation data not described
Participants	Number: 51 communities (with 25 handwashing and 26 control), with 1,923 households (937 intervention and 986 control) Inclusion criteria: geographically impoverished parts of urban Dhaka Exclusion criteria: not stated Age: families (unspecified)	
Interventions	Interventions (see Appendix 3.7 for detailed description): <u>Intervention</u> 1. Discussion 2. Demonstrations 3. Community planning and action planning 4. Posters, flexiplans, pictorial stories 5. Games 6. Basic primary health care services <u>Control</u> 1. Basic primary health care services	
Outcomes	<u>Handwashing-related</u> 1. Observed HWWS before food preparation	- Authors results different from reviewer's ones (Authors indicated evidence of an effect ($p<0.05$) whereas reviewer found weak evidence of an effect (P=0.049 and risk

[23] 8. Ibid.

		ratio's 95% confidence interval included 1).
Notes	Location: Dhaka, Bangladesh (urban) Duration: conducted from September 1984 to September 1985	

Appendix 3.7. Description of the included trials' handwashing interventions

Table 3.7.1. Description of included studies' interventions

Trial	Promotional activity	Classification	Intervention motive	Message content	Material provision	intervention intensity and duration
Biran 2009 IND	Intervention School visits (mothers and children) and opinion leaders' meetings 1. Flipchart 2. Glo Germ demonstration 3. Discussion and quiz 4. Children's rally 5. Games 6. Site clean-up 7. [Soap] wrapper redemption and prizes 8. Height and weight check 9. Songs, stories 10. Flag waving 11. Tree planting Control No intervention	Health	- Health	- HWWS after faecal contact and before eating or feeding a child	None	Low intensity: 4 visits over 8 weeks.
Biran 2014 IND	Intervention Community and school-based events 1. Animated film 2. Skits 3. Public pledging ceremonies 4. Posters 5. Intervention branded goods (e.g. badge, cut-out model of SuperAmma Control 1. Shortened intervention version after 6 months follow-up	Non-health motive	- Nurture - Disgust - Affiliation (social norms) - Status	- HWWS after faecal contact (i.e. defecation, cleaning a child's bottom) and before handling food (i.e. eating and food preparation)	None	- Low intensity: 4 days

Table 3.7.1. *(continued)*

Biswas 2012 BGD	Intervention (handwashing components) 1. Handwashing station supply (a stand, a bucket with tap, a basin, and a 1.5-liter plastic bottle to make soapy water). 2. Meetings 3. Flipcharts 4. Cue cards Control 1. No intervention	Health motive	- Health	- HWWS after defecation, cleaning a child's bottom and before food preparation	No, but participants taught how to make soapy water with 30-g packet of detergent	- Medium intensity: A minimum of two weekly visits over 13 months
Bowen 2013 PAK	Intervention Handwashing health education 1. Slide shows 2. Videos 3. Pamphlets 4. Supply of soap bars Control 1. Supply of children's books and school stationaries	Health motive	- Health	- HWWS after toilet use, before cooking, before eating or feeding an infant, and after cleaning a child's bottom	90-g soap bar resupplied accordingly during the course of the initial promotion	- Medium intensity: A minimum of two weekly visits over 8 months

Table 3.7.1. *(continued)*

Briceño 2017 TZA	<u>Intervention</u> Intensive social marketing intervention 1. Mass radio campaigns 2. Face-to-face interactions 3. Household visits 4. Travelling road shows 5. Entertaining performances 6. Distribution of promotional material 7. Handwashing promotion with women on days of market, pre-natal clinic visits', meetings in the village 8. Provision of technical assistance to build tippy taps <u>Control</u> No intervention	Health motive	- Health[1] -Aspiration	- HWWS after faecal contact (i.e. defecating, toileting, cleaning a child's bottom) and before handling food (before cooking, eating, serving food, breastfeeding)	None, but technical assistance to build tippy taps	- High intensity: daily for 2 years and 4 months (mass media and interpersonal intervention)
Burns 2018 ZAF	<u>Intervention</u> 1. Supply of colourful and translucent soap bar (Hope Soap©) with a toy embedded in the centre of the soap bar. 2. Provision of a single standard hygiene and health lesson. <u>Control</u> 1. Supply of bar soap more colourful than usual soap, with a toy supplied along side the soap bar. 2. Provision of a single standard hygiene and health lesson.	Non-health motive	- Play - Curiosity - Health	- HWWS after toilet use and before meals	Soap replenished every 2 weeks	Low intensity: 1 visit every 2 weeks over 7 weeks.

Table 3.7.1. *(continued)*

Chase 2012 VNM	Intervention Mass media campaign 1. TV ad (with proverbs and songs) 2. Posters 3. Paper handout 4. Intervention branded goods and with tagline (e.g. hand clappers, washcloths, and stickers) Interpersonal communication component (IPC) 1. Group meetings (with mothers of children under five years old, grandparents and women aged between 18 and 49 years old) 2. Market meetings 3. Household visits 4. Loudspeaker announcements 5. Women's Union club meetings 6. Cooking competition 7. HWWS festivals 8. Distribution of HWWS promotional materials and information at strategic locations in the village. Control Mass Media campaign-only (without IPC component) See above	Health motive	- Health - Nurture	- HWWS after faecal contact, before cooking and before feeding a child	None	Unclear: 3 months (frequency unknown)

Table 3.7.1. *(continued)*

Christensen 2015 KEN	Intervention 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap) Control 1. Child growth monitoring	Mixed emotion	- Health - Social norms - Aspiration - Disgust - Nurture	- HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child)	Handwashing stations supplies with limited quantity of small powdered soup packs for soapy water	- Low intensity: A minimum of 1 monthly visit over about 4 months.
Christensen 2015-2 KEN	Intervention 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap) Control 1. Child growth monitoring	Mixed emotion	- Health - Social norms - Aspiration - Disgust - Nurture	- HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child)	Handwashing stations supplies with limited quantity of small powdered soup packs for soapy water	- Low intensity: A minimum of 1 monthly visit over about 4 months.
Friedrich 2018 ZWE	Intervention Intervention directly targeting, indirectly targeting (via school children), or a combination of both, children's caregivers. Direct intervention 1. Community meetings (small drama performances, pledging, participation certificate distribution and handwashing self-monitoring calendar distribution) 2. Household visits (Planning when, where and how to wash hands; distribution of self-monitoring calendars to record when hands are	Health motive	- Health - Disgust	- HWWS after faecal contact (i.e. cleaning or using the toilets and cleaning a child's bottom) and food handling occasions (i.e. food preparation and eating).	None	- Low intensity: 1 week

	washed after key occasions) <u>Indirect intervention</u> 1. Classroom activities (health education on spread of diarrhoea, and mode of prevention, including oral-faecal route poster discussion, handwashing station maintenance, distribution of handwashing self-monitoring calendars controlled by teachers, handwashing pledging and posters design. 2. School events (Existing handwashing stations repair; design of new handwashing stations and soap dispensers; handwashing station maintenance). <u>Control</u> No intervention					

Table 3.7.1. *(continued)*

Gautam 2017 NPL	Intervention Promotion package made of 6 [community] events and 6 household visits 1. Games 2. Family drama 3. Peer review 4. Cookery demonstration 5. Glo Germ demonstration 6. Public pledging and display of 'ideal mothers' pictures 7. Declaration of safe food zone 8. Songs 9. Intervention branded goods (e.g. fan, badge, flags, bibs) Control No intervention	Non-health	- Disgust - Affiliation (social norms) - Nurture - Health	- HWWS before feeding a child and washing child's hands before eating - Using soap or ash to clean utensils to serve child's food - Storing food using tight lid and no visible dirt or flies in food - Thoroughly reheating stored food and at adequate temperature - Serving treated water to child	Plastic buckets for handwashing	- Low intensity: 6 community events, and 6 household visits implemented over 3 months
Greenland 2016 ZMB	Intervention 1. Radio adverts and call-in show 2. Role play 3. Skills demonstration 4. Strong emotion eliciting demonstrations (i.e. disgust and nurture) 5. Discussions 6. Quizzes 7. Video adverts 8. Dance 9. Giving of prize 10. Intervention branded goods (i.e. hats, banners, certificates, stickers, branded bus) Control 1. Standard care at clinics	Non-health	- Disgust - Nurture - Health - Social norms	- HWWS after faecal contact (i.e. toilet use and cleaning a child's bottom or disposing of a child's stool)) (primary) - HWWS combined (after faecal contact and before food-handling occasions) (secondary handwashing outcome) - Exclusive breastfeeding of infants (between 0 and 5 months) (primary) - Correct method to prepare oral rehydration solution (primary) - Use of zinc to treat childhood diarrhoea (primary)	None	- High intensity: with some intervention implemented daily over 6 months.

Table 3.7.1. *(continued)*

Guiteras 2016 BGD	Intervention Promotional meetings 1. Presentation with flipcharts 2. Disgust eliciting demonstrations *or* Germs transmission messages and link between handwashing and illness 3. Glo Germ *(disgust and shame arm-only)* 4. Plastic bottle supply with small detergent packs 5. Water chlorine treatment intervention Control 1. Water chlorine treatment intervention	1.Health 2. Non-health	1. - Disgust - Shame 2. Health	- HWWS after toilet use - Water chlorine treatment	Supply of plastic bottles with small detergent packs periodically resupplied over 4 months	- Low intensity: 3 promotional meetings (including 1 follow-up) over 4 months.
Langford 2013 NPL	Intervention 1. Intervention launch meetings; 2. Home visits; 3. Mother's group meetings; 4. Posters, drama performances, HW song, dancing; 5. Community events Control No intervention	Mixed motive[2]	- Health - Social norms - Comfort	HWWS after toilet use, after cleaning a child's bottom, before cooking, before eating, and before feeding a child	Supply of free bar soap every 2 weeks	- Unclear: daily visits at first, and then once a week over 6 months (unclear duration of each implementation schedules)
Luby 2009 PAK	Intervention Neighbourhood meetings 1. Slide shows, videotapes and pamphlets 2. Visits at least twice a week to reinforce intervention message 3. Soap supply Control 1. Supply of children's books and school stationaries	Health motive	- Health	- HWWS after defecation, after cleaning a child's bottom, before food preparation, before eating and before feeding a child	Soap supplied and replenished at least twice a week	- Medium intensity: A minimum of 2 weekly visits over 8 months

Table 3.7.1. *(continued)*

Luby 2010 BGD	Intervention Stages of change theory 1. Show summary findings of HWWS frequency at key occasions and petri dishes showing bacterial growth and no growth, and discussions about link between handwashing practices and child health 2. Bar soap or waterless hand sanitizer supply and demonstration on how to use it 3. Mothers' HWWS support group 4. Posters 5. Household stickers as social recognition prize Control No intervention	Health motive	- Health	- HWWS after defecation, after cleaning a child's bottom, before food preparation, before eating and before feeding a child, after sneezing, coughing, entering the compound from outside, and before and after hands came in contact with other person	Soap or hand sanitiser supplied and replenished throughout the intervention period	- Low intensity: 2 times a week for about a month (Initially 2 times a week for about two months. However, due to deviation from intervention protocol, the intervention was implemented again about 3 months post initial implementation).
Nicholson 2014 IND	Intervention Social marketing programme (in classrooms and home visits) 1. Soap supply (with Lifebuoy branding) 2. Health education 3. Environmental cues (wall hanger, danglers) 4. Rewards (coins, stickers, toy animals) 5. Songs, poems, stories Mother's help enlisted 2. Home visits 3. Parents' evenings 4. 'Good mums' club creation 5. Pledging (pledging (children and mothers) Control No intervention	Health motive	- Health - Social norms - Disgust	- HWWS after defecation, before handling food and during bathing	Supply of 5 bar soap replenished on presentation of soap empty wrappers	- High intensity: weekly visits for 41 weeks.

Table 3.7.1. *(continued)*

Parvez 2018 BGD	Intervention Interactive approach 1. Discussions with mothers on how to solve the issue of practicing the targeted behaviour 2. Storytelling, songs 3. Handwashing station delivery 4. Training on hardware maintenance Control No intervention	Health motive	- Health - Nurture - Social norms	- HWWS after toilets use, after cleaning a child's bottom, before handling food, before cooking, before eating, and before feeding a child	Handwashing station supply with soapy water bottle with regular supply of detergent sachets	- Medium intensity: 1 weekly visit for 6 months and every two weeks thereafter (unclear intervention length)
Ram 2017 BGD	Intervention Interactive approach 1. Discussions with mothers and family members so they identify their own perceived handwashing barriers, to then find behavioural solutions 2. Verbal reminders to wash hands and cue cards 3. Facilitate handwashing via the supply of handwashing stations and soap 4. Maternal and neonatal health counselling Control 1. Maternal and neonatal health counselling	Health motive	- Health[2] - Nurture	- HWWS after respiratory secretion contact, before umbilical cord care, before breastfeeding, after faecal contact and before food preparation	Handwashing station and soap supply (soap replenished throughout the neonatal period)	- Low intensity 4 visits including one with health-counselling only
Stanton 1987 BGD	Intervention 1. Discussion 2. Demonstrations 3. Community planning and action planning 4. Posters, flexiplans, pictorial stories 5. Games	Health motive	Health	- Handwashing before cooking - Defecating away from house and adequate site - Appropriate waste and faeces disposal	None	- Unclear: 8 weeks with periodic reinforcement visits thereafter (unclear for how long)

	6. Basic primary health care services <u>Control</u> 1. Basic primary health care services					

Appendix 3.8. Reviewer's risk of bias judgement for each included trial

Study: Biran 2009, India

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear	Quote: "The 10 study villages were stratified by size into two categories […], and then randomised within each stratum to intervention and control arm." Comment: Random sequence generation methods not specified
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[24].
Blinding of participants and personnel (performance bias)	High risk	Quote: "Subjects were told that routine domestic practices and child care were being observed". Comment: measures taken to blind participants. Unclear if personnel was blinded. However, due to the nature of the intervention, masking would not have been total possible.
Blinding of outcome assessment (detection bias)	High risk	Unspecified Quote: "The hygiene promotion intervention was delivered over a series of visits by an intervention team of two trained communicators from a marketing agency with experience of commercial soap marketing […]. The observations were carried out by female fieldworkers, 2 or 3 of whom were recruited from each study village […]." Comment: Unclear whether outcome assessors were masked. Intervention implementers and outcome assessors were distinct teams. Due to the nature of the intervention blinding of outcome assessors would not have been totally possible.
Incomplete outcome data (attrition bias)	Unclear	Comment: The authors did not provide enough information on attrition/exclusions to be able to judge the risk level.

[24] 8. Ibid.

Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias:	Low risk	Comment: No other bias detected.

Study: Biran 2014, India

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "14 villages (clusters) were selected by simple random sampling from a list of 57 that were eligible […] Random allocation was done by the study statistician in the UK using a random number generator in Microsoft Excel"
Allocation concealment (selection bias)	Low risk	Quote: See above Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [25]
Blinding of participants and personnel (performance bias)	High risk	Quote: "To minimise the effect of the presence of the observers on behaviour, observers and participant households were told that this was a study of domestic water use. Participants were not explicitly told that they were taking part in a study about handwashing. […]. For the 6-month observation, 15 participating households in each village were excluded at random and replaced with 10 new households selected at random […]. This procedure was done to study the potential for reactivity attributable to repeated observation […]. No further masking of participants or investigators was possible because of the nature of the intervention." Comment: Due to the nature of the intervention, masking of participants and personnel was not totally possible. However, efforts were taken towards that aim. Masking efforts would however be at high risk of being broken.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Outcomes were measured by observers who had no connection with the intervention. Observers were not told that the study was assessing an intervention and the intervention was never mentioned to the observers […]. A professional events management agency […] was engaged to deliver the intervention […]." Also see above quote. Comment: Efforts made to mask outcome assessors, and outcome assessors and intervention implementers were two separate teams. However, given the nature of the intervention, there is still a high risk that attempt at masking would be broken. Data collection tools do not seem to have contained masking items.

[25] 8. Ibid.

Incomplete outcome data (attrition bias)	Low risk	Comment: From the trial flow diagram, 104 (of 174) and 101 (of 171) households excluded at random in the intervention group and control group respectively. 140 new households included (70 households in each group). 1 household and 4 households unavailable for follow-up in the intervention group and control group respectively. The number of randomly excluded households and replacement households was comparable in both intervention groups. From the flow-diagram, all 14 villages were available and included in the analysis. Each village also seems to have received the intervention it was intended to receive.

Study: Biran 2014, India *(Continued)*

Selective reporting (reporting bias)	High risk	Quote: "At 6 months' follow-up, handwashing with soap at any key events had increased further in the intervention group (37% [SD 7]) but remained largely stable in the control group (6% [SD 3]) […], p=0.002, (figure 3); handwashing at other occasions followed the same pattern (data not shown) […]. The short intervention implemented in the control group achieved much the same increase in handwashing with soap when assessed at the 12-month visit […], (figure 3)." Comment: Intervention effect on primary outcome only reported by event at 6 weeks post intervention delivery, but not at 6 and 12 months post intervention delivery. The results are reported as faecal contact and food handling handwashing occasions combined for the latter follow-up points. However, we only used the 6-week follow-up data for the point estimate, as stated above.
Other bias	Low risk	No other bias detected.

Study: Biswas 2012, Bangladesh

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear	Quote: "[…] 90 clusters of almost 240,000 people in approximately 60,000 households were randomly assigned to the three study arms. Each study arm included 30 clusters." Comment: Random sequence generation methods not specified
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[26].
Blinding of participants and personnel (performance bias)	High risk	Unclear Comment: Blinding of participants and trial personnel not specified. However, due to the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	High risk	Unspecified Quote: "[…] a local non-governmental organization delivered the hand washing and household water treatment intervention to the Vaccine+HWT households through community hygiene promoters. […] Interviewers collected pre-intervention data on the presence of water and soap or soapy water from 400 households among the three study arms […]." Comment: Unclear whether outcome assessors were masked. Intervention implementers and outcome assessors were two distinct teams. Due to the nature of the intervention blinding of outcome assessors would not have been totally possible.
Incomplete outcome data (attrition bias)	Unclear	Quote: "We performed an intent- to- treat analysis, considering households to be from the Vaccine+HWT group if they were initially assigned to this group, even if they refused the hand washing supplies or missed any part of the hand washing intervention due to absence."

[26] 8. Ibid.

		Comment: The authors did not provide enough information on attrition/exclusions to be able to judge the risk level. Intention-to-treat analysis was used.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	High risk	Comment: The presence of water and soap at handwashing location used as proxy indicator to measure handwashing practices. The presence of handwashing supply does not guaranty actual change in HWWS practices.
		Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

Study: Bowen 2013, Pakistan

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The 49 clusters were listed in the order that they had been identified. Using a spreadsheet, the five study groups […] were assigned a computer generated random number. The five study groups were ordered according to their random number, and this order was consecutively and repetitively applied to the list of the 49 clusters." [27]
Allocation concealment (selection bias)	Low risk	Quote: See above Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[28]
Blinding of participants and personnel (performance bias)	High risk	Quote: "Health Oriented Preventive Education (HOPE) […] conducted the field-work […]. Fieldworkers arranged neighbourhood meetings during which they used slide shows, videos and pamphlets to educate participants […]." Comment: Masking of participants and personnel unspecified, but unlikely as intervention implementers and data assessors were the same team. Data collection tools do not seem to have contained masking items.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Although group allocation was not disclosed to fieldworkers during this study, some fieldworkers had been employed during the 2003 study and might have recalled the original study allocations." Comment: Proportion of fieldworkers who had partaken in intervention promotion and data collection in the 2003 study not provided. Data collection tools do not seem to have contained masking items.

[27] 10. Luby, S.P., et al., *Combining drinking water treatment and hand washing for diarrhoea prevention, a cluster randomised controlled trial.* Trop Med Int Health, 2006. **11**: p. 479-489.

[28] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

Study: Bowen 2013, Pakistan *(Continued)*

Incomplete outcome data (attrition bias)	Low risk	Quote: "Households who re-enrolled did not differ significantly on many key variables […] from those who declined re-enrolment or were lost to follow-up." Comment: From trial flow diagram, 123, 102 and 118 households excluded in the handwashing group, handwashing and water treatment group, and control group respectively, as children did not meet target age group anymore in 2009. Out of the 139, 164 and 164 households eligible in 2009 in the handwashing group, handwashing and water treatment group, and control group respectively, 32, 17 and 27 households were lost or declined follow-up respectively. No clusters were lost to follow-up. No key differences between households who agreed to re-enrolled in trial vs. those who did not.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	High risk	Comment: HWWS behavioural outcome measured using self-report known to be prone to over-reporting (social desirability bias)[29] Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

[29] 11. Contzen, N., S. De Pasquale, and H.J. Mosler, *Over-Reporting in Handwashing Self-Reports: Potential Explanatory Factors and Alternative Measurements.* Plos One, 2015. **10**, 12. Biran, A., et al., *Comparing the performance of indicators of hand-washing practices in rural Indian households.* Journal of Tropical Medicine and International Health, 2008. **13**: p. 278-285, 13. Curtis, V., et al., *Structured Observations of Hygiene Behaviors in Burkina-Faso - Validity, Variability, and Utility.* Bull World Health Organ, 1993. **71**: p. 23-32, 14. Watson, J.A., et al., *Does targeting children with hygiene promotion messages work? The effect of handwashing promotion targeted at children, on diarrhoea, soil-transmitted helminth infections and behaviour change, in low- and middle-income countries.* Tropical Medicine & International Health, 2017: p. 526-538.

Study: Briceño 2017, Tanzania

Risk of Bias

Bias	**Author's judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "The sample included 181 rural wards that were randomly assigned to 4 groups. […] The ward-level randomization was stratified by district and population size using STATA" Comment: Random sequence generation methods not specified, but as STATA was used for stratification, random sequence generation was probably done using the same statistical programme
Allocation concealment (selection bias)	Low risk	Unspecified Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [30]
Blinding of participants and personnel (performance bias)	High risk	Quote: "It was not possible to blind participants, although they were never told explicitly about the link between the survey and interventions, and any questions on program exposure were included only at the end of the survey. […] To mitigate enumerator bias, survey firms were never provided information on treatment status of participating wards […]." "Front-line activators (FLAs) [...] trained to visit households and conduct handwashing promotion events […]. FLAs were subsequently taught how to monitor hygienic practices in the village." [15] Comment: Due to the nature of the intervention, blinding was not possible. However, some measures taken to mask participants and personnel. No information provided as of how FLAs monitored hygienic practices. This information was only provided in a World Bank report and not the actual paper. It is unclear whether this may have jeopardised masking attempts. Data collection tools do not seem to have contained masking items.

[30] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

Study: Briceño 2017, Tanzania *(continued)*

Blinding of outcome assessment (detection bias)	High risk	Quote: "To mitigate enumerator bias, survey firms were never provided information on treatment status of participating wards. […] Masking was not possible due to the nature of the intervention, but enumerators played no part in the intervention and were blinded to treatment status." Comment: The impossibility of blinding due to the nature of the intervention is mentioned, but at the same time, the authors stated that outcome assessors were blinded to treatment status. No information is provided to explain how this was ensured. Outcome assessors and intervention implementers were two distinct teams. Data collection tools do not seem to have contained masking items.
Incomplete outcome data (attrition bias)	Low risk	Quote: "Of the 181 wards selected for the sample, 45 were assigned to handwashing, 44 to sanitation, 46 to the combined intervention and the remainder to control. According to administrative records, the implementing agency accidentally conducted handwashing promotion in one of the sanitation wards, resulting in actual delivery of TSSM only to 43 wards and combined TSSM and HWWS to 47 wards. […] While our main specification yields an ITT estimate, we show in the robustness checks […] that the results do not change signs, significance, or conclusions when using the randomized assignment as an instrumental variable for actual program implementation […]. All non-redistricted wards were available for follow-up."
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias: confounding bias	Low risk	Quote: "A baseline was commissioned in 2009 before the interventions began, but half way through the data collection it became clear that the survey firm was not able to deliver reliable data. […] The research team chose to focus resources on the endline […]. We find a statistically significant difference in 12 tests for balance at the 5% significance level. The expected number of "by-chance" imbalances from a random draw of 261 is 13, which suggests that this is well within the expected range. However, some concerns persist. Firstly, half (6) of the imbalances are found in the HWWS group, which is more likely to have a cement floor and piped water connection […] Finally, we run two robustness checks for all the results. The first includes control variables to reduce residual variance and account for any baseline imbalance. We use the variables found to be unbalanced across intervention groups."

Comment: Imbalances between HWWS intervention group and other trial arms. These were accounting for in the analysis.

Study: Burns 2018, South Africa

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "We randomised (1:1) to either HOPE SOAP© or the control soap at the household level (n = 203) using the statistical software package Stata 14" Comment: We assume that STATA was used to generate random numbers.
Allocation concealment (selection bias)	Low risk	Unspecified Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[31]
Blinding of participants and personnel (performance bias)	High risk	Quote: "The baseline and endline surveys were administered by an independent research team. […] These [subsequent] soap deliveries were conducted by an independent team (i.e. not the community workers) […]." Comment: Independent research team delivering soap and conducting baseline and endline surveys do not seem to have been blinded. However, they did not administer the snack test nor collected observed data on handwashing before meals. No information provided on masking of participants. Unclear whether participants were told to wash hands with soap at targeted key occasions, as part of the intervention. Due to the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	Low risk	Quote: "As it was impossible to completely blind community workers to the study group assignment […], we attempted to minimise non-blinding study in three ways. First, we stratified our randomisation by community workers to ensure that community workers had children in both treatment and control households. Measurement bias […] would therefore apply for both treatment and control households, and not influence findings on treatment effect. Second, community workers were under the impression that the study aimed to assess the impact of soap provision to households, rather than the impact of HOPE SOAP© relative to normal soap specifically. Third, all deliveries of soap were made in brown parcels, and deliveries of soap subsequent to the first delivery were made by an independent research team at a time when the community worker was not with households. This step aimed to keep group assignment as obscure as possible to the community workers, and minimise the salience of the study in their

[31] 8. Ibid.

			minds. […] The community worker offered a snack of crackers and jam to the children at the end of the home-visit and observed whether or not the children washed their hands unprompted before eating the snack." Comment: Considerable efforts made to mask outcome assessors. However, given the nature of the intervention, whilst the outcome assessors may not have been able to know the exact study aim, and did not partake in subsequent soap delivery, their impression that the study assessed the impact of soap delivery on households handwashing behaviour could still bias data collection (i.e. recording of positive handwashing outcomes due to knowledge of soap supply). Such measurement bias would however apply in both groups.

Study: Burns 2018, South Africa *(Continued)*

Incomplete outcome data (attrition bias)	Unclear	Comment: The authors did not provide information on attrition/exclusions; Intention-to-treat analysis not specified.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	Unclear	Quote: "[…] In almost all cases, sample attributes were balanced between the treatment and control group, with exceptions being […] children in treatment households [being] significantly more likely to be reported as having difficulty opening a tap [45% in treatment group vs. 30% in control group, p=0.03]. […] Additional controls included but not reported: female, age, household size, number of children in households (HH), asset ownership, piped water available in HH, HH limits water use; soap observed in HH; HH received hygiene training; caregiver depressed/anxious; child had difficulty opening tap; child cannot reach taps; child's hands too small for soap." Comment: Difficulty opening tap used for handwashing was reported as among handwashing hinderers. However, this covariate was among the reported list of covariates adjusted for in the analysis. Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

Study: Chase 2012, Vietnam

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear	Quote: "As a final step, the communes in each group of three were randomly assigned to one of three arms to account for the original design of the evaluation that comprised of two separate treatment arms. A total of 140 communes were assigned to treatment and 70 to control. " Comment: Random sequence generation methods not specified
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [32]
Blinding of participants and personnel (performance bias)	High risk	Comment: Unclear whether participants and personnel were blinded. No indication that data collection tools contained masking items. Given the nature of the intervention, masking would not have been possible.
Blinding of outcome assessment (detection bias)	High risk	Comment: Unclear whether outcome assessors were masked. Intervention implementers and outcome assessors were two different teams. No indication that data collection tools contained masking items. Given the nature of the intervention, masking would not have been possible.
Incomplete outcome data (attrition bias)	Low risk	Quote: "The study was able to successfully follow up over 94% of households across the three rounds of data collection, with no differential attrition found between treatment and control arms. […] We are able to assess the causal impact of the […] campaign by simply comparing average outcomes between those communes assigned to treatment to those communes assigned to control. This is what is known as the intention-to-treat parameter (ITT). […] We conduct mean comparison tests for those households that were included as replacement households during the follow-up survey […]. Several characteristics […] are higher in the control arm, suggesting that these household are somehow better off, at least along these dimensions. When we compare the entire endline sample (panel plus replacement) on characteristics presumably independent of treatment, we find there are still differences in livestock ownership and that control households are more likely to have access to an improved water source. While access to an improved water source is an important characteristic, it is over 95% for both groups and thus is not likely to help explain much of the variation in outcomes across

[32] 8. Ibid.

		households. Therefore, we maintain the full sample of panel plus replacement households in all models for estimation of impact. […] Between baseline and endline approximately 26% of primary caregivers changed. New caregivers are on average older, less educated and more likely to be male. […] Since the HWIPC intervention was targeted at caregivers, including grandparents, we leave these new caregivers in the sample for estimation of program impact on outcomes at the caregiver level but include a dummy in the adjusted models to indicate there has been a change in caregiver.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	Unclear	Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

Study: Christensen 2015, Bungoma, Kenya

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "[…] each village was assigned a randomly generated number using STATA.
Allocation concealment (selection bias)	Low risk	Quote: "Randomization and assignment of clusters to interventions were conducted by [the first author], who had no personal ties to any of the villages and had not seen any baseline data at the time of randomization." Comment: No allocation concealment. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [33]
Blinding of participants and personnel (performance bias)	High risk	Quote: "The nature of the interventions made blinding [of respondents and survey enumerators] impossible at follow-up […]. The pilot study was both implemented and evaluated by Innovations for Poverty Action (IPA) in Kenya […]. Health promoters also liaised with IPA to assist in replacing broken or stolen hardware […].""" Comment: Participants were not masked and could link outcome assessors to the intervention. No precision on blinding of personnel. However, given the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	High risk	Quote: See above Comment: Outcome assessors were not masked and at times were assisted by intervention implementers.
Incomplete outcome data (attrition bias)	Low risk	Quote: "[…] We were able to survey 436 (87%) [both trials sites combined, and 83% in Bungoma trial site] in repeated attempts at follow-up 6 months later. […] Attrition in most cases was caused by respondents moving to another village. […] We tested for differential attrition across treatment arms and found only limited evidence.[…] All analyses were conducted using the originally assigned intervention status (intention to treat). […] All households successfully found in follow-up were used in analysis." Comment: Per the trial flow diagram, 5 and 6 households in the hygiene and control groups respectively were lost to follow-up.

[33] 8. Ibid.

Selective reporting (reporting bias)	High risk	Quote: "Our primary outcomes were adoption indicators of improved WASH behaviours and all measured at the household level, but they were not pre-specified. […] In the hygiene arm, 66 percentage points more of the households had soap for handwashing (95% CI = 44–88 percentage points)." Comment: Primary outcomes not pre-specified. Also, in the text, authors only reported the results of one handwashing outcome vs. all outcomes measures used to report the effect of the intervention.
Other bias in favour or against intervention	High risk	Comment: HWWS behavioural outcome measured using self-report known to be prone to over-reporting (social desirability bias) [34]. Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

[34] 11. Contzen, N., S. De Pasquale, and H.J. Mosler, *Over-Reporting in Handwashing Self-Reports: Potential Explanatory Factors and Alternative Measurements.* Plos One, 2015. **10**, 12. Biran, A., et al., *Comparing the performance of indicators of hand-washing practices in rural Indian households.* Journal of Tropical Medicine and International Health, 2008. **13**: p. 278-285, 13. Curtis, V., et al., *Structured Observations of Hygiene Behaviors in Burkina-Faso - Validity, Variability, and Utility.* Bull World Health Organ, 1993. **71**: p. 23-32, 14. Watson, J.A., et al., *Does targeting children with hygiene promotion messages work? The effect of handwashing promotion targeted at children, on diarrhoea, soil-transmitted helminth infections and behaviour change, in low- and middle-income countries.* Tropical Medicine & International Health, 2017: p. 526-538..

Study: Christensen 2015, Kakamega, Kenya

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "[…] each village was assigned a randomly generated number using STATA.
Allocation concealment (selection bias)	Low risk	Quote: "Randomization and assignment of clusters to interventions were conducted by [the first author], who had no personal ties to any of the villages and had not seen any baseline data at the time of randomization." Comment: No allocation concealment. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [35]
Blinding of participants and personnel (performance bias)	High risk	Quote: "The nature of the interventions made blinding [of respondents and survey enumerators] impossible at follow-up […]. The pilot study was both implemented and evaluated by Innovations for Poverty Action (IPA) in Kenya […]. Health promoters also liaised with IPA to assist in replacing broken or stolen hardware […]." Comment: Participants were not masked and could link outcome assessors to the intervention. No precision on blinding of personnel. However, given the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	High risk	Quote: See above Comment: Outcome assessors were not masked and at times were assisted by intervention implementers.
Incomplete outcome data (attrition bias)	Low risk	Quote: "[…] We were able to survey 436 (87%) [both trials sites combined, and 89% in Kakamega trial site] in repeated attempts at follow-up 6 months later. […] Attrition in most cases was caused by respondents moving to another village. […] We tested for differential attrition across treatment arms and found only limited evidence.[…] All analyses were conducted using the originally assigned intervention status (intention to treat)" Comment: Per the trial flow diagram, 12, 13, and 7 households in the WASH, WASH and nutrition and control groups respectively were lost to follow-up.

[8] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

Selective reporting (reporting bias)	High risk	Quote: "Our primary outcomes were adoption indicators of improved WASH behaviours and all measured at the household level, but they were not pre-specified. […] In the combined treatment arms in Kakamega […], intervention households saw an increase in soap available for handwashing by 49 percentage points (95% CI = 38–61 percentage points)" Comment: Primary outcomes not pre-specified. Also, in the text, authors only reported the results of one handwashing outcome vs. all outcomes measures used to report the effect of the intervention.
Other bias in favour or against intervention	High risk	Comment: HWWS behavioural outcome measured using self-report known to be prone to over-reporting (social desirability bias) [36]. Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

[36] 11. Contzen, N., S. De Pasquale, and H.J. Mosler, *Over-Reporting in Handwashing Self-Reports: Potential Explanatory Factors and Alternative Measurements.* Plos One, 2015. **10**, 12. Biran, A., et al., *Comparing the performance of indicators of hand-washing practices in rural Indian households.* Journal of Tropical Medicine and International Health, 2008. **13**: p. 278-285, 13. Curtis, V., et al., *Structured Observations of Hygiene Behaviors in Burkina-Faso - Validity, Variability, and Utility.* Bull World Health Organ, 1993. **71**: p. 23-32, 14. Watson, J.A., et al., *Does targeting children with hygiene promotion messages work? The effect of handwashing promotion targeted at children, on diarrhoea, soil-transmitted helminth infections and behaviour change, in low- and middle-income countries.* Tropical Medicine & International Health, 2017: p. 526-538..

Study: Friedrich 2017, Tanzania

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Randomisation was done directly before the beginning of the campaign using the random number generator in Microsoft Excel, by a researcher not further involved in the study."
Allocation concealment (selection bias)	Low risk	Unspecified Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [37]
Blinding of participants and personnel (performance bias)	High risk	Quote: "Masking of participants was not possible, because the consent procedure required by the Medical Research Council of Zimbabwe included informing participants about the content of the study." Comment: No information provided on masking of study personnel.
Blinding of outcome assessment (detection bias)	High risk	Quote: "The community-based direct interventions were implemented by the staff of the local health centres, and the school-based interventions were implemented by teachers at the local primary school […]. Outcome variables were assessed at baseline and follow-up by trained local data collectors." Comment: No information provided on masking of outcome assessors. The latter were a separate team than intervention implementers. However, due to the nature of the intervention, blinding would not have been totally possible. Data collection tools do not seem to have contained masking items.
Incomplete outcome data (attrition bias)	Low risk	Quote: "Households that dropped out before the conclusion of the study showed similar socio-demographic characteristics and baseline values in outcomes to those households that remained in the study." Comment: Per the trial flow diagram, 52, 53, 32 and 41 households lost to follow up in the control, indirect intervention, direct intervention and combined intervention

[37] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

		group respectively. The authors reported no cluster lost to follow-up and all clusters received allocated intervention. All clusters and participants were included in the analysis.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias: confounding bias	High risk	Quote: "[…] With regards to the outcome variables, intervention groups were also similar at baseline, with the exception of handwashing frequency with soap, which was higher in the indirect and direct intervention groups than in the other two groups." Comment: The authors did not report adjusting for baseline imbalances in their analysis.

Study: Gautam 2017, Nepal

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear	Quote: "The clusters were then randomized into four intervention and four control clusters." Comment: Allocation methods not specified.
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [38]
Blinding of participants and personnel (performance bias)	High risk	Unspecified Comment: Unclear whether participants and personnel was blinded. However, due to the nature of the intervention total blinding of participants and personnel would not have been possible.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Observers were kept blind to the study objectives and had no role in the intervention." Comment: Authors specified that outcome assessors were masked, but did not specify how. Due to the nature of the intervention blinding of outcome assessors would not have been totally possible.
Incomplete outcome data (attrition bias)	Low risk	Comment: From the trial flow diagram, 2 households were lost to follow-up in the control group. No information provided on the households lost to follow-up. All clusters received the intervention they were intended to receive. No cluster was lost to follow-up.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias:	Low risk	Comment: No other bias detected.

[38] 8. Ibid.

Study: Greenland 2016, Zambia

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Clusters were randomly selected within three strata based on district in a 2:1:1 ratio […]. A statistician unrelated to the study allocated half of the clusters in each district to intervention or control using a random number table."
Allocation concealment (selection bias)	Low risk	Quote: "Randomisation was done before baseline data collection took place, but cluster allocation was concealed from the study team until after baseline data had been collected." Comment: Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [39]
Blinding of participants and personnel (performance bias)	High risk	Quote: "Participants could not be masked to the intervention." Comment: No precision on blinding of personnel. However, given the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Outcome assessors were not involved in delivering the intervention and were not informed where the intervention had taken place." Comment: Authors' comment seems to imply that outcome assessors knew an intervention was delivered and the intervention nature, but did not know where the intervention had been implemented. Given the nature of the intervention, masking would not have been totally possible.
Incomplete outcome data (attrition bias)	Low risk	Quote: "We compared outcomes on an intention-to-treat population between intervention and control groups […]." "Baseline and follow-up surveys were independent random samples, as caregivers of children eligible at baseline would not have all been eligible at follow-up. The follow-up sample excluded individuals who had moved into the area since baseline."

[39] 8. Ibid.

		Comment: Independent random samples used at baseline and follow-up in each study groups. No cluster was lost to follow-up, as reported in trial flow diagram.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias	Low risk	No other bias detected

Study: Guiteras 2016, Bangladesh

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "We allocated compounds to treatment arms using the optimal sequential method of Atkinson […]. STATA code is available from the authors upon request[40]." Comment: This implies that STATA was used for sequence generation.
Allocation concealment (selection bias)	Low risk	Quote: "Enumerators did not know which of several covariates they collected would be used as stratification variables, so they could not have anticipated which assignment any given compound would receive[41]." Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [42]
Blinding of participants and personnel (performance bias)	High risk	Quote: "To reduce the influence of the presence of an observer, the enumerator stated she was there to observe daily household activities, without mentioning hand washing specifically." Comment: Measures taken to blind participants. No information provided on blinding on personnel. However, given the nature of the intervention, masking would not have been totally possible.
Blinding of outcome assessment (detection bias)	High risk	Unspecified Comment: Unclear whether outcome assessors were masked. Intervention implementers and outcome assessors were distinct teams. Due to the nature of the intervention blinding of outcome assessors would not have been totally possible.
Incomplete outcome data (attrition bias)	Low risk	Quote: "Unless otherwise noted, estimates are intention to treat: while some compounds dropped out of the intervention during the free trial, they were surveyed and remain in the sample […]."

[40] 16. Guiteras, R.P., et al. *Testing disgust- and shame-based safe water and handwashing promotion in urban Dhaka, Bangladesh*. 2015. International Initiative for Impact Evaluation.
[41] 16. Ibid.
[42] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

		Comment: Number of compounds which dropout not provided. However, authors comments seem to suggest that these were included in the analysis, given data could be collected. Intention-to treat used to analyse data.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	Unclear	Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

Study: Langford 2013 Nepal

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The study was conducted in the 8 largest slums […], randomised to either intervention or control groups, on the basis of the most recent demographic data available." Comment: The authors did not provide enough information to be able to judge the risk level.
Allocation concealment (selection bias)	Low risk	Unspecified Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [43]
Blinding of participants and personnel (performance bias)	High risk	Quote: "The lead author (RL) conducted participant observation throughout this period, and led the intervention with the help of two research teams: one responsible for the intervention's design and implementation, the other responsible for survey evaluation. […] Mothers were informed that our observations focussed on their daily work, rather than hygiene. Post intervention, we chose not to repeat direct observations, due to likely 'reactivity' […]. The lead author conducted interviews […]." Comment: Personnel not blinded. Lead author took part in data collection and intervention implementation. Outcome assessors involved in intervention delivery. Some measures taken to blind participants. However, due to the nature of the intervention, and fieldworkers being involved in both intervention delivery and data collection, blinding is likely not to have been effective.
Blinding of outcome assessment (detection bias)	High risk	Quote: "To minimise bias, [fieldworkers] were never involved in any elements of the intervention programme." Comment: Outcome assessors not blinded. Data collection tools do not seem to have contained masking items.
Incomplete outcome data (attrition bias)	Unclear	Comment: The authors did not provide enough information on attrition/exclusions to be able to judge the risk level.

[43] 8. Ibid.

Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias:	High risk	Quote: "Our sample was small but comprised of all available mother/infant pairs" Comment: Sample size exhaustive but small. Study at unclear risk of Type I and Type II errors. HWWS behavioural outcome measured using self-report known to be prone to over-reporting (social desirability bias)[44]. The authors did not report the quantitative analysis methods, and clustering does not seem to have been accounted for.

[44] 11. Contzen, N., S. De Pasquale, and H.J. Mosler, *Over-Reporting in Handwashing Self-Reports: Potential Explanatory Factors and Alternative Measurements.* Plos One, 2015. **10**, 12. Biran, A., et al., *Comparing the performance of indicators of hand-washing practices in rural Indian households.* Journal of Tropical Medicine and International Health, 2008. **13**: p. 278-285, 13. Curtis, V., et al., *Structured Observations of Hygiene Behaviors in Burkina-Faso - Validity, Variability, and Utility.* Bull World Health Organ, 1993. **71**: p. 23-32, 14. Watson, J.A., et al., *Does targeting children with hygiene promotion messages work? The effect of handwashing promotion targeted at children, on diarrhoea, soil-transmitted helminth infections and behaviour change, in low- and middle-income countries.* Tropical Medicine & International Health, 2017: p. 526-538..

Study: Luby 2009, Pakistan.

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The 49 clusters were listed in the order that they had been identified. Using a spreadsheet, the five study groups were assigned a computer generated random number. The five study groups were ordered according to their random number, and this order was consecutively and repetitively applied to the list of the 49 clusters.[45]"
Allocation concealment (selection bias)	Low risk	Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once[46].
Blinding of participants and personnel (performance bias)	High risk	Quote: "Field workers arranged neighbourhood meetings in areas assigned to the soap and handwashing promotion intervention. Field workers used slide shows, videotapes, and pamphlets to illustrate health problems resulting from hand contamination and proper handwashing technique. […] Field workers encouraged participants to wet their hands, lather them completely with soap, and rub them together for 45 seconds." Comment: Masking of participants and personnel unspecified, but unlikely as, in the initial study, outcome assessors and intervention implementers were the same team.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Field workers were not formally blinded to the original intervention, because some of the fieldworker had worked on the earlier project"
Incomplete outcome data (attrition bias)	Low risk	Quote: "In August 2005, 577 households were re-enrolled in the follow-up evaluation. These 577 households were derived from 560 households from the original 810 enrolled (69%) […]. The 560 households that re-enrolled were similar to the 250 households that declined re-enrolment by household size, water supply, reported income, and amount spent on soap and water as measured in 2003. However, households that re-enrolled were more likely to have been assigned to the handwashing promotion with soap intervention during the randomized trial and were more likely to own a refrigerator and television." Comment: Although households were comparable in reported incomes, the authors reported that re-enrolled households were more likely to have been assigned to the

[45] 10. Luby, S.P., et al., *Combining drinking water treatment and hand washing for diarrhoea prevention, a cluster randomised controlled trial.* Trop Med Int Health, 2006. **11**: p. 479-489.

[46] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

		handwashing intervention group (34), to have higher ownership of refrigerators (27) and televisions (62), compared to households which declined re-enrolment (28, 17 and 52 respectively). Nevertheless, upon examining the reported data, the reviewers judged that the differences observed were relatively small.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against intervention	High risk	Comment: Several proxy indicators used to measure handwashing practices. Some of the handwashing practices proxy outcomes were measured using self-reporting. This measurement method is known to be prone to over-reporting[47]. Also, intervention implementers and outcome assessors were the same team, which increases even more the risk of social desirability bias. Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

[47] 11. Contzen, N., S. De Pasquale, and H.J. Mosler, *Over-Reporting in Handwashing Self-Reports: Potential Explanatory Factors and Alternative Measurements.* Plos One, 2015. **10**, 12. Biran, A., et al., *Comparing the performance of indicators of hand-washing practices in rural Indian households.* Journal of Tropical Medicine and International Health, 2008. **13**: p. 278-285, 13. Curtis, V., et al., *Structured Observations of Hygiene Behaviors in Burkina-Faso - Validity, Variability, and Utility.* Bull World Health Organ, 1993. **71**: p. 23-32, 14. Watson, J.A., et al., *Does targeting children with hygiene promotion messages work? The effect of handwashing promotion targeted at children, on diarrhoea, soil-transmitted helminth infections and behaviour change, in low- and middle-income countries.* Tropical Medicine & International Health, 2017: p. 526-538..

Study: Luby 2010, Pakistan

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "[…] The principal investigator (SL) listed the compound numbers in a spreadsheet and used a random number generator to assign each compound to one of three groups […]."
Allocation concealment (selection bias)	Low risk	Quote: See above Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [48]
Blinding of participants and personnel (performance bias)	High risk	Quote: "After completing structured observation and sample collections, field workers shared the summary findings […]. They discussed the relationship handwashing practice and child health […]. Field staff visited intervention compounds 2–3 times each week. They placed a sticker on the door of the individual households that used the most soap or waterless sanitizer in a compound to provide social recognition as a clean household. […] Because the implementation promotion materials and supplies were clearly visible, neither the intervention communities nor the fieldworkers were blinded to the intervention." Comment: Participants and fieldworkers not masked. Fieldworkers and intervention implementers were the same team. No indication provided on masking of trial personnel. However, masking would not have been totally possible due to the nature of the intervention.
Blinding of outcome assessment (detection bias)	High risk	See above Comment: Fieldworkers not masked. Fieldworkers and intervention implementers were the same team.
Incomplete outcome data (attrition bias)	Low risk	Quote: "All 30 compounds completed the study". Comment: No clusters lost to follow-up. No indication that each intervention was not delivered to the intended compounds.

[48] 8. Cochrane, *Assessing risk of bias in cluster-randomized trials*, in *Cochrane handbook for systematic reviews of interventions*, J.P. Higgins and S. Green, Editors. 2011.

Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias:	Low risk	Comment: No other bias detected.

Study: Nicholson 2014, India.

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "A coin toss was used to assign one community in each pair to intervention and one to control."
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [49]
Blinding of participants and personnel (performance bias)	High risk	Quote: "It was impossible to 'blind' either the participants or those responsible for data collection. We tried to reduce recording biases by appointing separate hygiene promotion and data collection teams. Further, data collectors were only assigned to one of the treatment groups." Comment: Due to the nature of the intervention, masking of participants and data collectors was not possible. Data collectors and intervention implementers were however distinct teams. Unspecified blinding of personnel, but unlikely given the nature of the intervention.
Blinding of outcome assessment (detection bias)	High risk	See quote above Quote: "Data collectors were independent of the behaviour change intervention. Each was assigned, exclusively, either to households in the intervention group or to control households." Comment: outcome assessors not blinded.
Incomplete outcome data (attrition bias)	Low risk	Quote: "To check for biases in the data caused by dropouts, we also report 'intention-to-treat' analyses which included all collected data." Comment: as per the trial flow diagram, during group allocation, in the intervention group (n=1,057 households), 72 did not receive the allocated intervention (40 were replaced due to safety reasons; 8 did not meet the inclusion criteria; 6 refused to participate, 9 left the area and 9 dropped out for other reasons. In the control group (n=1,057 households), 31 did not receive the allocated intervention (2 did not meet the inclusion criteria, 7 refused

[49] 8. Ibid.

		to participate, 19 left the area, and 3 had other reasons to drop out). At the follow-up, in the intervention group, n=179 stopped being part of the intervention (9 did not meet the inclusion criteria, 5 refused to participate, 160 left the are, 2 died, and 3 dropped out for other reasons). In the control group n=191 discontinued the intervention (4 did not meet the inclusion criteria, 4 declined to participate, 182 left the area, and 1 died). The analysis was both done per protocol (n=847 and n=833 in the intervention and control group respectively) and per intention-to-treat (n=1,025 and 1026 in the intervention and control group respectively). 1 household in the intervention group was excluded as it provided no data, and 2 households were excluded in the control group as they did not meet the inclusion criteria).
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour of the intervention	High risk	Comment: Empty soap wrappers were used as a proxy indicator of handwashing behaviour change. Due to the absence of masking, asking participants to show empty soap wrappers as handwashing proof in order to receive further soap supply would be highly prone to participants showing empty soap wrappers even though soap was not actually used for handwashing. Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

Study: Parvez 2018, Bangladesh

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Unclear	Quote: "We randomly allocated the clusters of each trial block to one of six interventions arms and retained two clusters as control." Comment: random sequence generation method not specified
Allocation concealment (selection bias)	Low risk	Quote: See above Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [50]
Blinding of participants and personnel (performance bias)	High risk	Comment: Masking of participants and personnel not specified. However, due to the nature of the intervention, it is unlikely that masking could have been totally enforced.
Blinding of outcome assessment (detection bias)	High risk	Quote: "[…] [Intervention implementers] did not collect any outcome measures, this was a separate team." Comment: Masking of outcome assessors not specified. Outcome assessors team distinct from intervention implementers' team. Due to the nature of the intervention, it is unlikely that masking could have been totally enforced. Data collection tools do not seem to have contained masking items.
Incomplete outcome data (attrition bias)	Unclear	Comment: No information provided on attrition/exclusion to allow judgement.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias in favour or against the intervention	Unclear	Comment: Sample size calculation methods for handwashing outcome (s) not presented. Study at unclear risk of Type I and Type II errors.

[50] 8. Ibid.

Study: Ram 2017, Bangladesh

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "We used block randomization, using blocks of 4, to randomize participants to either the intervention or control arm. A study team member not involved in day-to-day field operations constructed the assignment table."
Allocation concealment (selection bias)	High risk	Quote: See above Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [51]
Blinding of participants and personnel (performance bias)	High risk	Quote: "The field team leader consulted the assignment status to which the participant was allocated." Comment: Data personnel not masked. Masking unspecified for participants. However, due to the nature of the intervention, it is unlikely that participants could be blinded. Data collection tools do not seem to have contained masking items.
Blinding of outcome assessment (detection bias)	High risk	Quote: "Data collectors were not blinded to the assignment status of participants, since the intervention included various hardware [...] which were expected to be visible during the data collector's visit to the household". We trained female behaviour change communicators, who typically have […] experience in data collection, to implement the intervention." Comment: Outcome assessors not masked, but distinct from intervention implementers. Data collection tools do not seem to have contained masking items.
Incomplete outcome data (attrition bias)	Low risk	Quote: "We randomised 126 (49.8%) participants to the intervention arm and 127 (50.2%) to the control. One participant assigned to the intervention arm and two in the control arm were later found to be ineligible because another woman residing in the same household compound had previously been enrolled in the study; data collection was discontinued upon identification of the ineligibility criteria. Therefore, we analysed data from 125 women in each arm) […]."We used mixed linear regression to calculate the difference in the mean number of observed handwashing events between arms […], in an intent-to-treat analysis."

[51] 8. Ibid.

		Comment: From the trial flow diagram, in the intervention group, 4 participants censored in the intervention group (with 3 having moved out of the study area and 1 judged ineligible after consent); and 11 participants censored in the control group (with 9 having moved out of the study area and 2 judged ineligible after consent).
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias	Low risk	Comment: No other bias detected

Study: Stanton 1987, Bangladesh

Risk of Bias

Bias	Author's judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Within each stratum, one community was assigned to the intervention group and one to the control group with use of a random number table. For the one un-paired community, allocation was also random."
Allocation concealment (selection bias)	Low risk	Unclear Comment: This is a cluster trial. Lack of allocation concealment should not be an issue, given in CRCTs clusters are often randomised at once [52]
Blinding of participants and personnel (performance bias)	High risk	Unspecified Comment: Unclear whether participants and personnel were masked, and if fieldworkers and intervention implementers were distinct teams. Due to the nature of the intervention total blinding of participants and personnel would not have been possible.
Blinding of outcome assessment (detection bias)	High risk	Unspecified Comment: Unclear whether fieldworkers and intervention implementers were distinct teams. Due to the nature of the intervention total blinding of outcome assessors would not have been totally possible.
Incomplete outcome data (attrition bias)	Low risk	Quote: "Eight of the 255 selected families refused observation or emigrated before census, leaving 247 sentinel families at the outset of the study. If a family emigrated from a community and another family subsequently occupied the vacated residence, the new family was included in the study regardless of the date of in-migration […]. […] This eligibility procedure might have reduced the apparent efficacy of the intervention by including families that were absent for part or all of the major educational program […]. On the other hand, since behavioural observation before and after the intervention were used to assess whether the training had affected behaviours among those fully participating in the educational program, we did not include for behavioural observation any family that immigrated into the study area after the intervention had begun."

[52] 8. Ibid.

		Comment: Information provided on attrition. No indication that each intervention was not delivered to the intended recipients, or that there were clusters lost to follow-up.
Selective reporting (reporting bias)	Low risk	Comment: All pre-specified handwashing outcomes reported.
Other bias:	Low risk	Comment: No other bias detected.

Appendix 3.9. Individual studies' findings by handwashing outcome and intervention's motives *(as reported)*

Table 3.9.1. Individual health-motives interventions studies' findings by outcome *(as reported)*

Trial Country code	Cluster adjusted	Measured by	Outcome	Intervention	Control	Adjusted Risk Ratio (RR) (Random, 95% CI)
Occasion: HWWS combined (before handling food and after faecal contact)						
Biran 2009 IND	Yes	Outcome assessors conducted 3-hour structured observation of household members HWWS practices	Proportion of household members HWWS practices combined (after faecal contact and before handling food)	5%	6% p-value reported as no evidence of a difference	0.82 (0.51, 1.34)
Friedrich 2018 ZWE	Yes	Outcome assessors conducted 3-hour structured observation of mothers HWWS practices	Proportion of mothers HWWS practices combined (after faecal contact and before handling food)	19%	5% Assumed P=0.001	3.80 (1.70, 8.49)
Occasion: HWWS after toilet use						
Bowen 2013 PAK	Yes	Outcome assessors used a standardised questionnaire to record in each household a female adult self-reported HWWS practices	Proportion of respondents HWWS practices after toilets use.	HW 132/141 (94%) HW+ 154/160 (96%) Combined 286/301 (95%)	150/160 (94%)	1.01 (0.96, 1.07)

Table 3.9.1. *(continued)*

Guiteras 2016 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compound residents HWWS practices after toilets use	155/1160 (13%)	76/717 (11%)	1.26 (0.92, 1.73)
Parvez 2018 BGD	Yes	Outcome assessors conducted structured observation of pregnant women HWWS practices	Proportion of pregnant women HWWS practices after toilets use.	HW 18/27 (67%) HW+1 26/35 (74%) HW+2 20/30 (67%) Combined 64/92 (70%)	29%	2.42 (1.57, 3.74)
Luby 2010 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compounds residents HWWS practices after defecation	HW+soap 80/94 (85%) HW+sanitiser 61/95 (64%) Combined 141/189 (75%)	20/95 (21%)	3.54 (2.18, 5.76)

Table 3.9.1. *(continued)*

Occasion: HWWS after faecal contact						
Briceño 2017 TZA	Yes	Outcome assessors conducted 3-hour structured observation of caregivers HWWS practices	Proportion of caregivers HWWS practices after faecal contact (defecating; toileting; cleaning a child's post-toileting)	HW 25/253 (10%) HW+ 32/246 (13%) Combined 57/499 (11%)	30/239 (13%)	0.91 (0.55, 1.51)
Chase 2012 VNM	Yes	Outcome assessors asked participants to self-report their family members HWWS practices	Proportion of primary caregiver of oldest child under 2 years old HWWS practices after faecal contact (defecating, toileting, cleaning a child's bottom)	1457/2111 (69%)	713/1048 (68%)	1.01 (0.95, 1.08)
Ram 2017 BGD	Yes	Outcome assessors conducted 3-h structured observation of mothers HWWS practices	Proportion of mothers HWWS practices after faecal contact	33/242 (14%)	10/219 (5%)	2.99 (1.42, 6.30) (RR provided by authors)
Occasion: After cleaning a child's bottom						
Bowen 2013	Yes	Outcome assessors used a standardised questionnaire to record in each household a female adult self-reported HWWS practices	Proportion of respondents HWWS practices after cleaning a child's bottom	HW 48/141 (34%) HW+ 51/160 (32%) Combined 99/301 (33%)	37/160 (23%)	1.42 (0.96, 2.12)

Table 3.9.1. *(continued)*

Occasion: After cleaning a child's bottom						
Luby 2010 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compounds residents HWWS practices after cleaning a child's bottom	HW+soap 20/22 (91%) HW+sanitizer 11/26 (42%) Combined 31/48 (64%)	3/18 (14%)	4.52 (1.23, 16.65)
Parvez 2018 BGD	Yes	Outcome assessors conducted structured observation of pregnant women HWWS practices	Proportion of pregnant women HWWS practices after cleaning a child's bottom	HW 14/23 (61%) HW+1 24/35 (69%) HW+2 28/39 (72%) Combined 66/97 (68%)	18/69 (26%)	2.61 (1.56, 4.35)

Table 3.9.1. *(continued)*

Occasion: Before handling food						
Briceño 2017 TZA	Yes	Outcome assessors conducted 3-hour structured observation of caregivers HWWS practices	Proportion of caregivers HWWS practices before handling food	HW 15/504 (3%) HW+ 16/538 (3%) Combined 31/1042 3%	8/606 (1%)	2.25 (0.88, 5.77)
Occasion: Before cooking						
Bowen 2013	Yes	Outcome assessors used a standardised questionnaire to record in each household a female adult self-reported HWWS practices	Proportion of respondents HWWS practices before cooking	HW 120/141 (85%) HW+ 129/160 (81%) Combined 249/320 (78%)	109/160 (68%)	1.20 (1.03, 1.40) (RR provided by authors)
Chase 2012 VNM	Yes	Outcome assessors asked participants to self-report their family members HWWS practices	Proportion of primary caregiver of oldest child under 2 years old HWWS practices before cooking	730/2111 (35%)	325/1048 (31%)	1.12 (0.98, 1.27)

Table 3.9.1. *(continued)*

Occasion: Before cooking						
Luby 2010 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compounds residents HWWS practices before cooking	HW+soap 57/216 (26%) HW+sanitizer 22/250 (9%) Combined 79/387 (17%)	0/168 0%	57.32 (1.89, 1735.50)
Parvez 2018 BGD	Yes	Outcome assessors conducted structured observation of pregnant women HWWS practices	Proportion of pregnant women HWWS practices before cooking	HW 6/121 (5%) HW+1 9/104 (9%) HW+2 6/119 (5%) Combined 21/344 (6%)	1/186 (1%)	11.35 (0.99, 129.98)
Stanton 1987 BGD	Yes	Outcome assessors conducted 3 to 5-h structured observation of sentinel families HWWS practices	Proportion of sentinel families HWWS practices before food preparation	39/79 (49%)	25/75 (33%)	1.48 (0.92, 2.38)

Table 3.9.1. *(continued)*

Occasion: Before eating						
Luby 2010 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compounds residents HWWS practices before eating	HW+soap 84/318 (26%) HW+sanitizer 14/308 (5%) Combined 98/626 (16%)	0/264 0%	83.26 (2.80, 2471.96)
Parvez 2018 BGD	Yes	Outcome assessors conducted structured observation of pregnant women HWWS practices	Proportion of pregnant women HWWS practices before eating	HW 21/306 (7%) HW+1 34/300 (11%) HW+2 16/317 (5%) Combined 71/923 (8%)	4/546 (1%)	10.50 (3.09, 35.64)

Table 3.9.1. *(continued)*

Occasion: Before eating or feeding						
Bowen 2013	Yes	Outcome assessors used a standardised questionnaire to record in each household a female adult <u>self-reported</u> HWWS practices	Proportion of respondents HWWS practices before eating or feeding a child	HW 69/141 (49%) HW+ 83/160 (52%) Combined 152/301 (50%)	48/160 (30%)	1.70 (1.30, 2.10) (RR provided by authors)
Occasion: Before feeding a child						
Chase 2012 VNM	Yes	Outcome assessors asked participants to <u>self-report</u> their family members HWWS practices	Proportion of primary caregiver of oldest child under 2 years old HWWS practices before feeding a child	823/2111 (39%)	377/1048 36%	1.08 (0.96, 1.22)
Luby 2010 BGD	Yes	Outcome assessors conducted 5-hour structured <u>observation</u> of HWWS practices of compounds residents	Proportion of compounds residents HWWS practices before feeding a child	HW+soap 5/16 (31%) HW+sanitizer 1/13 (8%) Combined 6/29 (21%)	0/13 (0%)	9.58 (0.32, 290.06)

Table 3.9.1. *(continued)*

Parvez 2018 BGD	Yes	Outcome assessors conducted structured observation of pregnant women HWWS practices	Proportion of pregnant women HWWS practices before feeding a child	HW 26/161 (16%) HW+1 14/155 (9%) HW+2 10/190 (5%) Combined 50/506 (10%)	6/343 (2%)	5.65 (2.04, 15.66)
Ram 2017 BGD	Yes	Outcome assessors conducted 3-h structured observation of mothers HWWS practices	Proportion of mothers HWWS practices before breastfeeding	31/410 (8%)	6/396 (2%)	5.11 (1.89, 13.85)

Table 3.9.2. Individual non-health-motives interventions studies' findings by outcome *(as reported)*

Trial Country code	Cluster adjusted	Measured by	Outcome	Intervention	Control	Adjusted Risk Ratio (RR) (Random, 95% CI)
Occasion: HWWS combined (before handling food and after faecal contact)						
Biran 2014 IND	Yes	Outcome assessors conducted 3-hour structured observation of household members HWWS practices	Proportion of household members HWWS practices combined (after faecal contact and before handling food).	19%	4% P=0.005	4.75 (1.58, 14.24)
Greenland 2016 ZMB	Yes	Outcome assessors conducted 3-hour structured observation of HWWS practices of mothers of infants younger than 6 months	Proportion of targeted mothers HWWS practices combined (after faecal contact and before food-handling occasions)	76/694 (11%)	64/498 (13%)	0.85 (0.58, 1.25)
Occasion: HWWS after toilets use						
Guiteras 2016 BGD	Yes	Outcome assessors conducted 5-hour structured observation of HWWS practices of compounds residents	Proportion of compound residents HWWS practices after toilets use	165/1155 (14%)	76/717 (11%)	1.35 (0.99, 1.84)
Occasion: HWWS after faecal contact						
Biran 2014 IND	Yes	Outcome assessors conducted 3-hour structured observation of household members HWWS practices	Proportion of household members HWWS practices after faecal contact (i.e. defecation and cleaning a child's bottom)	28%	7% P=0.18	4.00 (0.52, 30.71)

Greenland 2016 ZMB	Yes	Outcome assessors conducted 3-hour structured observation of HWWS practices of mothers of infants younger than 6 months	Proportion of targeted mothers HWWS practices after faecal contact (i.e. toilets use and cleaning a child's bottom or disposing of a child's stool)	42/130 (32%)	36/128 (28%)	1.15 (0.73, 1.81)
Occasion: Before handling food						
Biran 2014 IND	Yes	Outcome assessors conducted 3-hour structured observation of household members HWWS practices	Proportion of household members HWWS practices after food handling (i.e. eating and food preparation)	17%	3% P=0.003	1.89 (1.33, 2.69)
Occasion: Before eating						
Gautam 2017 NPL	Yes	Outcome assessors conducted 4-hour structured observation of mothers HWWS practices	Proportion of child's HWWS before eating	80/120 (67%)	5/112 (4%)	15.60 (5.42, 44.92)
Burns 2018 ZAF	Yes	Outcome assessors conducted 'snack test' where they observed whether children washed hands before eating the snack they offered	Proportion of children handwashing practices before snack test	Adjusted odd ratio = 1.53 P=0.279 (results of both snack tests)		1.27 (0.84, 1.92)
Occasion: Before feeding a child						
Gautam 2017 NPL	Yes	Outcome assessors conducted 4-hour structured observation of mothers HWWS practices	Proportion of mothers HWWS practices before feeding a child	80/120 (67%)	6/117 (5%)	13.00 (4.96, 34.06)

Table 3.9.3. Individual mixed health and non-health-motives interventions studies' findings by outcome *(as reported)*

Trial Country code	Cluster adjusted	Measured by	Outcome	Intervention	Control	Adjusted Risk Ratio (RR) (Random, 95% CI)
Occasion: HWWS combined (before handling food and after faecal contact)						
Christensen 2015 KEN (Bungoma)	Yes	Outcome assessors conducted household surveys to collect residents self-reported HWWS practices	Proportion of household respondents HWWS practices combined (after faecal contact and before handling food)	18/28 (64%)	11/24 (46%)	1.40 (0.75, 2.63)
Christensen 2015 KEN (Kakamega)	Yes	Outcome assessors conducted household surveys to collect residents self-reported HWWS practices	Proportion of household respondents HWWS practices combined (after faecal contact and before handling food)	125/229 (55%)	41/94 (44%)	1.25 (0.91, 1.72)
Occasion: HWWS after toilets use						
Langford 2013 NPL	No/ unclear	Trial staff completed questionnaires with mothers self-reporting their HWWS practices	Proportion of mothers HWWS practices after toilets use	45/45 (100%)	39/43 (91%)	1.10 (0.34, 3.57)
Occasion: After cleaning a child's bottom						
Langford 2013 NPL	No/ unclear	Trial staff completed questionnaires with mothers self-reporting their HWWS practices	Proportion of mothers HWWS practices after cleaning child's bottom	45/45 (100%)	36/43 (84%)	1.19 (0.25, 5.71)
Occasion: Before cooking						
Langford 2013 NPL	No/ unclear	Trial staff completed questionnaires with mothers self-reporting their HWWS practices	Proportion of mothers HWWS practices before cooking	32/45 (71%)	1/43 (2%)	30.58 (2.85, 328.46)

Occasion: Before eating						
Langford 2013 NPL	No/ unclear	Trial staff completed questionnaires with mothers self-reporting their HWWS practices	Proportion of mothers HWWS practices before eating	27/45 60%	0/43 (0%)	52.56 (1.81, 1,530.20)
Occasion: Before feeding a child						
Langford 2013 NPL	No/ unclear	Trial staff completed questionnaires with mothers self-reporting their HWWS practices	Proportion of mothers HWWS practices before feeding a child	28/45 (62%)	8/43 (19%)	3.34 (1.49, 7.53)

Appendix 3.10. Summary of findings for the effect of handwashing interventions on HWWS practices by handwashing occasions, and by intervention motive

1. Summary of findings for the effect of handwashing interventions on HWWS practices after faecal contacts in general and by intervention motive

Population: Compound residents, mothers, women and 30 months<person<96 months, pregnant women in their second and third trimester, child caregivers, primiparous women, mothers of children under five years old and other caregivers of young children, such as grandparents, adults and children, mothers of infants less than 6 months.

Setting: Community-based and schools/clinics-based (as part of community-based intervention)

Intervention: Handwashing promotion

Comparison: No intervention or in one study [17], mass media campaign-only handwashing intervention

Occasion	Relative risk (Random, 95% CI)	*Minimum* No of participants (trials)	Quality of the evidence (GRADE)
1. Aggregated faecal-contact related occasions			
1.1. Overall faecal contact-related occasions (after toilet use and after cleaning a child's bottom) Collected using structured observation and self-report	1.39 (1.20, 1.60)	3,116 HH (10 trials)	**Very low**[1,2,3,4,5]
Overall faecal contact-related occasions (after toilet use and after cleaning a child's bottom) *Restricted to structured observation*	1.80 (1.32-2.46)	2,567 HH (8 trials)	**Very low**[1,2,3,4,5]
Health-motive intervention Collected using structured observation and self-report	1.57 (1.26-1.94)	2,307 HH (7 trials)	**Very low**[1,2,3,4,5]
Health-motive intervention *Restricted to structured observation*	1.90 (1.29-2.78)	1,846 HH (6 trials)	**Very low**[1,2,3,4,5]
Emotion-motive intervention Collected using structured observation	1.38 (1.02-1.87)	721 HH (3 trials)	**Very low**[1,2,3,5,6]
Mixed-motive intervention Collected using self-report	1.14 (1.04-1.24)	88HH (1 trial)	**Very low**[3,5,6,9]

2. Disaggregated faecal-contact related occasions			
1.2. Toilets use Collected using structured observation and self-report	1.44 (1.14-1.81)	818 HH (5 studies)	**Very low**[1,2,3,4,5]
Toilets use *Restricted to structured observation*	1.89 (1.21-2.96)	269 HH (3 trials)	**Very low**[1,2,3,5,6]
Health-motive intervention Collected using structured observation and self-report	1.75 (1.03-2.99)	730 HH (4 trials)	**Very low**[1,2,3,4,5]
Health-motive intervention *Restricted to structured observation*	2.17 (1.16-4.04)	388 HH, 692 compounds residents (30 compounds) and 720 pregnant women clusters (3 trials)	**Very low**[2,3,5,6,10]
Emotion-motive intervention Collected using structured observation	1.35 (0.99-1.84)	Unclear (1 trial)	**Low**[3,5,6,10]
Mixed-motive intervention Collected using self-report	1.10 (0.98-1.24)	88 HH (1 trial)	**Very low**[3,5,6,9]
1.3. Cleaning a child's bottom Collected using structured observation and self-report	1.73 (1.11-2.69)	818 HH (4 studies)	**Very low**[1,2,3,4,5]
Cleaning a child's bottom *Restricted to structured observation*	2.81 (1.74-4.52)	269 HH (2 studies)	**Low**[3,5,6,7,8]
Health-motive intervention Collected using structured observation and self-report	2.15 (1.22-3.80)	730 HH (3 trials)	**Low**[2,3,4,5,8]
Health-motive intervention *Restricted to structured observation*	2.81 (1.74-4.52)	269 HH (2 studies)	**Low**[3,5,6,7,8]
Mixed-motive intervention Collected using self-report	1.19 (1.04-1.36)	88 HH (1 trial)	**Very low**[3,5,6,9]

1.4. Faecal-related contact Collected using structured observation	1.28 (0.85-1.92)	2,298 HH (5 trials)	**Very low**[1,2,3,4,5]
Health-motive intervention Collected using structured observation	1.24 (0.79-1.94)	1,577 HH (3 trials)	**Very low**[1,2,3,4,5]
Emotion-motive intervention Collected using structured observation	2.61 (0.50-13.61)	721 HH (2 trials)	**Very low**[1,2,3,5,11]

RR: risk ratio; **CI:** confidence interval, **HH:** household

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]**Downgraded by 2** for very serious risk of bias: All trials suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. Some studies also suffered from selection bias (i.e. [17-20]), reporting bias (i.e. [21]), other bias in favour or against the intervention (i.e. [17-19, 22, 23]).

[2]**Downgraded by 1** for serious inconsistency: We did not expect homogeneous effects across studies as human behaviour is complex and behaviour change tend to be dependent on psychological factors, social and environmental cues, among other elements[53]. It is thus difficult to predict how individuals will act in particular situations[54], even more so from one setting to the next. The interventions were also different between studies.

[3]No serious indirectness: The inclusion criteria restricted the studies setting to LMICs settings.

[4]No serious imprecision

[5]Publicatiom bias: Undetected

[6]**Downgraded by 1** for serious imprecision: The evidence is only based on a small number of studies (e.g. up to two trials), or on a small number of studies which are also small in size.

[7]No serious inconsistency

[8]**Downgraded by 1** for serious risk of bias: All trials suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. Some studies also suffered from selection bias (i.e. [17, 19, 20]), reporting bias (i.e. [21]), other bias in favour or against the intervention (i.e. [17, 19, 23]). **We only downgraded by 1, due to the large effect size observed.**

[9]**Downgraded by 2** for very serious risk of bias: Langford et al's study [18] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. The study also suffered from selection bias, and other bias in favour or against the intervention.

[53] 24. Kelly, M. and M. Barker, *Why is changing health-related behaviour so difficult?* Public health, 2016. **136**: p. 109-116.
[54] 24. Ibid.

[10]**Downgraded by 1** for serious risk of bias: Guiteras et al's study [23] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. The study was also at unclear of other bias in favour or against the intervention.

[11]**Downgraded by 2** for very serious imprecision: The confidence interval is substantially wide. Additionally, the evidence is only based on a small number of studies (e.g. up to two trials), or on a small number of studies which are also small in size.

2. Summary of findings for the effect of handwashing interventions on HWWS practices before food-related occasions in general and by intervention motive

Population: mothers, women and 30 months<person<96 months, pregnant women in their second and third trimester, child caregivers, primiparous women, mothers of children under five years old and other caregivers of young children, such as grandparents, adults and children, families, children aged 3 to 9 years old.

Setting: Community-based and schools-based (as part of community-based intervention)

Intervention: Handwashing promotion

Comparison: No intervention or in one study [17], mass media campaign-only handwashing intervention

Occasion	Relative risk (Random, 95% CI)	No of participants (trials)	Quality of the evidence (GRADE)
1. Aggregated food-handling related occasions			
1.1. Overall food-handling related occasions (before cooking, before eating, before feeding) Collected using structured observation and self-report	3.82 (2.56-5.70)	4,783 HH (11 trials)	**Low**[1,2,3,4,5]
Overall food-handling related occasions (before cooking, before eating, before feeding) *Restricted to structured observation*	4.38 (2.43-7.90)	4,234 HH (9 trials)	**Very low**[1,2,3,5,6]
Health-motive intervention Collected using structured observation and self-report	2.24 (1.58-3.19)	4,230 HH (7 trials)	**Low**[1,2,3,4,5]
Health-motive intervention *Restricted to structured observation*	3.87 (2.03-7.41)	3,769 HH (6 trials)	**Very low**[1,2,3,5,6]
Emotion-motive intervention Collected using structured observation	5.95 (2.38-14.85)	816 HH (3 trials)	**Very low**[1,2,3,5,6]
Mixed-motive intervention Collected using self-report	16.04 (2.10-122.77)	88HH (1 trial)	**Very low**[3,5,9,11]

2. Disaggregated food-handling related occasions			
1.2. Before cooking Collected through structured observation and self-report	2.84 (1.25-6.44)	3,341 HH (6 studies)	**Very low**[1,2,3,5,6]
Before cooking *Restricted to structured observation*	6.17 (0.70-54.42)	2,792 HH (4 trials)	**Very Low**[2,3,5,9,10]
Health-motive intervention Collected using structured observation and self-report	1.65 (0.91-3.02)	3,253 HH (5 trials)	**Very low**[2,3,4,5,10]
Health-motive intervention *Restricted to structured observation*	6.17 (0.70-54.42)	2,792 HH (4 trials)	**Very low**[2,3,5,9,10]
Mixed-motive intervention Collected using self-report	30.58 (4.37-214.07)	88 HH (1 trial)	**Very low**[3,5,9,11]
1.3. Eating Collected through structured observation and self-report	14.89 (3.99-55.52)	745 HH (5 studies)	**Very low**[1,2,3,5,9]
Eating *Restricted to structured observation*	9.12 (2.30-36.22)	657 HH (4 studies)	**Very low**[1,2,3,5,9]
Health-motive intervention Collected using structured observation	15.77 (3.15-79.02)	269 HH (2 trials)	**Very low**[1,2,3,5,9]
Emotion-motive intervention Collected using structured observation	4.37 (0.34-55.78)	468 HH (2 trials)	**Very Low**[2,3,5,9,10]
Mixed-motive intervention Collected using self-report	52.56 (14.70-187.91)	88 HH (1 trial)	**Very low**[3,5,9,11]
1.4. Before feeding a child Collected using structured observation and self-report	3.69 (1.58-8.60)	1,449 HH (6 trials)	**Very low**[1,2,3,5,6]
Before feeding a child *Restricted to structured observation*	4.06 (1.34-12.33)	1,361 HH (5 trials)	**Very low**[1,2,3,5,6]
Health-motive intervention Collected using structured observation	3.30 (1.05-10.33)	1,122 HH (4 trials)	**Very low**[1,2,3,5,6]
Emotion-motive intervention	13.46 (1.50-120.93)	239 HH (1 trial)	**Very low**[3,5,9,12]

Collected using structured observation			
Mixed-motive intervention	3.34 (1.72-6.51)	88 HH	**Very low**[3,5,6,11]
Collected using self-report		(1 trials)	
1.5. Before handling food	3.36 (1.37-8.27)	1,072 HH	**Very low**[1,3,5,7,8]
Collected using structured observation		(2 trials)	
Health-motive intervention	2.25 (0.88-5.77)	724 HH	**Low**[3,5,8,13]
Collected using structured observation		(1 trial)	
Emotion-motive intervention	5.70 (1.79-18.11)	348 HH	**Very low**[3,5,8,14]
Collected using structured observation		(1 trial)	
1.6. Before feeding/eating	1.70 (1.24-2.33)	461 HH	**Very low**[3,5,6,15]
Collected using self-report		(1 trial)	

RR: risk ratio; **CI:** confidence interval, **HH:** household

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]**Downgraded by 1** for very serious risk of bias: All trials suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. Some studies also suffered from selection bias (i.e. [17-20]), attrition bias (i.e. [25], reporting bias (i.e. [21]), other bias in favour or against the intervention (i.e. [17-19, 22] [25]). **We only downgraded by 1, due to the large effect size observed.**

[2]**Downgraded by 1** for serious inconsistency: We did not expect homogeneous effects across studies as human behaviour is complex and behaviour change tend to be dependent on psychological factors, social and environmental cues, among other elements[55]. It is thus difficult to predict how individuals will act in particular situations[56], even more so from one setting to the next. The interventions were also different between studies.

[3]No serious indirectness: The inclusion criteria restricted the studies setting to LMICs settings.

[4]No serious imprecision

[5]Publicatiom bias: Undetected

[6]**Downgraded by 1** for serious imprecision: The confidence interval is substantially wide; or the evidence is only based on a small number of studies (e.g. up to two trials), or of a small number of studies which are also small in size.

[7]No serious inconsistency

[8]**Downgraded by 1** for serious imprecision: The confidence interval is substantially wide. Moreover, the evidence is only based on a small number of studies (e.g. up to two trials), or on a small number of studies which are also small in size.

[55] 24. Ibid.
[56] 24. Ibid.

[9]**Downgraded by 2** for very serious imprecision: The confidence interval is extremely wide. Additionally, the evidence is only based on a small number of studies (e.g. up to two trials), or on a small number of studies which are also small in size.

[10]**Downgraded by 2** for very serious risk of bias: All trials suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. Some studies also suffered from selection bias (i.e. [17-20]), reporting bias (i.e. [21]), other bias in favour or against the intervention (i.e. [17-19, 22, 23])

[11]**Downgraded by 2** for very serious risk of bias: Langford's study [18] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. The study also suffered from selection bias, and other bias in favour or against the intervention.

[12]**Downgraded by 1** for serious risk of bias: Gautam et al's study [26] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded.

[13]**Downgraded by 1** for serious risk of bias: Briceño et al's study [27] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded.

[14]**Downgraded by 2** for very serious risk of bias: Biran et al's study [21] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. The study also suffered from reporting bias.

[15]**Downgraded by 2** for very serious risk of bias: Bowen et al's study [22] suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. The study also suffered from other bias in favour or against the intervention

3. Summary of findings for the effect of handwashing interventions on HWWS practices after faecal contact and before food-related occasions aggregated

Population: Child's primary caregiver, pregnant women in their second or third trimester, and caregivers of 3-month-old children, caregivers of children aged 4 to 16 months, mothers and children aged 8 to 13 years old, adults and children, mothers of infants less than 6 months.

Setting: Community-based and schools/clinics-based (as part of community-based intervention)

Intervention: Handwashing promotion

Comparison: No intervention

Occasion	Relative risk (Random, 95% CI)	No of participants (trials)	Quality of the evidence (GRADE)
1.1. Faecal contact and food-related occasions aggregated Collected using structured observation and self-report	1.46 (0.94, 2.29)	1,229 HH (4 trials)	**Very low**[1,2,3,4,5]
Faecal contact and food-related occasions aggregated *Restricted to structured observation*	1.75 (0.39-7.83)	888 HH (2 trials)	**Very low**[1,2,3,5,8]
Health-motive intervention Collected using structured observation	1.75 (0.39-7.83)	888 HH (2 trials)	**Very low**[1,2,3,5,8]
Mixed-motive intervention Collected using self-report	1.29 (1.15-1.45)	341 HH (2 trials)	**Very low**[1,3,5,6,7]

RR: risk ratio; **CI:** confidence interval, **HH:** household

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]**Downgraded by 2** for very serious risk of bias: All trials suffered from serious risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be totally blinded. Some studies also suffered from selection bias (i.e. [28]), attrition bias (i.e. [28]), reporting bias (i.e. [29]), other bias in favour or against the intervention (i.e. [29, 30]).

[2]**Downgraded by 1** for serious inconsistency: We did not expect homogeneous effects across studies as human behaviour is complex and behaviour change tend to be dependent on psychological factors, social and

environmental cues, among other elements[57]. It is thus difficult to predict how individuals will act in particular situations[58], even more so from one setting to the next. The interventions were also different between studies.

[3]No serious indirectness: The inclusion criteria restricted the studies setting to LMICs settings.

[4]No serious imprecision

[5]Publicatiom bias: Undetected

[6]**Downgraded by 1** for serious imprecision: The confidence interval is substantially wide; or the evidence is only based on a small number of studies (e.g. up to two trials), or of a small number of studies which are also small in size.

[7]No serious inconsistency

[8]**Downgraded by 1** for serious imprecision: The confidence interval is substantially wide. Moreover, the evidence is only based on a small number of studies (e.g. up to two trials), or on a small number of studies which are also small in size.

[57] 24. Ibid.
[58] 24. Ibid.

4. Summary of findings for the effect of handwashing interventions on HWWS practices after faecal contact and before food-related occasions from studies using proxy indicators

Population: Mothers of households and persons > 30 months of age

Setting: Community

Intervention: Handwashing-alone and handwashing combined with water treatment

Comparison: No intervention

Occasion	Relative risk (Random, 95% CI)	No of participants (trials)	Quality of the evidence (GRADE)
After toilets use		577 HH	**Very low**[1,2,3,4,5]
Collected through a mix of structured observation and self-report *(proxies)*	.	(1 trial)	
After cleaning a child's bottom		577 HH	**Very low**[1,2,3,4,5]
Collected through a mix of structured observation and self-report *(proxies)*	.	(1 trial)	
Before cooking		577 HH	**Very low**[1,2,3,4,5]
Collected through a mix of structured observation and self-report	.	(1 trial)	
Before eating		577 HH	**Very low**[1,2,3,4,5]
Collected through a mix of structured observation and self-report	.	(1 trial)	
Before feeding a child		577 HH	**Very low**[1,2,3,4,5]
Collected through a mix of structured observation and self-report	.	(1 trial)	

RR: risk ratio; **CI:** confidence interval, **HH:** household

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]Only proxy indicators (i.e. presence of water and soap at handwashing locations, soap ownership, proper handwashing techniques, and soap purchase) were used to measure handwashing practices. Luby et al (2009)

found evidence that when the intervention was on-going and with soap supply, there were indications that handwashing had increased in the intervention group. However, at the 18 months follow-up, this was no longer the case.

[2] **Downgraded by 2** for serious risk of bias: Luby et al's study [31] was at high risk of performance and detection bias. Due to the nature of the intervention, study participants, personnel and outcome assessors could not be blinded. Data collectors and intervention implementers were the same team. The study was also at high risk of social desirability bias. Some of the handwashing practices proxy outcomes were measured using self-reporting. This measurement method is known to be prone to over-reporting [11-14]. The trial was also at unclear risk of other bias in favour or against the intervention.

[3]No serious indirectness: The inclusion criteria restricted the studies setting to LMICs settings.

[4]**Downgraded by 2** for very serious imprecision: We chose to downgrade by 2 points, due to the use of proxy indicators to measure handwashing practices. Additionally, the evidence is only based on a small number of studies (e.g. up to two trials).

[5]Publicatiom bias: Undetected

Population: Five years old children attending first grade in primary school, and compounds residents

Setting: Community

Intervention: Handwashing promotion

Comparison: Control/no intervention and Vaccine-only intervention

Occasion	Relative risk (Random, 95% CI)	No of participants (trials)	Quality of the evidence (GRADE)
After defecation			
Measured through collecting empty soap wrappers to estimate quantity of soap used (1) and observed presence of water and soap at handwashing location (1)	.	2,555 HH (2 trial)	**Very low**[1,2,3,4,5]
Before handling food		2,155 HH	**Very low**[1,2,3,4,5]
Measured through collecting empty soap wrappers to estimate quantity of soap used	.	(1 trial)	
Before cooking	.	400 HH	**Very low**[1,2,3,4,5]
Measured through observing the presence of water and soap at handwashing location		(1 trial)	

RR: risk ratio; **CI:** confidence interval, **HH:** household

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]Only proxy indicators (i.e. weighing soap wrappers in Nicholson et al' study [32] and/or presence of water and soap at handwashing location in Biswas' study [33]) was used to measure handwashing practices. In Nicholson et al's [32] trial, the median soap consumption was estimated at 45 g per household per week (control group) compared to 235 g in the intervention group. Nicholson et al [32] concluded that the observed intervention effect on the health outcomes may have been mediated by soap use (and thus handwashing behaviour change). In Biswas' study, the presence of water and soap was 30% and 35% higher in the Vaccine+HW and water treatment intervention group compared to the control group and the vaccine-only intervention group respectively ($P<0.01$).

[2]**Downgraded by 2** for serious risk of bias: The trials were at high risk of performance and detection bias. Due to the nature of the interventions, study participants, personnel and outcome assessors could not be blinded. The studies were also at high risk of response bias. In Nicholson et al's trial [32], the authors used the collection of empty soap wrappers from the soap supplied, to evaluate soap consumption as a proxy for handwashing behaviour change, and replenish soap. In the absence of masking and knowledge that fee soap would be supplied, this makes this outcome measure method highly prone to bias in favour of the intervention. In Biswas' trial [33], the absence of masking could lead participants to replenish the HWS, but without actual behaviour practice. The trials were also at unclear risk of other bias in favour or against the intervention

[3]No serious indirectness: The inclusion criteria restricted the studies setting to LMICs settings.

[4]**Downgraded by 2** for very serious imprecision: We chose to downgrade by 2 points, due to the use of proxy indicators to measure handwashing practices. Additionally, the evidence is only based on a small number of studies (e.g. up to two trials).

[5]Publicatiom bias: Undetected

Appendix 4.1. Description of Handwashing interventions using social norms

Table 4.1.1: Description of handwashing interventions using social norms

Trial	Promotional activity	Classification	Intervention motive	Message content	Material provision	intervention intensity and duration
Biran 2014 IND	Intervention Community and school-based events 1. Animated film 2. Skits 3. Public pledging ceremonies 4. Posters 5. Intervention branded goods (e.g. badge, cut-out model of SuperAmma Control 1. Shortened intervention version after 6 months follow-up	Non-health motive	- Nurture - Disgust - Affiliation (social norms) - Status	- HWWS after faecal contact (i.e. defecation, cleaning a child's bottom) and before handling food (i.e. eating and food preparation)	None	- Low intensity: 4 days
Christensen 2015 KEN	Intervention 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap) Control 1. Child growth monitoring	Mixed emotion	- Health - Social norms - Aspiration - Disgust - Nurture	- HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child)	Handwashing stations supplies with limited quantity of small powdered soup packs for soapy water	- Low intensity: A minimum of 1 monthly visit over about 4 months.
Christensen 2015-2 KEN	Intervention 1. Songs 2. Interactive games 3. Visual aids (i.e. cue cards, calendars, picture sheet) 4. Handwashing station supply (tippy-tap) Control 1. Child growth monitoring	Mixed emotion	- Health - Social norms - Aspiration - Disgust - Nurture	- HWWS combined (after defecation, after cleaning a child's bottom, before eating, before food preparation, and before feeding a child)	Handwashing stations supplies with limited quantity of small powdered soup packs for soapy water	- Low intensity: A minimum of 1 monthly visit over about 4 months.

Gautam 2017 NPL	<u>Intervention</u> Promotion package made of 6 [community] events and 6 household visits 1. Games 2. Family drama 3. Peer review 4. Cookery demonstration 5. Glo Germ demonstration 6. Public pledging and display of 'ideal mothers' pictures 7. Declaration of safe food zone 8. Songs 9. Intervention branded goods (e.g. fan, badge, flags, bibs) <u>Control</u> No intervention	Non-health	- Disgust - Affiliation - Nurture - Health	- HWWS before feeding a child and washing child's hands before eating - Using soap or ash to clean utensils to serve child's food - Storing food using tight lid and no visible dirt or flies in food - Thoroughly reheating stored food and at adequate temperature - Serving treated water to child	Plastic buckets for handwashing	- Low intensity: 6 community events, and 6 household visits implemented over 3 months
Greenland 2016 ZMB	<u>Intervention</u> 1. Radio adverts and call-in show 2. Role play 3. Skills demonstration 4. Strong emotion eliciting demonstrations (i.e. disgust and nurture) 5. Discussions 6. Quizzes 7. Video adverts 8. Dance 9. Giving of prize 10. Intervention branded goods (i.e. hats, banners, certificates, stickers, branded bus) <u>Control</u> 1. Standard care at clinics	Non-health	- Disgust - Nurture - Health	- HWWS after faecal contact (i.e. toilet use and cleaning a child's bottom or disposing of a child's stool)) (primary) - HWWS combined (after faecal contact and before food-handling occasions) (secondary handwashing outcome) - Exclusive breastfeeding of infants (between 0 and 5 months) (primary) - Correct method to prepare oral rehydration solution (primary) - Use of zinc to treat childhood diarrhoea (primary)	None	- High intensity: with some intervention implemented daily over 6 months.

Description of handwashing interventions using social norms *(continued)*

Guiteras 2016 BGD	<u>Intervention</u> Promotional meetings 1. Presentation with flipcharts 2. Disgust eliciting demonstrations *or* Germs transmission messages and link between handwashing and illness 3. Glo Germ *(disgust arm-only)* 4. Plastic bottle supply with small detergent packs 5. Water chlorine treatment intervention <u>Control</u> 1. Water chlorine treatment intervention	Non-health	- Disgust - Shame	- HWWS after toilet use - Water chlorine treatment	Supply of plastic bottles with small detergent packs periodically resupplied over 4 months	- Low intensity: 3 promotional meetings (including 1 follow-up) over 4 months.
Langford 2013 NPL	<u>Intervention</u> 1. Intervention launch meetings; 2. Home visits; 3. Mother's group meetings; 4. Posters, drama performances, HW song, dancing; 5. Community events <u>Control</u> No intervention	Mixed motive[2]	- Health - Social norms - Comfort	HWWS after toilet use, after cleaning a child's bottom, before cooking, before eating, and before feeding a child	Supply of free bar soap every 2 weeks	- Unclear: daily visits at first, and then once a week over 6 months (unclear duration of each implementation schedules)
Nicholson 2014 IND	<u>Intervention</u> Social marketing programme (in classrooms and home visits) 1. Soap supply (with Lifebuoy branding) 2. Health education	Health motive	- Health - Social norms - Disgust	- HWWS after defecation, before handling food and during bathing	Supply of 5 bar soap replenished on presentation of soap empty wrappers	- High intensity: weekly visits for 41 weeks.

3. Environmental cues (wall hanger, danglers)
4. Rewards (coins, stickers, toy animals)
5. Songs, poems, stories
Mother's help enlisted
2. Home visits
3. Parents' evenings
4. 'Good mums' club creation
5. Pledging (pledging (children and mothers)
Control
No intervention

Appendix 5.1. Observations grids

(All data collection tools are presented in French)

1. Handwashing structured observation grids

OUTIL (2) – GRILLE D'OBSERVATION

Nom de l'enquêteur : …… **Date : ……**

Période d'observation (Tranche horaire) : ……

Commune : …… **Quartier : ……**

Code Identifiant de la cours : …… **Code identifiant du Ménage : ……**

Lot :…….. **Ilot :……..**

……

Contexte : Cette enquête vise à observer les activités liées à l'eau, l'assainissement et l'hygiène du ménage, en vue d'une étude de Thèse de Doctorat de l'Ecole de Londres, d'hygiène et de Médicine Tropicale. Cette étude bénéficie de l'appuie de l'Agence Eau et Assainissement pour l'Afrique (EAA).

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Moments	**Personne**	**Action**	**Utilisation de l'eau**	**Type de savon utilisé**
☐ Avant de manger...1 ☐ Avant de nourrir un enfant (moins de 5 ans)……2 ☐ Avant de cuisiner...3 ☐ Apres l'utilisation des WC……4 ☐ Apres avoir nettoyé les fesses d'un enfant…5 ☐ Lavage des mains a un moment autre que ceux précisés ci-dessus.6	☐ Homme.....1 ☐ Femme.....2 ☐ Enfant (moins de 5 ans) F…….3 ☐ Enfant (moins de 5 ans) G……4 ☐ Enfant en âge d'être scolarisé (5 à 12 ans) F ….5 ☐ Enfant en âge d'être scolarisé (5 à 12 ans) G …6	☐ Mains non lavées ……..1 ☐ Une main lavée ……..2 ☐ Deux mains lavées……3 ☐ Mains lavées et Ablution (ex. bras, jambes, pieds)……4 ☐ Ne sais pas.9	☐ Non applicable….1 ☐ Pas d'eau utilisée…….2 ☐ Eau simple……..3 ☐ Eau ET Savon……4	☐ Non applicable….1 ☐ Savon barre……..2 ☐ Savon en poudre……..3 ☐ Savon liquide……..4

2. Compound's water, sanitation and handwashing observation grid

GRILLE D'OBSERVATION de l'ENVIRONNEMENT

Nom de l'enquêteur : …… **Date : ……**

Période d'observation (Tranche horaire) : ……

Commune : …… **Quartier : ……**

Lot :…….. **Ilot :……..**

1. Utilisation de l'eau		**Observations**	**Consignes**
1.1. Est-ce qu'il y'a de l'eau stockée dans la cour ?	Oui……☐……1 Non……☐……2		
1.2. Décrivez le(s) type(s) de récipient(s) de stockage de l'eau	Seau……☐……1 Bidon……☐……2 Bassine……☐……3 Barique……☐……4 Séridaca/bouilloire……☐…5 Autre……☐……6 N/A……☐……99		**- Plusieurs réponses possibles !** **- Si Autre, précisez !**
1.3. Le(s) récipient(s) de stockage de l'eau est/sont –il(s) couvert(s) ?	Oui……☐……1 Non……☐……2 Certains……☐……3		
1.4. Observez et précisez le type(s) d'activité(s) pour laquelle/lesquelles l'eau du/des récipients COUVERT(S) est utilisée	Cuisine……☐……1 Boire……☐……2 Se doucher……☐…3 Lessive/vaisselle……☐…4 Laver les mains……☐…5 Autre……☐……6		**- Plusieurs réponses possibles !** **Si Autre, Précisez !**

1.5. Observez et précisez le type(s) d'activités pour laquelle/lesquelles l'eau des récipients NON-COUVERTS est utilisée	Cuisine……☐..1 Boire……☐……..2 Se doucher……☐……3 Lessive/vaisselle…☐……4 Laver les mains……☐……5 Autre……☐……..6	**- Plusieurs réponses possibles !** **Si Autre, Précisez !**
2. Lavage des mains		
2.1. Précisez a quelle(s) occasion(s) vous avez aperçu du savon être utilisé par un membre de la cour	Lessive……☐……..1 Vaisselle……☐……2 Douche……☐……..3 Lavage des mains…☐……4 Autre……☐……..5	**- Plusieurs réponses possibles !** **Si Autre, Précisez !**
2.2. Y-a-t-il un lieu précis dans la cour ou les ménages se lavent les mains ?	Oui……☐……..1 Non……☐……..2	
2.3. Ou se situe le/les lieu(x) de lavage des mains ?	Dans le lavoir……☐……..1 N'importe où dans la cour ou il y'a un point d'eau……☐……2	**Si Autre, précisez !**

Lieu de lessive/vaisselle..☐..... 3

Autre……☐…….. 4

2.4. Caractérisez le dispositif de lavage des mains	Lavabo……☐……..1 Seau/Bassine contenant de l'eau dans lequel les mains sont trempées……☐……2 Seau/Bassine contenant de l'eau que l'on verse sur les mains……☐……..3 Seau/Bassine avec eau ET récipient pour verser l'eau sur les mains ……☐……..4 Seridaca……☐……5 Autre……☐……..6N/A ……☐……..99	**Plusieurs réponses possibles !** **Si Autre, Précisez !**

3. Eaux usées

3.1. Y-a-t-il un system d'évacuation des eaux usées ?	Oui……☐……..1 Non……☐…..2	
3.2. Décrivez le system d'évacuation des eaux usées	Lavoir……☐……1 Drain simple……☐……..2 Drain relié à un Caniveau à l'entrée de la cour….☐……..3 Caniveau…☐……4 Canalisation/trou……☐…..5 Fosse/Regard……☐……6 Autre……☐……..7N/A ……☐…..99	**Si Autre, Précisez !**

Appendix 5.2. Water, sanitation and handwashing compound-level questionnaire

QUESTIONNAIRE A L'ENDROIT DES MENAGES

Nom de l'enquêteur : _____ Date : _____

Commune : _____ Heure : _____

Quartier : _____

Code d'identification du Ménage : _____

……

Contexte : Cette enquête vise à collecter des données sur les activités liées à l'eau et à l'assainissement du ménage, en vue d'une étude de Thèse de Doctorat de l'Ecole de Londres, D'hygiène et de Médicine Tropicale.

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Section I: Mode d'Accès à l'Assainissement

1. Avez-vous des WC dans votre cours communes? Oui : _____ Non : _____ ***(Si non allez a la Question 32!)***

2. Combien de WC avez-vous ? 1 : _____ 2 : _____ 3 : _____

4 : _____ Plus de 4 : _____

3. Utilisez-vous les WC de votre cours commune ? Oui : _____ ***(Si oui allez à la Question 9)*** Non : _____

4. Pourquoi n'utilisez-vous pas vos WC ? _____

5. Partagez-vous les WC avec d'autres personnes de votre cours commune? Oui : _____

Non : _____

6. Partagez-vous les WC avec des personnes qui n'habitent pas dans votre cours commune ? Oui : _____ Non : _____ ***(Si non allez à la <u>Question 9</u>!)***

7. Qui sont ces personnes ? _____

8. *Ou vous soulagez-vous si vous n'avez pas de WC/n'utilisez pas les WC de la cours ?*

Dans la nature : _____ *WC publiques :* _____ *Autres (a préciser) :* _____

9. *Ou se situe les WC que vous utilisez ?* _____ ***(Si les WC sont dans la cours, allez à l' endroit ou se situe les WC !)***

10. Est-ce qu'il y'a une source d'eau ou vous aller au toilette ? Oui : _____ Non : _____

11. ***OBSERVATION DIRECTE !***

Quelle est/sont la/les source(s) d'eau la/les plus proche(s) des WC ?

SODECI : _____ *Eau de puits :* _____

Autre (à préciser) : _____

12. Est-ce qu'il y a du savon ou vous allez au WC, ou prés de l'endroit ou vous allez au WC ?

Oui : _____ Non : _____

13. ***OBSERVATION DIRECTE !***

S'il y'a du savon, demander au participant de vous montrez le savon

Décrivez le type de savon : Savon liquide : _____ Barre de savon : _____Savon en poudre : _____ Autre (à préciser) : _____

14. Est-ce qu'il y'a un endroit ou vous pouvez vous laver les mains ou vous allez au toilette ?

Oui ***(Si oui préciser où)***: _____ Non : _____

<u>Section II</u>: LMAS

15. Est-ce que vous vous lavez les mains ? Oui : _____ Non : _____

16. Quand est ce que vous vous lavez les mains (après ou avant quelle activité(s)?

_____ _____ _____ _____

17. Pourquoi est ce que vous vous lavez les mains à ce(s) moment(s)?

_____ _____ _____ _____

18. Quelle source d'eau utilisez-vous pour vous lavez les mains ?

SODECI : _____ Eau de puits : _____ Eau de vendeurs : _____

Autre (à préciser) : _____

19. Qu'est ce que vous utilisez pour vous laver les mains ?

Eau seulement : _____ ***(Si oui allez à la <u>Question 22</u>!)*** Eau et savon : _____

20. Quand utilisez-vous de l'eau sans savon pour vous lavez les mains ?

_____ _____ _____

21. Quand utilisez-vous de l'eau avec du savon pour vous lavez les mains ?

_____ _____ _____

22. Quel type de savon utilisez vous pour vous lavez les mains ?

Savon liquide : _____ Bar de savon : _____ Savon en poudre : _____

23. Est-ce que vous utilisez ce savon pour laver autre chose que vos mains ?

Oui : _____ ***(Si oui, préciser les autres usages)***
Non : _____

24. Combien coute le savon ? _____

25. Est-ce que vous trouvez que le savon coute cher ? Oui : _____ Non : _____

26. Est-ce qu'il y'a un/des endroit(s) précis dans la cours commune ou les gens se lavent les mains ? Oui : _____ Non : _____ ***(Si non allez a la section III !)***

27. Ou se situe l'endroit pour se laver les mains ?

Dans les WC : _____ A coté des WC : _____ Dans la cours : _____

Devant la cours : _____ Autre (à préciser) : _____

28. Est-ce que l'endroit pour se laver les mains est aménagé à cet effet (Est-ce qu'il y'a des bassines ou autres pour se laver les mains) ?

Oui : _____ Non : _____ ***(Si non allez a la section III !)***

<u>Section III</u> : Mode d'Accès à l'Eau

29. Quelle source (s) d'eau utilisez-vous pour :

	Sources d'approvisionnement					
Usages	**SODECI**	**BF**	**Revendeur**	**Puits**	**Eau de surface**	**Autres**
Boire						
Cuisiner						
Lavage des mains						
Vaisselle, lessive						
Douche						

30. Pourquoi le choix de la/des source(s) d'eau ?

Eau de boisson

Qualité : _____ Prix : _____ Goût : _____ Autre (A préciser) : _____

Eau de cuisine

Qualité : _____ Prix : _____ Goût : _____ Autre (A préciser) : _____

Eau pour lavage des mains

Qualité : _____ Prix : _____ Goût : _____ Autre (A préciser) : _____

Vaisselle et Lessive

Qualité : _____ Prix : _____ Goût : _____ Autre (A préciser) : _____

Douche

Qualité : _____ Prix : _____ Goût : _____ Autre (A préciser) : _____

31. Ou se situe la/les source(s) d'eau utilisée(s) ?

Dans la cour commune : _____ Dans la maison : _____

Dans le quartier : _____ Autre (à préciser) : _____

32. *Si l'une de vos sources d'eau est la SODECI, avez-vous un compteur individuel ?*

Oui : _____ ***(Si oui, allez à la <u>Question 8</u> !)*** Non : _____

33. Pourquoi n'avez-vous pas de compteur individuel ? _____

34. Avec combien de ménage(s) partagez-vous le compteur SODECI? _____

35. Comment vous organisez-vous pour régler les factures d'eau ?

Division par nombre de ménage : _____ Division selon l'usage : _____

Forfait (mensuel ou jour) : _____ Autre (à préciser) : _____

36. Quelle est la quantité d'eau utilisée par jour ?

Barrique de 200l : _____ Barrique de 150l : _____ Barrique de 100l : _____

Cuvette de 75l : _____ Cuvette de 50l : _____ Autre (à préciser) : _____

37. Qui est chargé de la corvée d'eau ?

Mère : _____ Servante : _____ Jeune fille/enfant du ménage : _____

Autre (à préciser) : _____

38. Comment se fait le transport de l'eau ?

Sur la tête : _____ Brouette : _____ Autre (à préciser) : _____

39. Le récipient pour transporter l'eau est-il couvert ?

Oui : _____ (Si oui à préciser) Non : _____

40. Combien dépensez-vous par jour pour l'achat de l'eau ?

Moins de 100F/j : _____ 100F/j : _____ 200F/j : _____

250F/j : _____300F/j : _____ 500F/j : _____ Plus de 500F/j : _____

41. ***OBSERVATION DIRECTE !***

Décrivez le type d'aménagement pour se laver les mains :

Lavabo : _____ Bassine : _____ Sceau : _____ Cuvette : _____

Autres (à préciser) : _____

<u>Section IV</u> : Caractéristiques Socioéconomiques du Ménage

42. Sexe : M : _____ F : _____

43. Age : Moins de 18 ans : _____ 18-34 : _____ 35-55 : _____

+55 : _____

44. Rôle dans le ménage : Père : _____ Mère : _____ Enfant : _____

Autre (à préciser) : _____

45. Groupe ethnique : Krou : _____ Akan: _____ Mande du Nord: _____

Mande du Sud : _____ Autre (à préciser) : _____

46. Nationalité: Ivoirienne : _____ Autre (à préciser) : _____

47. Situation matrimoniale: Célibataire : _____ Marié(e) : _____ Veuf (ve) : _____

48. Confession religieuse : Chrétien : _____ Musulman : _____ Animiste : _____ Autres (à préciser) : _____

49. Niveau d'instruction: Illettré : _____ Primaire : _____ Secondaire : _____ Supérieur : _____ Autres (à préciser) : _____

50. Principale source de revenu : Fonctionnaire : _____ Salarié du privé : _____

Artisans : _____ Commerçant : _____ Agriculture Transport : _____

Autres (à préciser) : _____

51. Revenu du chef de ménage par mois : Moins de 50 000F : _____

de 50 000F à 100 000F : _____ De 100 000F-200 000F : _____

Plus de 200 000F : _____

52. Revenu additionnel du ménage :

Moins de 15 000F : _____ de 15 000 à 20 000F : _____

de 20 000 à 50 000F : _____ de 50 000F à 75 000F : _____

Plus de 75 000F : _____

53. Estimation du revenu générale du ménage : _____

54. Quelle est la taille du ménage ? Moins de 5: _____ de 5 à 10 : _____

de 10 à 15 : _____ 15 et plus : _____

55. Combien de ménage y'a-t-il dans la cours commune ? _____

56. Est-ce que vous êtes le propriétaire de la maison ou de la cours commune ?

Oui : _____ Non : _____

57. Quelle est votre statut d'occupation : Propriétaire : _____ Locataire : _____

Hébergé(es) gratuit : _____ Autre (à préciser) : _____

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Appendix 5.3: Household-level structured questionnaire

QUESTIONNAIRE A L'ENDROIT DES MENAGES

<u>Section I</u> : Mode d'Accès à l'Eau

1. Quelle (s) source (s) d'eau utilisez-vous pour :

Usages	**Pompe/Robinet (dans la cour)**	**Pompe/Robinet (hors cour)**	**Borne Fontaine**	**Puits**	**Autres**
Boire					
Cuisiner					
Lavage des mains					
Vaisselle, lessive					
Douche					

2. Si la source d'eau est hors de la cour, précisez la distance (par rapport à la cour)

-100m a 100m ☐ -500 m ☐ Entre 500 m et 1Km ☐ + 1Km ☐

3. Est-ce que vous stockez/gardez de l'eau dans des récipients (bassines, seau, barrique)?

Oui ☐ Non ☐

4. Dans quel type de récipient l'eau est-elle stockée/gardée?

Bidon ☐ Barique ☐ Seau ☐ Bassine ☐

5. Pour quelle(s) type(s) d'activites l'eau stockée dans les recipients non-couverts est-elle utilisée?

Tous les récipients sont couverts ☐ Cuisine ☐ Boisson ☐ Douche ☐
Lessive ☐ Vaisselle ☐ Ménage ☐ Lavage des mains ☐
Autre (à préciser) ☐.....

6. Ou vous approvisionnez-vous en eau lorsque vous n'avez plus du tout d'eau dans la cour?

Revendeur dans la cour ☐ Revendeur hors de la cour ☐

Autre (à préciser) ☐……

7. Qui est chargé de la corvée d'eau ?

Mère ☐ Père☐ Jeune fille du ménage ☐ Jeune homme du ménage ☐

Tout le monde ☐ Autre (à préciser) ☐ ……

Household-level structured questionnaire *(continued)*

8. Si vous acheter l'eau a des revendeurs, combien dépensez-vous par jour pour l'achat de l'eau ?

Moins de 100F/j ☐ 100F/j ☐ 200F/j ☐

250F/j ☐ 300F/j ☐ 500F/j ☐ Autre (à préciser) ☐ ……

9. Quel type de récipient est utilisé pour transporter l'eau ?

Bidon ☐ Bassine ☐ Seau ☐ Autre (à préciser) ☐……

10. Comment se fait le transport de l'eau ?

Sur la tête ☐ Brouette/Charrette ☐ Porté à la main ☐

Autre (à préciser) ☐ ……

11. Le récipient pour transporter l'eau est-il couvert ?

Oui ☐ Non ☐ Certains couverts/certains non-couverts ☐

12. Combien de fois par jour est ce que vous faite la vaisselle?

1 a 2fois/j ☐ 2 a 3fois/j ☐ 4 a 5 fois/j ☐ Autre (à préciser) ☐…….

13. Combien de fois par jour est ce que vous preparer ?

1 fois/j ☐ 2 fois/j ☐ 3 fois/j ☐ Plus de 3 fois/j ☐

14. Combien de fois par jour est-ce que vous faites la lessive ?

1 a 2fois/j ☐ 1 a 2 fois/semaine ☐ 1 a 2 fois/mois ☐ Autre (à préciser) ☐ …….

15. Quelle est la quantité d'eau que votre famille utilise par jour ?

Nombre de grosse(s) bassine(s)…….. Litre :……..

Nombre de seau(x)…….. Litre :……..

Nombre de bidon(s)…….. Litre :……..

Nombre de baril(s)…….. Litre :……..

<u>Section II</u>: LMAS

16. Combien de type(s) de savon(s) avez-vous ?

Savon dur ☐ Savon liquide ☐ Savon en poudre ☐

17. Précisez le type(s) d'activités pour lesquelles vous utilisez <u>le plus</u> les différents types de savon:

Savon dur : Lessive ☐ Vaisselle ☐ Se doucher ☐

Savon liquide : Lessive ☐ Vaisselle ☐ Se doucher ☐

Savon en poudre : Lessive ☐ Vaisselle ☐ Se doucher ☐

Household-level structured questionnaire *(continued)*

18. Précisez le cout des différents savons utilisés :

Savon dur ..... Savon en poudre ..... Savon liquide .....

19. Est-ce que vous trouvez que le cout du savon est élevé ?

Oui ☐ Non ☐

20. Apres et/ou avant quelles types d'activités vous lavez-vous les mains ? (Laissez l'enquêté lister)

Avant de préparer ☐ Avant de manger ☐ Apres avoir mangé ☐

Avant de nourrir un enfant ☐ Apres être allé au WC ☐ Apres avoir nettoyé les fesses d'un enfant ☐ Apres être rentré d'une sortie ☐ Avant la prière ☐

Autres (à préciser) ☐ ……

21. Pourquoi est-ce que vous vous lavez les mains à ce(s) moment(s)? (Laissez l'enquêté lister)

Eviter les maladies/microbes ☐ (précisez quelle(s) maladie(s))
.....

Enlever la saleté ☐ Eviter le regard des autres ☐ Par habitude ☐

Autre (à préciser) ☐ ……

22. Qu'est-ce que vous utilisez quand vous vous lavez les mains ?

Eau seulement ☐ ***(Allez a la Question 23)*** Eau ET savon ☐ ***(Allez à la Question 30!)***

Des fois de l'eau seule, des fois eau ET savon ☐

23. *Pourquoi n'utilisez-vous pas de savon pour vous laver les mains ?*

……

……

24. Quand utilisez-vous de l'eau simple pour vous laver/rincer les mains ?

Avant de préparer ☐ Avant de manger ☐ Apres avoir mangé ☐

Avant de nourrir un enfant ☐ Apres être allé au WC ☐ Apres avoir nettoyé les fesses d'un enfant ☐ Apres être rentré d'une sortie ☐ Autres (à préciser) ☐ ……

25. Pourquoi utilisez-vous de l'eau simple pour vous laver les mains à ses moments ?

Mains relativement propres/pas sales ☐ Habitude ☐ Autres (à préciser) ☐ ……

26. Quand utilisez-vous de l'eau avec du savon pour vous laver les mains ?

Avant de préparer ☐ Avant de manger ☐ Apres avoir mangé ☐

Avant de nourrir un enfant ☐ Apres être allé au WC ☐ Apres avoir nettoyé les fesses d'un enfant ☐ Apres être rentré d'une sortie ☐ Autres (à préciser) ☐ ……

27. Pourquoi vous lavez-vous les mains avec du savon à ce(s) moment(s)?

Mains sales ☐ Habitude ☐ Autres (à préciser) ☐ ……

28. Quel type de savon utilisez-vous pour vous laver les mains ?

Savon liquide ☐ Savon dur ☐ Savon en poudre ☐

Le savon le plus proche de l'endroit où je me trouve ☐

29. Est-ce que vous partagez ce savon avec d'autre personne que les personnes de votre famille ?

Oui ☐ Non ☐

30. Est-ce que le savon utilisé pour se laver les mains est multifonctionnel (sert aussi à se laver, vaisselle, lessive)? ?

Oui ☐ Non ☐

31. Si toute la cour devait utiliser un savon pour se laver les mains, quel type de savon vous accepterez que tout le monde partage ?

Savon liquide ☐ Savon dur ☐ Savon en poudre ☐ Peu importe ☐

32. Pourquoi cela ne vous dérangerait pas de partager ce type de savon avec les personnes de la cour ?

Pratique ☐ Hygiénique/Propre ☐ Economique ☐

Autre (à préciser) ☐ ……

33. Est-ce qu'il y'a un/des endroit(s) précis dans la cour ou vous-vous lavez les mains ?

Oui ☐ Non ☐

34. Ou se situe l'endroit où vous vous lavez les mains ?

A côté des WC/douches ☐ N'importe où dans la cour (ou il y a du savon/eau) ☐

A cote du lieu de lessive/vaisselle ☐ Autre (à préciser) ☐ ……

Household-level structured questionnaire *(continued)*

35. Est-ce que vous souhaiteriez avoir un endroit aménagé (type lavabo) pour vous laver les mains dans la cour ?

Oui ☐ Non ☐

Pourquoi ?.....

36. Est-ce que vous pensez que les maladies diarrhéiques sont des maladies graves pour les enfants ?

Oui ☐ Non ☐

37. A votre avis, quel est le moyen le plus efficace d'éviter les maladies diarrhéique tel que le cholera ?

……

38. Si vous sortez des WC, et que vos voisins/amis ne veulent pas vous serrer la main parce qu'ils ont vu que vous ne vous étiez pas lavez les mains, est-ce que vous pensez qu'ils ont raison ?

Oui ☐ Non ☐

39. Pourquoi ?

……..

40. Comment vous sentiriez-vous dans cette situation ?

Honte/Gêné(e) ☐ Indiffèrent(e) ☐ Enervé(e) ☐

Autres (à préciser) ☐…….

41. Est-ce que cela vous donnerait envie de vous laver les mains la prochaine fois que vous iriez au WC ?

Oui ☐ Non ☐

42. Est-ce que cela vous dérangerait de manger un plat préparé par une personne qui est allée au WC pour se soulager, mais qui ne s'est pas lavée les mains avant de préparer votre plat ?

Oui ☐ Non ☐

Pourquoi ?.....
.....

43. Est-ce qu'il peut y'avoir des bouts d'excréments/caca dans un plat si la personne qui l'a préparé ne sait pas lavez les mains après être allée au WC ?

Oui ☐ Non ☐

44. En sachant que les excréments/caca de cette personne pourraient se mélanger a votre plat, est-ce que vous voudriez toujours manger de ce plat?

Oui ☐ Non ☐

45. Comment vous sentiriez-vous si vous deviez manger ce plat ?

Fortement dégouté/Refuse de manger ☐ Dégoûté ☐ Peu dégouté ☐

Pas dégouté ☐

46. Comment est-ce qu'on dit le mot « excrément/caca » dans votre ethnie ?.....

47. Qu'est-ce qu'un microbe ?.....

48. Comment est-ce qu'on dit le mot « microbe » dans votre ethnie ?.....

49. Qu'est-ce que le mot « microbe » signifie dans votre ethnie ?.....

<u>Section IV</u> : Caractéristiques Socioéconomiques du Ménage

50. Sexe : M ☐ F ☐

51. Avez-vous entre : 18-34 ? ☐ 35-55 ? ☐ +55 ? ☐ **Age :**…….

52. Statut dans le ménage : Père ☐ Mère ☐ Enfant ☐ Lien de parenté ☐

Autres (à préciser) ☐ ……

53. Nationalité: Ivoirien ☐ **Autre** (à préciser) ☐ ……

54. Ethnie : Krou ☐ Akan ☐ Mande du Nord ☐ Mande du Sud ☐

Précisez le nom de l'ethnie ……

55. Situation matrimoniale: Célibataire ☐ Marié ☐ Concubinage ☐

Veuf (ve) ☐

56. Confession religieuse : Chrétien ☐ Musulman ☐ Animiste ☐
Autre (à préciser) ☐ ……

57. Combien d'enfant y'a-t-il dans le ménage ?

Aucun ☐ 1☐ 2☐ 3☐ 4☐ 5+☐ Nombre :…….

58. Combien d'enfant de moins de 5 ans y'a-t-il dans le ménage ?

Aucun ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐

Autre (à préciser) ☐ ……

59. Niveau d'instruction du père : Illettré/n'est pas allé à l'école ☐ Primaire ☐
Secondaire ☐ Ecole Coranique ☐ Supérieur ☐ Autres (à préciser) ☐

60. Niveau d'instruction de la mère : Illettrée/n'est pas allée à l'école ☐
Primaire ☐ Secondaire ☐ Ecole Coranique ☐ Supérieur ☐
Autres (à préciser) ☐

61. Niveau d'instruction des enfants en âge d'être scolarisé :

Enfant 1 : Illettré ☐ Primaire ☐ Secondaire ☐ Supérieur ☐

Enfant 2 : Illettré ☐ Primaire ☐ Secondaire ☐ Supérieur ☐

Enfant 3 : Illettré ☐ Primaire ☐ Secondaire ☐ Supérieur ☐

Enfant 4 : Illettré ☐ Primaire ☐ Secondaire ☐ Supérieur ☐

Enfant 5 : Illettré ☐ Primaire ☐ Secondaire ☐ Supérieur ☐

……

62. Montant de la scolarité de l'enfant/des enfants ? (par an) ……

63. Dans votre famille, qui passe le plus de moment de la journée dans la cour?

Mère ☐ Père ☐ Enfants ☐ Mère et enfants ☐ Père et enfants ☐

Parent du ménage ☐ Autre (à préciser) ☐ ……

64. Activité socioéconomique du chef de ménage : Fonctionnaire ☐ Salarié du privé ☐
Artisans ☐ Commerçant ☐ Agriculteur ☐
Transport ☐

Autres (à préciser) ☐ ……

65. Activité socioéconomique de la femme/ou des femmes du ménage : Fonctionnaire ☐

Salarié du privé ☐ Artisans ☐ Commerçant ☐ Agriculteur ☐ Transport ☐

Ménagère ☐ Autres (à préciser) ☐ ……

66. A combien s'élève votre loyer mensuel ? ……

67. A combien s'élève l'argent de la popote ?

Montant par jour ☐ …… Montant par semaine ☐ ……

Montant par mois ☐ …… Autre (à préciser) ☐ ……..

68. Quel est le coût mensuel de votre facture d'électricité ?

…… Ne sais pas ☐

69. Quel est le coût mensuel de votre facture d'eau ?

…… Ne sais pas ☐

Household-level structured questionnaire *(continued)*

70. Est-ce que vous possédez :

Une voiture ☐ (nombre) …….Un vélo ☐ (nombre) …….. Une moto ☐ (nombre) ……

71. Si vous avez une voiture, quel type d'essence est-ce qu'elle consomme ?

Diesel ☐ Gasoil ☐

72. Combien de fois par mois est ce que vous y mettez de l'essence ?

1 ☐ **2** ☐ **3** ☐ **4** ☐ **5+** ☐

Précisez le montant…….

73. Est-ce que vous possédez un portable ?

Oui ☐ Non ☐

74. Si vous n'êtes pas le chef du ménage, est-ce que le chef du ménage à un portable ?

Oui ☐ Non ☐

75. Est-ce que vous possédez :

Une télévision ☐ Une radio ☐ Un ordinateur ☐ Un frigidaire ☐

Un ventilateur ☐ Un lecteur DVD ☐

76. Taille du ménage (nombre de personne habitant la maison) ?

Moins de 5 ☐ de 5 à 10 ☐ de 10 à 14 ☐ 14 a 19 ☐

20 et plus ☐

Nombre précis si possible……

77. Quelle est votre statut d'occupation dans la cour ?

Propriétaire ☐ Parent du propriétaire ☐ Locataire ☐

Hébergé(es) gratuit ☐ Autre (à préciser) ☐ ……

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Appendix 5.4. Handwashing station pilot

The handwashing station pilot was conducted by the PI and the WSA staff in four of the six compounds where the data collection tools had been piloted. We also piloted the handwashing stations in four compounds in Treichville, to have a broader idea of the suitability of handwashing stations in compound settings in general. The four compounds from Treichville were compounds used for training the fieldworkers. We visited each compound, and explained to residents that we were conducting a study to assess the suitability of supplying handwashing stations to compounds. This would entail leaving the stations in their compounds for seven days, and coming back to gather their opinions of the stations. We obtained informed consent from all eight compounds.

Each compound was given a handwashing station which was placed next to the toilets' entrance, when feasible. Where the toilets were in more than one location the stations were placed in the middle of the compound. Compounds were also given a 1.5 litre bottle of liquid soap, as per the soap preferences stated by residents (see Chapter 5, Section 3.3.). Liquid soap was chosen as it seemed to be the most hygienic soap type to share. The PI bought the soap from a woman, who was a compound resident, and who they had met during the compounds inventory. The resident made liquid soap that she subsequently bottled in recycled plastic bottles (e.g. cleaned water or soda bottles), and sold. Artisanal liquid soap is often made by female compounds inhabitants, and sold to generate income. They are thus readily accessible to the study population.

The PI thought it would be important to use a soap the study population was familiar with. This would help emphasise the future intervention messages that any soap was efficient at cleaning hands, and that no special or expensive soap was required. Soap ads in Côte d'Ivoire often stress the presence of antibacterial agents in the soap advertised, to emphasise its effectiveness at cleaning hands and removing bacteria (e.g. Pharmapur, Pharmaderm, and Lifeboy soap brands). Such soaps are usually more expensive than soaps that do not contain antibacterial agents and may thus be less accessible to the study population. As mentioned in Chapter 2, HWWS effectiveness in improving health do not seem to be significantly affected by the type of soap used for handwashing (i.e. plain soap vs. 'commercial' antibacterial soap) (excluding in healthcare settings). [34-36]

Appendix 5.5: Focus group discussion guide

FOCUS GROUPE-GUIDE D'ENTRETIEN

Le but de ce focus group est de recueillir des informations sur les impressions des habitants de la cours sur la station de lavage des mains, et leurs recommandations.

Nom de l'animateur: _____ Date: _____

Commune: _____ Heure: _____

Quartier: _____

Nombres de participants: _____

Questions

1. Qu'est-ce que vous avez pensé de la station de lavage des mains ?

1.1. Quels sont ses avantages et inconvénients ?

2. Est-ce que vous avez rencontré des problèmes avec la station de lavage des mains ?

2.2. Est-ce que vous avez eu des difficultés à entretenir la station (ex. remplir, vider, partager le savon, remplacer le savon, etc.)

3. Comment est-ce que vous amélioriez la station de lavage des mains ?

4. Est-ce que vous avez d'autres commentaires sur la station de lavage des mains que vous souhaiteriez partager ?

Appendix 6.1. Development of a context-specific Likert type response scale

We developed and tested a context-specific Likert-type response scale, with a provisional list of commonly used local vernacular expressions to express agreement and disagreement attached to each answer category. We attributed a score from one to five to each response category, with one indicating the highest level of endorsement and five indicating the lowest level (Box 6.2) in main Thesis text). The pilot study was conducted in a convenience sample of compounds in Koumassi and Treichville communes. An information sheet was read to eligible residents (i.e. permanent adult compounds residents) prior to each interview, and verbal informed consent obtained. Participants were told that the aim of the study was to gain a better understanding of local vernacular expressions commonly used in everyday conversation. We aimed to identify a comprehensive list of expressions for each response category. An iterative process was used to develop the response scale. We sampled a minimum of five residents at each piloting round, and modified the number of response categories and/or expressions in each response category as needed, at the end of each round.

An open-ended questionnaire was used to gather participants' understanding of the provisional list of expressions in each response category. This was to ensure that the degree of agreement we hypothesised each expression conveyed was accurate. For instance, participants were asked to explain their understanding of the expression *'C'est pas faux'* (literally '*It is not false'*), which is locally used to mean that something is somewhat true. We then asked how the degree of agreement conveyed by this expression compared to the degree of agreement conveyed by the expression *'C'est vrai'* ('*It is true'*), hypothesised to be in the response category comparable to '*True'.*

Definitely untrue	*Untrue*	*Somewhat True*	*True*	*Definitely true*
Ah ca seulement c'est faux!/ C'est faux même / '…deh !/ 'En tout cas…'/ 'Il faut dire la vérité…'	C'est pas vrai/ C'est faux/	C'est pas faux	C'est vrai	Ah ca seulement c'est vrai!/ C'est la vérité même'/ '…deh !'/ 'En tout cas…'/ 'Il faut dire la vérité…'
5	4	3	2	1

Box 6.2. Initial context-specific Likert-type response scale

To help participants indicate their understanding of the degree of endorsement conveyed by some expressions on the response scale, a visual analogue scale (VAS) was added to the questionnaire for subsequent piloting rounds. Participants were instructed to indicate their view of the strength of each expression by pointing to its position on the VAS, which was numbered from one to five, with one indicating the lowest level of endorsement.

We expected that, when presented with scale items, interviewees would select expressions in the comprehensive list compiled for each answer category, without being prompted with the available options. In order to assess whether this held true in practice, we included ten general statements on compound organisation at the end of the open-ended questionnaire for participants to rate. The only directive we gave participants was to share their opinion of each statement in relation to their compound.

For each response given by the interviewee, we identified, from the list of expressions in the different response categories, the one the interviewee used to express their agreement/disagreement with the item presented. We also circled its corresponding score. To minimize classification error, we included a space under each statement on the form and noted

the expression used by the interviewee to rate items, in addition to circling response rating scale scores. When interviewees used expressions that were not on the response scale, we added them in their corresponding response categories for testing in the subsequent round. Piloting went on until there was a consensus among participants regarding the strength of endorsement expressed by the terms in each response category, and until no new expressions emerged from the interviews.

It took a total of 31 interviews over four piloting rounds to finalise the response scale. In the first piloting round, a consensus emerged pertaining to the meaning of expressions at the two ends of the scale (i.e. comparable to *Definitely untrue* and *Definitely true*). These were clearly understood by participants as indicating a stronger degree of agreement or disagreement with a statement than expressions posited to be comparable to the *True* or *Untrue* answer categories. However, there was a lack of consensus pertaining to the expression *'C'est pas faux'* (comparable to '*Somewhat true'*). As a result of this and of new expressions emerging, we then tested a 6-point scale, introducing a new and neutral response option, *'Souvent aussi…'/'Des fois aussi…'* (comparable to '*Neither true nor untrue'*). After two additional piloting rounds where there was still a lack of consensus regarding the above expressions, we reverted to a 5-point scale, combining the lists of expressions comparable to '*Neither true nor untrue' and* '*Somewhat true'.*

New expressions emerged during each of the first three piloting rounds but none emerged during the fourth (and final) piloting round. The finalised response scale was translated into Dioula, and this translated version was tested in a total of five residents. Data from the ten statements added at the end of the pilot questionnaire confirmed that participants would naturally use terms from the list of words in the response categories to rate the presented statements, without the need for prompting.

Appendix 6.2. Likert-type questionnaire, including norms scales and masking effectiveness assessment questions

Questionnaire sur l'Organisation des Cours

		***(Ah)* ca seulement c'est FAUX !/ 'vérité'/ '…même'/'…deh !/ '…keh !'/ Hmmm ! 'En tout cas…'/Ah !!!/ Nonnn !!/Jamais !/ Tu dis rien !/Pas du tout !/Quand même ! Non hein !/'Tout le monde sait…'/'*(C'est ca)* Ye dis…'/'C'est ca tu dis doucement ?'/'Ou ca ?'/ 'C'est pas ici'/'Non, t*k*-t*k*'/'il faut reconnaître…'**	**C'EST FAUX/ Non/ Non-Non C'est pas vrai**	**'C'est PAS faux'/ 'C'est vrai aussi'/ DES FOIS aussi…/ SOUVENT aussi…/C'est pas toujours/ Certains…/ On peut dire ca/C'est PAS forcé**	**C'EST VRAI/ Oui/ Oui-oui/ Si/Si-si Voilà/ Tu vois non ?**	***(Ah)* ca seulement c'est VRAI !/ 'vérité'/'…même'/ '…deh !/ '…keh !' Hmmm !/'En tout cas…'/ Wouhh !/ Ouiiii !!/Quand même !/ 'Tout le monde sait…'/ *'(C'est ca)* Ye dis…'/'C'est ca tu dis doucement ?'/ Voiiila !/ Effectivement !/ Justement !/ 'Forcé'/ 'Il faut reconnaître…'/**	**NSP**
1.	**Dans votre cour, la majorité des hommes passent plus de temps dehors que dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							

2.	**Vous pensez que beaucoup de garçons font la cuisine, dans votre cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
3.	**Ce sont les femmes qui travaillent le plus dans votre cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							

4.	**Vous pensez que y'a <u>PAS</u> assez de travail a faire dans la cour la journée *(ex. lessive, vaisselle, cuisiner, s'occuper des enfants…).***	5	4	3	2	1	7
Expression(s) clé(s) :							
5.	**Quand les garçons sont dans la cour, les femmes peuvent se reposer de leur travail *(ex. les garçons font le travail des femmes).***	5	4	3	2	1	7
Expression(s) clé(s) :							

6.	**Les garçons aident les femmes dans leur travail dans la cour *(ex. lessive, vaisselle, cuisiner…)***	5	4	3	2	1	7
Expression(s) clé(s) :							
7.	**Dans <u>VOTRE COUR</u>, si c'est <u>PAS VOUS, Y'A PAS ASSEZ</u> de personnes qui lavent leur mains <u>AVEC SAVON APRES LES WC.</u> *(On parle pas d'eau simple, mais avec savon !)***	5	4	3	2	1	7
Expression(s) clé(s):							
8.	**Vous croyez /pensez que y'a <u>PAS BEAUCOUP</u> de gens qui lavent leurs mains <u>AVEC SAVON APRES LES WC</u> dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s):							

9.	**A PART <u>VOUS, Y'A PAS ASSEZ</u> de personnes qui trouvent que c'est important de laver les mains <u>AVEC SAVON APRES LES WC DANS LA COUR.</u>**	5	4	3	2	1	7
Expression(s) clé(s) :							
10.	**<u>LA PLUS PART</u> des gens <u>DANS LA COUR</u> trouvent que laver les mains <u>AVEC SAVON APRES LES WC</u> ca ne leur dit rien *(c'est a dire, ils ne pensent pas a ca).***	5	4	3	2	1	7
Expression(s) clé(s) :							
11.	**Si c'est <u>PAS VOUS</u>, laver les mains <u>AVEC SAVON APRES LES WC</u> n'est <u>PAS</u> dans la tête des gens <u>DE LA COUR</u>.**	5	4	3	2	1	7
Expression(s) clé(s) :							
12.	**Dans la cour, <u>A PART VOUS</u>, les gens pensent que y'a <u>PAS ASSEZ</u> de temps pour laver les mains <u>AVEC SAVON APRES LES WC</u>.**	5	4	3	2	1	7
Expression(s) clé(s) :							

13.	**C 'est <u>PAS</u> à cause de microbes que vous vous lavez les mains <u>AVEC SAVON, EN GENERAL</u>).**	5	4	3	2	1	7
Expression(s) clé(s) :							
14.	**Vous vous lavez les mains avec savon <u>POUR ENLEVER</u> la saleté sur les mains.**	5	4	3	2	1	7
Expression(s) clé(s) :							
15.	**Le lavage des mains de chacun dans la cour n'est <u>PAS</u> facile à observer, comme y'a pas d'endroit fixe ou se laver les mains.**	5	4	3	2	1	7
Expression(s) clé(s) :							
16.	**Pour savoir <u>QUI</u> lave les mains <u>DANS LA COUR</u>, les yeux doivent se fatiguer (*c'est a dire, les yeux doivent regarder a gauche a droite),* <u>COMME</u> on/chacun lave les mains un peu partout dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
17.	**Vous trouvez que les gens font beaucoup palabres dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
18.	**C'est les garçons qui font palabres, dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							

19.	**C'est plus fréquent de voir les femmes faire palabres.**	5	4	3	2	1	7
Expression(s) clé(s) :							
20.	**D'après vous, les palabres dans la cour sont des gros palabres.**	5	4	3	2	1	7
Expression(s) clé(s) :							
21.	**Dans la cour, palabre finit vite.**	5	4	3	2	1	7
Expression(s) clé(s) :							
22.	**C'est garçons qui fait et puis palabre finit (ex. c'est eux qui calment les gens).**	5	4	3	2	1	7
Expression(s) clé(s) :							
23.	**Vous pensez que y'a la solidarité dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
24.	**Les gens dans la cour sont comme une famille pour vous.**	5	4	3	2	1	7
Expression(s) clé(s) :							
25.	**Pour qu'il y'ait l'entente, il faut qu'il y'ait uniquement des Chrétiens ou uniquement des Musulmans dans la même cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							

26.	**Pour qu'il y'ait l'entente, il faut qu'il y'ait uniquement des personnes de même ethnie dans la même cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
27.	**Dans les cours communes <u>EN GENERAL</u>, même si les garçons s'entendent entre eux, si les femmes ne s'entendent <u>PAS</u> entres elles, y'a <u>PAS</u> l'entente dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
28.	**Les cours communes ont toutes les mêmes règles *(c'est a dire, si dans une cour on lave les douches tous les dimanches, dans toutes les cour ce sera le même jour aussi).***	5	4	3	2	1	7
Expression(s) clé(s) :							

C'est fini, merci beaucoup...J'aimerais juste vous demander :

Qu'est ce que vous avez pensé du questionnaire ?

_____

_____

_____

_____

_____

Est-ce qu'il y a des activités importantes dans la cour dont on n'a pas parlé et que vous pensez que je dois rajouter?

_____

_____

_____

_____

_____

Je vais aller poser les mêmes questions à d'autres personnes dans votre cour et dans d'autres cours. Si les personnes de votre cour vous demande y a quoi dans le questionnaire comment vous pouvez leur expliquer de quoi le questionnaire parle ?

_____

_____

_____

_____

MERCI BEAUCOUP

Appendix 7.1. Interventions design process

1. Target audience

The interventions' primary target audience was permanent female (≥16 years old) compound residents. This group was chosen as they take care of children, and inculcate children with good hygiene practices. We also considered that it would be key for adults to feel engaged with the issue of handwashing, given the tendency to attribute bad hygiene practices to children, as seen in the pilot study (Chapter 5). Children were blamed for bad hygiene practices in compounds, although structured observation data also showed poor handwashing behaviour in adults.

2. Handwashing station-only intervention design process

The HWS-only intervention consisted of delivering an HWS with an initial supply of four 50 cl bottles of liquid soap. There were no handwashing promotion intervention messages. Thus, HWWS after using the toilet or at any other occasion was not promoted beyond the availability of the HWS. The emphasis was rather put on the convenience of the facility, making handwashing easier to perform, given both water and soap would be readily available at the handwashing location. Nevertheless, as we wished to compare the effectiveness of both interventions at increasing HWWS after using the toilet, the HWS was placed at the toilet entrance, thus facilitating an evaluation of the added benefit, if any, of the TNSB intervention components.

2.1. Key intervention message

The HWS-only intervention message was:

- The HWS will make handwashing easier to perform, as both water and soap are at the same location.

2.2. Change to the handwashing station design

Due to resource constraints, the HWS stand was made of wood as opposed to iron, as in the 2012 pilot (Pictures 7.1, 7.2 and 7.3). The round shape of stand was adopted, and the rings

holding the liquid soap bottle and the bucket were modified to be slightly bigger, so that it would be easier to remove both containers. At the time when the different components we purchased to assemble the stations (in 2015), the West African Ebola epidemic was on-going. There was thus a shortage of plastic taps in Abidjan. Therefore, the taps were ordered from Nigeria. A total of 90 handwashing stations were made. The handwashing station was supplied with four 50 cl bottles of liquid soap. The soap was made by a woman in Koumassi and was of a type which was readily available to the study population. It contributed to conveying the message that any soap type was effective at cleaning hands, and that it did not need to be costly.

Picture 7.1: HWS in the making (1)

Picture7.2: Handwashing station in the making (2)

Picture 7.3: Handwashing station's finished product (top bucket's cover removed)

3. Design of the TNSB-based handwashing intervention

The TNSB-based handwashing intervention comprised ten short video clips, a Glo Germ© demonstration, the provision of posters promoting handwashing, and a handwashing station also placed at the toilet entrance, and with an initial supply of four 50 cl bottles of liquid soap.

3.1. Key intervention messages

The intervention was designed around messages focussed on faecal material.

The primary TNSB-based handwashing intervention message was:

- We must practise HWWS after using the toilet.

Besides the primary message, the intervention also contained secondary intervention messages, including the promotion of HWWS after cleaning a child's bottom. The secondary intervention messages aimed at bolstering the primary intervention message.

These were:

- We have poo on our hands after using the toilet, but we cannot see this;
- If we do not wash our hands with water and soap after using the toilet, we eat our poo, and we distribute it to other residents.
- Water alone is not effective at removing poo on our hands;
- Only water and soap are effective at removing poo on our hands;
- Even if only one resident in the compound does not wash their hands with soap after using the toilet but that all other residents do, we could all eat the poo of the 'non-handwasher';
- We must wash our hands with soap after cleaning a child's bottom.

Table 7.1 summarises the two interventions and expected effects on the behaviour of interest and norms-related constructs.

Table 7.1. Summary of the two interventions and expected effects on handwashing with soap after using the toilet, and the norms-related constructs.

Handwashing Interventions	**Intervention aim**	**Intervention components**	**Key intervention message**	**Effect on norms-related constructs**
HWS-only	Increase HWWS after using the toilet *(primary)* Increase HWWS after cleaning a child's bottom *(secondary)*	- Handwashing stations with four 50 cl soap bottles	- The handwashing station will make handwashing easier to perform, as both water and soap are located at the same location.	*Unintended* - Increased perceived behaviour publicness - Increased perceived descriptive norm - Strengthened perceived injunctive norm *(to some extent)*
TNSB-based	Increase HWWS after using the toilet *(primary)* Increase HWWS after cleaning a child's bottom *(secondary)*	- Short video clips - Glo Germ© - Posters - Handwashing stations with four 50 cl soap bottles	- We must wash our hands with soap after using the toilet.	*Intended* - Increased perceived behaviour publicness - Increased perceived descriptive norm - Strengthened perceived injunctive norm - Change from good health to riddance of disgust outcome expectation

3.2. Intervention components design process

3.2.1. Videos

The videos were the most important intervention component, as they were the only component designed to change the relevant norms-related constructs on their own. It was also the only component which conveyed all the intervention messages. The other intervention components were designed to complement the videos.

A total of ten scripts were written by the PhD candidate and fieldwork assistants. Two artistic directors from a communication company in were hired to help with editing the scripts and writing the dialogs. The dialogs were written to include comic elements to increase the likelihood that the target population would remain interested in the intervention. We also took

care to ensure that the way the characters expressed themselves was representative of the way the study population spoke (e.g. local expressions, jargons, attitudes).

The stories were inspired by daily life scenes observed during structured observations or known to be typical of compound life. To develop persuasive and credible messages, it was key to create scenarios the study population could easily identify with and believe. If the scenarios were believable, we anticipated that this would increase the chances that the intervention be effective. Care was taken so that all genders and age groups were represented in the scenarios, and that character's names and practices were representative of the main religions and different ethnic groups in Côte d'Ivoire.

- **Videos structure**

The videos were divided in two groups: 'negative' (seven videos) and 'solutions' (three videos).

- *Negative videos*

The aim of the negative videos was to depict problematic handwashing practices in compounds after the key occasions, but without any health promotion messages. The negative videos focused on eliciting a feeling of disgust, promoting an outcome expectation of riddance of disgust rather than good health. Six out of the seven negative videos involved a key character who would end up going to the toilet at some point. The remaining video had a key character cleaning a child's bottom. In all the negative videos the key character would end up with a disgusting substance (i.e. faeces) on their hands. They would then either not wash their hands or wash their hands with water only. The stories then subsequently showed how the key character and/or other compound residents were affected by the fact the former had not performed HWWS after the key occasion. This was demonstrated by showing the different transfer paths of the disgusting substance, from the key character directly to a resident, or indirectly, from the key character to an object another resident would end up touching.

- *Solution videos*

The negative videos were divided in three groups. Videos groups 1 and 2 were composed of two videos each, and video group 3 contained three videos. The PhD candidate and fieldwork

assistants wrote three 'solution' video scenarios (i.e. one for each negative video group). One of the aims of the solution videos was to summarise the stories depicted in the group of negative videos they belonged to. Their role was also to explain to the audience what the key characters had done that was problematic, and why this was so. The solution videos also contained the intervention slogan :

"Eau et savon après les WC, c'est ça qui marche deh! Bien même!"

This can be translated as*:*

"Water and soap after using the toilet, that's what really works! Well indeed!"

At the end of each solution video, after having washed their hands with soap, the key characters would raise their hands to the screen to show their cleanliness. This would convey the message that water and soap had effectively removed faeces from their hands. The characters would also deliver the intervention slogan.

- **Using injunctive normative messages and behaviour publicness**

A key mechanism of the solution videos involved influencing residents' perception of the injunctive norm around and behaviour publicness of HWWS after using the toilet. At the beginning of each solution video, a group of residents within the same compound as that of the key character would get together to confront the latter about the fact they had not washed their hands with soap after the key occasion. The residents would express anger at the fact that, because of the key character, they were all eating faeces in their compound. It was important that the injunctive normative messages were delivered by a group that participants could identify with (i.e. other compound residents). If the key intervention messages were perceived as solely the views of an external group with whom residents did not identify (i.e. intervention providers), then "pressure" to conform to the expected behaviour would not have been as strong.

The group of angry residents also explained to the problematic characters why the behaviour they had engaged in was an issue for the entire compound. Through the exchanges with their fellow residents, the key character would then start to feel ashamed and remorseful about their actions, and understand why they should not engage in such practice anymore. Towards the end

of each solution video, the peak of residents' anger was depicted by residents throwing soap bars at the problematic characters, and ordering them to wash their hands with soap. Subsequently, the problematic characters were seen shamefacedly washing their hands with soap, under the scrutiny of one of their fellow residents.

Most of the residents in the solution videos were not present in the negative videos to witness the key characters' actions. However, in the solution videos, they were still portrayed as always being knowledgeable of who the 'non-handwashers' in their compounds were, and the precise practices the key characters had engaged in. This emphasised to the audience that HWWS after the key occasions was a visible/public behaviour in their compound, and thus open to the scrutiny of their fellow residents. If any of them did not engage in the practice, their fellow residents would be aware of it and would not tolerate it. Thus, an aim of the solution videos was to convey the injunctive norm message that HWWS after using the toilet was strongly expected of all residents, and that fellow residents had no tolerance for residents who did not comply with the practice. It also conveyed the idea that residents would know which individuals did not comply, and would therefore be able to lecture them.

- **Videos scenarios pilot and videos production**

A graphic artist student from Côte d'Ivoire's INSAAC[59] was hired to design the storyboards for each of the ten videos (Images 7.1, 7.2 and 7.3). The storyboards were edited over several meetings between the graphic artist, the PhD candidate, and the fieldwork assistants. Care was taken for the images to be self-explanatory. We then piloted the storyboards among adult compound residents in Treichville before finalising the scenarios (Pictures 7.4 and 7.5). Each storyboard was shown to participants, who were asked to tell the story depicted based on the images. The pilot testing confirmed that the intervention key messages came across to participants clearly. It also confirmed that the stories were believable and relevant to residents.

Additionally, the images aimed at triggering disgust emotions had the intended effect. The most common local expression participants used to voice disgust was: *"Ça me fait me sentir bizarre dans mon corps",* which literally translates to *"It makes me feel weird in my body."* The

[59] INSAAC stands for Institut National Supérieur des Arts et de l'Action Culturelle

expression could refer to the chills that the feeling of disgust sometimes triggers. The actual word 'disgust' is rarely used to express revulsion in our study population.

The finalised storyboards were given to a production company, for the videos to be produced. Filming took place over six days in a carefully selected compound in Treichville. The compound was selected on the basis of key compound features described in the scenarios and storyboards (e.g. compound with a *lavoir*, and with toilet facing the courtyard (i.e. not in a corridor) and with doors[60]). At the end of filming, and given filming occurred during Ramadan, the PhD candidate and fieldwork assistants offered 5 kg rice bags to each household in the compound, to thank residents.

Image 7.1: Example of an image from a negative video storyboard (1).

Image 7.2: Example of an image from a negative video storyboard (2).

Image 7.3: Example of an image from a solution video storyboard

[60] Whilst the toilet in the identified compound did not have a door at the entrance of the toilet area, it was still selected as the production company had initially stated that the doors would be digitally added. During post-production, and as the production company refused to finalise the videos, the doors were only added in a few videos.

Picture 7.4: Storyboards piloting in a compound in Treichville (1)

Picture 7.5: Storyboards piloting in a compound in Treichville (2)

- **Disgust triggering visual effect**

The production company designed eight visual effects intended to induce disgust, which could be superimposed on characters' hands and objects. The visual effects were piloted among adult compound residents in Treichville. The effects were shown to participants who were asked to rank the effects from the most disgusting to the least disgusting, and to justify their choices. The visual effect was edited and the list reduced after each piloting round, depending on the findings, and until a consensus emerged around one visual effect.

In general residents favoured visual effects which contained worm-like images (e.g. Picture 7.8). These were systematically characterised as being associated with something dirty. Another

criterion that seemed important to participants was how realistic the visual effects looked. Participants appeared to favour those they considered as looking real as opposed to visual effects they perceived as looking too obviously digitally made. Pictures 7.6 to 7.9 are examples of some of the visual effects designed, with Picture 7.9 showing the retained visual effect used in the intervention videos.

It is worth noting that, whilst we had initially intended that the disgust-evoking visual effect should not resemble microbes, what participants ended up finding most disgusting were precisely effects that reminded them somewhat of their notions of microbes (e.g. “moving worms” or “tiny unidentifiable beasts that moved”, as described by residents).

Picture 7.6: Example of disgust visual effect reminding of faeces (1)

Picture 7.7: Example of disgust visual effect reminding of Faeces (2)

Picture 7.8: Example of disgust visual effect reminding of microbes

Picture 7.9: Retained disgust visual effect

3.2.2. Glo Germ© demonstration

The Glo Germ© demonstration was in the intervention to complement the videos, and was delivered as a follow-up to the videos. This is a product which can be in liquid and powder forms, among other formats [37]. The product intends to simulate germs [37]. The product is rubbed onto hands or surfaces, and becomes invisible to the naked eye [37]. An ultra-violet light is then required to be able to see the product on hands or surfaces where it is applied [37]. If adequate and efficient cleaning techniques are used to wash hands or clean the surfaces where the product was applied, then the product should completely disappear [37]. If inadequate cleaning is performed, then traces of the product should remain visible in the areas which were not properly cleaned [37].

The use of Glo Germ© was designed to contribute to shifting the HWWS outcome expectation to riddance of disgust. This was done by using Glo gel product and UV light to show that individuals can have material on their hands which they cannot see (i.e. faeces after using the toilet) and that this invisible material can be transferred to other compound residents directly or indirectly. Last but not least, Glo Germ© aimed to demonstrate that water and soap was indeed the most effective way of removing invisible material (faeces) from one's hands.

- **Glo Germ© demonstration pilot**

Glo Germ© was first piloted along with the storyboards. The PhD candidate designed a black box, with ultra-violet lights and a webcam fitted inside, so that the Glo Germ© demonstration be projected on a wall, and thus be easily visible to the entire audience (Pictures 7.10, 7.11 and 7.12). We presented Glo gel as a product which made the faeces we had on our hands become visible. During piloting, we realised that the amount of Glo gel that water and soap removed was not always substantially different from the amount removed by water only. We thus decided to only do the demonstration involving washing hands with water and soap.

Picture 7.10: Designed Glo Germ© demonstration black box

Picture 7.11: Webcam and UV lights installed inside the black box

Picture 7.12: Glo Germ© demonstration pilot in a compound

3.2.3. Videos and Glo Germ© demonstration pilot

We piloted the videos and Glo Germ© demonstration together among compound residents in Treichville, to assess whether the videos conveyed the key intervention messages clearly. This was also to ensure that Glo Germ© contributed to reinforcing the messages put across and disgust feelings triggered by the videos. Additionally, the pilot allowed us to develop the intervention delivery methods, and to develop responses to the type of questions intervention providers might be faced with. Each video group was piloted three times.

Overall, the pilot-testing results were encouraging as the videos conveyed the key intervention messages clearly, and triggered disgust among participants (Pictures 7.13, 7.14 and 7.15). Participants also identified with the stories presented and found them believable. However, and in line with the findings from the first pilot, the Glo Germ© demonstration seemed to somewhat lessen the sense of disgust created by the videos. Some participants indicated with relief that they expected to see a substance as disgusting as the one they had seen in the videos, but that what they were seeing in the demonstration was tolerable. This may have been due to the fact the product colour was white, and thus did not resemble faeces.

Another key finding was that participants tended to comment on the videos using health-related concepts. They tended to use the word 'microbes' when describing the visual effect on character's hands. They also tended to use the verb 'infected', to talk about the transfer of the substance from the negative characters to other residents or objects. It sometimes took a lot of discussions and debates in order to be able to shift the health-related discourse to a disgust-related discourse (e.g. use of the word 'poo' instead of 'microbes'; substitute the verbs 'infected' by the verb 'soiled').

We had planned to show the videos in a specific order, although the first and second group of videos were interchangeable. During the pilot, we realised that it would be best to deliver the second video group first in compounds which were predominantly Muslim, as the second video group used names and practices (i.e. the use of seridaca to rinse hands) generally associated with Muslim populations. It was important that residents identified with the characters in the videos from the first intervention delivery session. In such compounds, the intervention was generally delivered in Dioula. On the other hand, and regardless of which video group was

delivered first, the third video group was delivered last, as it contained the video promoting HWWS after having cleaned a child's bottom. As this was a secondary intervention message, we did not want it to take away from the primary intervention message, by introducing it at the beginning of the intervention delivery.

Picture 7.13: Videos pilot in a compound in Treichville

Picture 7.14: Videos pilot in a compound in Treichville, with two adults residents holding themselves, and two children turning their heads away, as disgust reactions to the images *(fieldwork assistant with the face unmasked)*.

Picture 7.15: Videos pilot in a compound in Treichville, with one resident turning her head away from the screen, as a disgust reaction to the images.

3.2.4. Posters

The third intervention component was a set of posters. Their aim was to act as reminders of the videos' content and intervention messages, including the key intervention message. The posters also aimed to contribute to strengthening the injunctive norm. This is because it included both the handwashing behaviours that residents should approve and disapprove of. The posters were designed by the graphic artist. Care was taken to ensure gender diversity in the characters represented. Due to time constraints, we did not pilot the posters.

- **Negative posters**

As part of the piloting of the videos, participants were asked to indicate which scenes in the negative videos had disgusted them the most, and which scenes did they recommend we used as posters to be placed in compounds. The PhD candidate and fieldwork assistants selected five negative videos. The graphic artist designed one poster for each selected video, based on screenshots from the videos.

The negative posters depicted inappropriate behaviours with a red cross superimposed to make it clear that this was not the recommended practice (Images 7.4, 7.6, 7.8, 7.10, 7.12). They also

had a caption to reinforce the gravity of the behaviour depicted. One example of such caption is:

"That's how he does and we all drink poo here!"

The negative posters were designed to be placed on the door inside the toilet, so residents could see them, when using the toilet.

- **Positive posters**

One solution poster per solution video was designed. Solution posters showed a key character washing their hands with soap at a tap, helped by a fellow resident (Images 7.5, 7.7, 7.9, 7.11, 7.13). The key character then raised their hands to show how clean they were after having used soap. A thumbs up was shown to indicate appropriate behaviour. The solution posters also had as their caption the intervention slogan. Solution posters were designed to be placed on a wall next to the toilet entrance, so that they would be visible when in the compound courtyard. The solution posters also contained drawings of the main soap types encountered in the study population (i.e. bar, liquid and powder soap). For both the negative and solution posters, care was taken so that the images were self-explanatory, without the need to read the captions. This was to be inclusive of participants of all literacy levels.

The negative posters were printed in A4-format, to ensure that they would fit on the toilet doors, and the solution posters in A3-format, so that they could easily be seen when in the compound courtyard. A water proof paper was used given the likelihood that the posters would be exposed to water.

Image7.4: Negative poster, with the caption reading: "*Koutoubou!!*[61] *That's how he does and we drink poo here!"*. The poster is crossed out in red, to indicate the behaviour not to engage in.

Image 7.5: This image is the solution poster to Image 4, with the intervention slogan, *Water and soap after using the toilet, that's what really works! Well indeed!"*
The samples of the three common soap types found in the study population are also

61 *Koutoubou* is a local vernacular expression to express shock or surprise.

Represented. The thumbs up under the slogan indicates that this is the behaviour to adopt.

Image7.6: Negative poster, with the caption reading: "*What!!, All the food is poo!*"

Image 7.7: This image is the solution poster to Image 6.

Image 7.8: Negative poster, with the caption reading: "*Whoa! Whoa! Whoa! She killed her baby with poo!"*

Image 7.9: This image is the solution poster to Image 8.

Image 7.10: Negative poster, with the caption reading: "*Whatttttttttt! She shared her poo with the kids!*

Image 7.11: This image is the solution poster to Image 10.

Image 7.12: Negative poster, with the caption reading: "Huhhhh! *Small poo=Big poo! So, water only equals zero!*

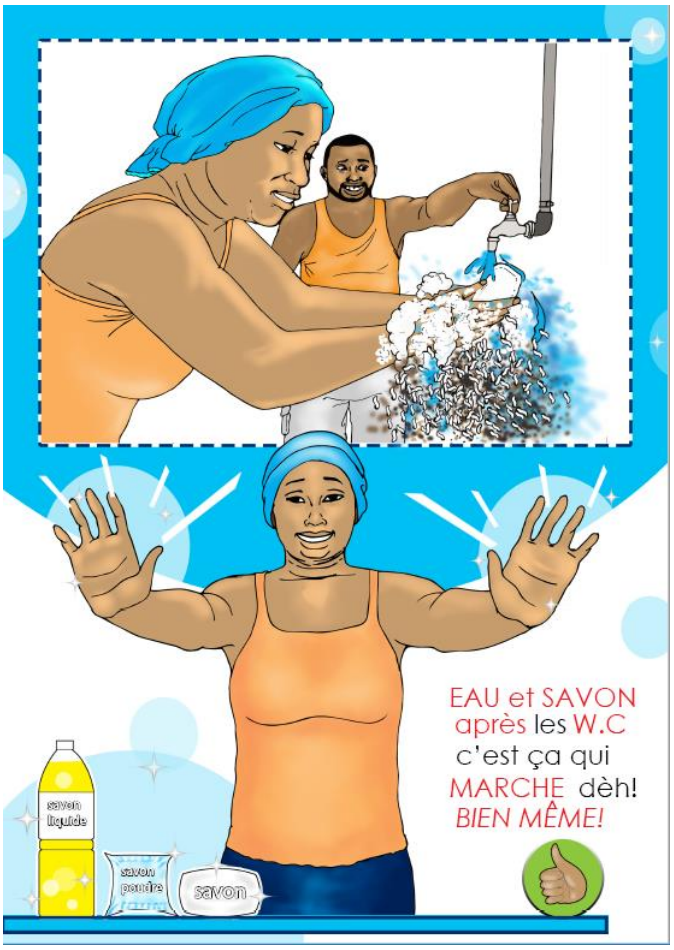


Image 7.13: This image is the solution poster to Image 12.

Appendix 8.1. Interventions providers recruitment

The PhD candidate and fieldwork assistants were in charge of the intervention providers' recruitment and training. One of the selection criteria was that staff had never worked in the health sector nor had ever taken part in health promotion before. This was key to minimise the risk that staff revert to using a health-related language during the TNSB-based intervention delivery. Another key criterion was that staff be fluent in Dioula, as the intervention would be delivered in Dioula in compounds where this was the preferred language. Candidates went through two rounds of selection. The interventions were presented to them, and they were trained to deliver the intervention both through classroom practicals and in compounds in Treichville. After a week of initial training, three candidates were hired to deliver the interventions.

The hired intervention providers then received an additional five weeks of training in delivering the interventions, mainly through practicals in compounds in Treichville, but also indoor role-play sessions (Pictures 8.1, 8.2 and 8.3). Each intervention delivery practical was followed by a debriefing session where the strengths and weaknesses of the intervention providers were discussed. The practical training sessions in Treichville, were also used to finalise the intervention delivery methods (e.g. best time to deliver the intervention, additional ways to deal with the type of questions asked). In the last week of training, the PhD candidate developed and tested the methods to assess whether disgust was the key emotion the negative videos triggered (See Chapter 9 for the detailed trial methods).

As part of their training, emphasis was put on the fact intervention providers should not deliver the intervention in a didactic fashion, but rather a participatory manner, with the audience an active part of the intervention delivery. Intervention providers were trained to position themselves as part of the study population (e.g. *We* must wash our hands with soap vs. *You* must wash your hands with soap), and to use the local vernacular used by the study population. The intervention providers were also taught to shift participants' health-related discourse to a disgust-related one, using a technique we had developed for the intervention Appendices 8.2 and 8.3).

Picture 8.1: The three-intervention staff presenting the negative and positive posters from the TNSB-based handwashing intervention, in an in-door role-play practical session.

Picture 8.2: An intervention provider practicing to deliver the HWS-only intervention, in an in-door role-play practical training session (1)

Picture 8.3: An intervention provider practicing to deliver the handwashing station-only intervention, in an in-door role-play practical training session (2).

Appendix 8.2. Videos questions session procedures

For each video, participants were asked a list of questions to ensure that they had understood the videos and messages conveyed. For each question, the intervention providers were instructed to attempt to have at least two to three participants answer the question, before intervening. The intervention providers would then intervene to summarise what had been said and add precisions/corrections when needed. Intervention providers were also trained to encourage participants to avoid using health-related terminologies (e.g. microbes, infected hands), when commenting the videos. When health terminology were used, intervention providers were trained to repeat what participants had said but replace the health-related words used by expressions linked to disgust (e.g. faeces instead of microbes, soiled hands instead of infected hands), and explain to participants why they had done so. When all questions had been answered, the intervention providers would then summarise all that had been said and, in the case of the solution videos, state the key intervention messages.

- *Negative videos questions*

1. What happened in the video?

2. What did [negative character] have on their hands?

2.1. Where did [negative character] come from?

3. Why did [negative character] have poo on their hands?

4. Why did the poo remain on the [negative character's] hands, despite them having washed their hands? *(Asked for videos where the negative character had washed their hands with water)*

4/5. How did [other character(s)] in the video also end up with poo on their hands, when they had not gone to the toilets

5/6. What happened when the characters (depending on the video) ate the food/drank the liquid/ put their hands in their mouth after having had their hands soiled with poo?

In one of the negative videos, a character was observed HWWS after having used the toilets. The disgusting substance would then disappear from their hands, as a result. For this video, additional questions were asked. These were:

What happened when the character HWWS ?

How come the character still ended up with poo on their hands, even when they HWWS?

- *Solution videos*

1. What happened in the video?

2. What did [negative character] do which they had not done in the other videos?

3. What happened when [negative character] used water and soap to wash their hands ?

4. Based on all you have seen, what should we all do to avoid eating poo?

Intervention providers would then make a summary of the lessons learned in all the videos, by stating the intervention key messages and involving the participants in the summary process.

Appendix 8.3. Technique used to encourage residents to shift their discourse from a health to a disgust-related one

During the intervention delivery pilot and design, we found that using graphic examples to which the audience could relate, was usually effective at encouraging participants to shift their discourse from a health to a disgust-related one. This in turn would contribute to shifting the health outcome expectation to disgust riddance. For instance, the following example was used to encourage participants to think of faeces as remaining on their hands after using the toilets, rather than microbes. Intervention staff would ask participants what the toilets was used for. When defaecation was mentioned, they would then asked what was left on their hands when they ate palm tree sauce with their hands. Participants would answer oil. We would then ask them again what the toilets were used for, and what was left on a person's hands when they cleaned themselves after defecating. This would generally result in the audience answering "poo". Intervention providers would then say that this was the case because, just like oil was the dirt linked to eating palm tree sauce with one's hand, faeces were the dirt left on our hands, when using the toilets.

Similar technique was used to encourage participants to use 'soiled' rather than 'infected, to describe the transfer of the disgusting substance from hands to objects or other characters. For instance, intervention providers asked participants whether, if they were holding a [given object] after having eaten palm tree sauce, whether they would say that they had 'infected' [given object] with oil. Participants would respond no, and that they had soiled [given object]. The intervention providers would then tell them that it was the same concept with faeces.

Appendix 8.4. Interventions equipments

1. TNSB-based intervention equipment

The equipment required to deliver the TNSB-based intervention comprised:

- One laptop computer (containing the intervention videos)
- One portable speaker
- One projector
- One portable power generator
- Three extension cables
- Three white sheets
- One Glo gel bottle
- One black box fitted with UV lights and a webcam
- One handwashing station
- Four 50 cl bottles of liquid soap
- Intervention posters
- Wooden boards (for the posters)
- A hammer
- Nails
- Pins

A car was used to transport the intervention providers and their equipment.

2. HWS-only intervention equipment

The equipment required to deliver the handwashing station-only intervention was as follows:

- One handwashing station
- Four 50 cl bottles of liquid soap

Appendix 8.5. TNSB-based Intervention delivery procedure

1. Video screening procedures

The group 2 videos depicted practices generally associated with Muslim populations. Thus, at the first visit, depending on whether the compound was predominantly Muslim, the group 1 or group 2 videos was screened. It was key that participants identified with the characters in the videos from the first intervention delivery session, hence the choice to invert the videos group order when relevant. Intervention staff were trained to always have one team member stand at the back of the audience (Pictures 8.1 and 8.2). This was done to ensure that participants' health-related comments made during the screening would not be missed. It was key to encourage participants to think in terms of faeces and disgust as opposed to thinking in terms of health, to facilitate the shift from a health to a riddance of disgust outcome expectation.

- *Videos questions session*

The intervention providers were provided with a list of questions that needed to be addressed after each video had been screened. These questions were tailored to the stories depicted in each video. Appendix 8.2 presents the list of questions asked to be adapted to each video. The aim of the questions was to ensure that the audience had clearly understood the video, and all the key intervention messages the video aimed to convey. Although ensuring that the target audience had understood the videos and messages was a key priority, children would occasionally be given the floor. Intervention providers would also address the comments and questions they had heard in the audience.

The question sessions were also an opportunity for the intervention providers to focus participants' attention on a disgust-related discourse (and thus riddance of disgust as an outcome expectation), using the techniques taught during their training. Appendix 8.3 presents the technique designed to shift participants' health discourse to a disgust-related one. This consisted of using daily-life scenes compound residents could easily identify with, and using a logical sequence to demonstrate why what remained on our hands after using the toilet were faeces.

At the end of the video screening session, and as a summary, the intervention providers asked the audience what needed to be done for us to avoid eating each other's faeces. The intervention providers would then restate all the key intervention messages, with audience participation, to facilitate the retention of the key intervention messages.

Picture 8.1: Video screening session in a compound with an intervention provider standing at the front and another one at the back of the audience (1).

Picture 8.2: Video screening session in a compound with an intervention provider standing at the front and another one at the back of the audience (2).

❖ *Disgust triggering emotion assessment*

After showing the last negative video and before screening the solution video, the intervention providers asked the participants to vote in order to assess the ability of the negative videos to

elicit feelings of disgust in the audience. These data were to be included in the intervention process evaluation (See Chapter 9 for the detailed process evaluation method).

2. Glo Germ© demonstration

❖ *Glo Germ© hands demonstration*

At the end of the video screening session, intervention providers told participants that they would now show them that we indeed had faeces on our hands after having used the toilet, but that we could not see them. The webcam inside the black box was connected to the computer, so that the images of the Glo Germ© demonstration taking place inside the box were projected onto the white sheet on the wall.

Intervention providers then asked for an adult volunteer in the audience. The volunteer was asked to sit at the Glo Germ© demonstration station, and raise their hands and show both sides to the audience (Picture 8.3). The audience was asked how clean the volunteer's hands were. The volunteer was instructed to place their hands inside the black box and under the webcam, so their hands were fully visible on the projection screen (Picture 8.4). The audience was invited to assess the volunteer's hands cleanliness again. On both occasions, the audience would respond that the volunteer's hands were clean.

The intervention providers then showed the Glo gel bottle to participants, and explained that this would show the areas on one's hands where there were still faeces from having used the toilet (Picture 8.5). A small amount of the product was then squirted onto the volunteer's hands (Picture 8.6), who was instructed to rub it onto their hands and nails as though applying a hand lotion, and until the product would disappear (Picture 8.7). This was repeated a second time, to ensure that the product would be well visible under the UV lights. The volunteer was then asked to raise their hands again to show them to the audience, who were asked to assess the cleanliness of the volunteer's hands again. The audience responded that the volunteer's hands were clean.

Picture 8.3: A volunteer showing their hands to the audience at the beginning of a Glo Germ© demonstration

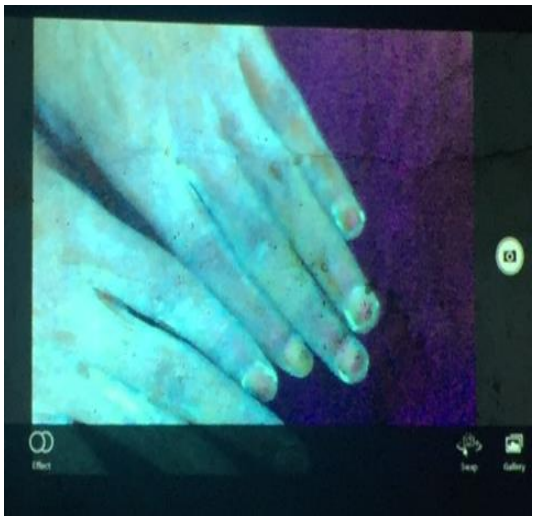
Picture 8.4: A volunteer showing their hands to the audience via the black box during Glo Germ© demonstration

Picture 8.5: An intervention provider presenting Glo gel to the audience

Picture 8.6: An intervention provider applying Glo gel on a volunteer's hands

Picture 8.7: A volunteer rubbing Glo gel on their hands

The intervention providers asked the volunteer to place their hands inside the black box, and asked participants to assess the cleanliness of the volunteer's hands again. The audience now responded that the volunteer's hands were dirty (Pictures 8.8 and 8.9). Intervention providers told the audience that what they were seeing in certain areas of the volunteer's hands were places where there were faeces from not having used soap to wash hands after having used the toilet.



Picture 8.8: Glo gel visible on a volunteer's hands under the UV-lights in the black box (1)

Picture 8.9: Glo gel visible on a volunteer's hands under the UV-lights in the black box (2)

The volunteer was then asked to wash their hands with water and soap, under the supervision of the intervention providers. This was done using soap, two buckets, including one filled with water, and a small container (Pictures 8.10 and 8.11). All handwashing equipment used had been requested from a compound resident, prior to the Glo Germ© demonstration. The intervention providers would emphasise to the audience that both the water and soap came from their compounds. They would also stress that any soap type (e.g. BF, Cabakrou, Omo soap brands which are commonly used in the study population) could be used (Pictures 8.12 and 8.13). This was done to emphasise the fact that no special or expensive soap was required. The volunteer was then asked to place their hands back in the black box, for the audience to assess their cleanliness again. The audience now rated the volunteer's hands as being clean.

Picture 8.10: An intervention provider showing the audience a container with a soap bar from the compound, to demonstrate that any soap type is effective at washing hands
.

Picture 8.11: An intervention provider showing the audience a powder soap pack from the compound to demonstrate that any soap type is effective at washing hands.

Picture 8.12: Two intervention providers supervising a volunteer their hands with soap.

Picture 8.13: A volunteer being assisted by an intervention wash provider to rinse their hands after having washed their hands with soap

- *Glo Germ© object demonstration*

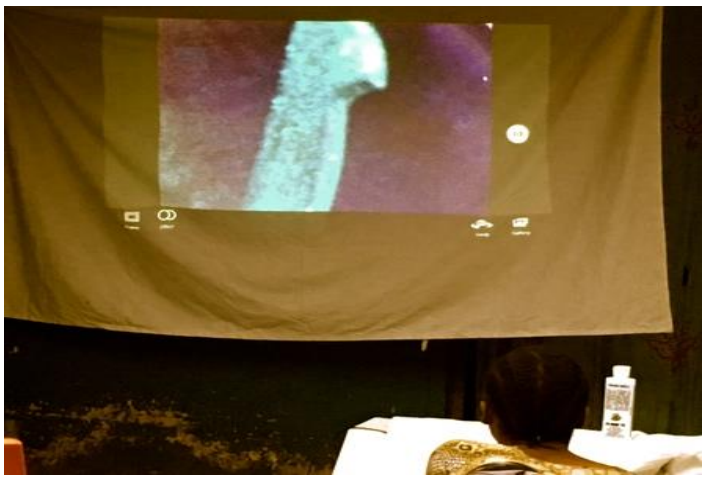
The procedure described above was also used to show that, by touching objects after not having HWWS after using the toilet, we ended up soiling the objects with our faeces. The demonstration was done using a clean cooking knife the intervention providers had asked the audience to provide them with. This object was chosen as it is commonly used by and shared among compounds residents.

A new volunteer was asked to carefully raise the knife, holding it so that the handle would be visible. The audience was then asked to assess the knife cleanliness, to which they responded that it was

clean. The same procedure was repeated, but placing the knife in the black box (Picture 8.14). Intervention providers would then show the Glo gel product to the audience, and explain again the product role. A small amount of the product was squirted on the knife handle, and the volunteer was asked to rub it until the product would disappear. The volunteer was then asked to raise the knife for the audience to assess its cleanliness, to which they responded that it was clean. The same question was asked, with the knife placed back inside the black box. The audience would now respond that the knife was dirty (Picture 8.15). Intervention providers would explain that what the audience was seeing were the areas where there were faeces on the knife. They would then ask the audience whether the knife had gone to the toilet, to which the audience would respond no. The intervention providers would explain that the knife had been soiled by a resident who had gone to the toilet, but had not HWWS. The resident had then touched the knife, thereby soiling it with their faeces.

At the end of the Glo Germ© demonstration, the audience was asked what we needed to do to avoid having faeces on our hands and eating each other's faeces. The audience would respond that we had to practise HWWS after having used the toilet.

Picture 8.14: Glo Germ© knife demonstration before Glo gel application



Picture 8.15: Glo gel visible on the knife handle under the UV-lights in the black box

3. Handwashing station

After the Glo Germ© demonstration, the intervention providers informed the audience that they would now be given a gift. The intervention providers explained that the gift brought was to encourage residents to HWWS after using the toilet. The audience was asked to remember how, during the Glo Germ© demonstration, handwashing had to be performed by fetching water and soap at different locations in the compound. The HWS was presented as resolving this issue.

The intervention providers were instructed to place the HWS at the toilet entrance, in compounds where toilets were grouped in a single location, and in the middle of the compound, when toilets were located in separate areas (Pictures 8.16 and 8.17). The intervention providers then set up the HWS, explaining what each component was for, where they should be placed on the stand, and how the HWS worked. When showing where the bottle of liquid soap was to be placed on the stand, intervention providers showed where the other soap types could be placed on the stand.

Participants were told that the HWS stand was made of wood, and that for the sake of sustainability, they should avoid moving the HWS, especially when it was filled with water. They were also instructed not to remove the HWS bucket with the tap attached to fetch water, as removing it and placing it back frequently could risk damaging the stand. They were rather advised to fetch water with a different bucket from the compound, and bring the bucket to the HWS to pour the water in the station. A

participant would then be asked to fetch some water to fill up the HWS. The intervention providers would show the audience the level the HWS bucket should be filled to. The bucket was not to be filled to the point where water could overspill.

Picture 8.16: Handwashing station placed at the toilet entrance

Picture8.17: Handwashing station placed in the middle of a compound

A volunteer was then asked to come up to the HWS, so that the intervention providers could demonstrate to the audience how to wash hands using the HWS. The volunteer was shown how to open the tap by either using their hands or their wrist (Picture 8.18), and told to wet their hands, and close the tap. They were then told to pour soap on their hands, using the liquid soap bottle provided. The audience was informed that the bottle cap had been pierced, so that it would be more convenient to pour the soap (Picture 8.19). The volunteer was asked to rub their hands together to lather the soap, as they would usually do when they washed their hands. The intervention providers then told the volunteer to open the tap again, to rinse their hands. As there would have been dirt from the toilet placed on the tap when opening it, the audience was instructed to take some water in their hand, whilst there was still some soap on it, to rinse the tap (Picture 8.20). When soap had disappeared from their hands, the volunteer was asked to close the tap, and dry their hands using a tissue, towel, or their own clothes. Participants were advised to either dispose of wastewater from handwashing every time they used the HWS, or wait for the wastewater container to be almost filled up to empty it. The container should however never be left to fill up so much that water would overspill.

The intervention providers then told the audience that, in order to encourage them to practice HWWS after using the toilet, they had brought them three additional soap bottles (a second gift), to be used to replace the soap at the HWS when it would end.

Picture 8.18: A volunteer opening the handwashing station tap with their wrist, as instructed.

Picture 8.19: Liquid soap bottle caps being pierced for the intervention delivery.

Picture 8.20: A volunteer rinsing the handwashing station tap, as instructed.

- *Handwashing station maintenance discussion*

At the end of the HWS demonstration, discussions were held on HWS maintenance. Intervention providers told participants that there should always be water and soap at the HWS. The audience were then asked how they would organise themselves so that there would never be a lack of water at the

HWS. Similarly, participants were asked how they would organise themselves to continue replenishing the HWS with soap, when the four soap bottles supplied were empty. Intervention providers were instructed to advise participants that one way to replace the soap would be by making soapy water. This would entail mixing a 50 g pack of powder soap (retailing at approximately 25FCFA[62]), in a suitable bottle filled with water. Pictures 8.21 to 8.24 illustrate the process of making soapy water from a test, prior to intervention delivery. Last, but not least, participants were told that, when needed, they could clean the HWS buckets. The bucket with the tap would have to be carefully removed from the stand when empty, to do so.

Picture 8.21: Making soapy water with a 50 g pack of powder soap

Picture8. 22: Bottle of soapy water ready to use

[62] A little less than 0.05 pounds.

Picture 8.23: Testing the soapy water made

Picture 8.24: The soap lathers, indicating success

During HWS delivery, intervention staff also collected data which would enable to assess the HWS sustainability (Chapter 8.9). These included where the HWS had been installed in the compound, and how compound residents had agreed to organise themselves to maintain the HWS.

4. Posters

At the end of the HWS demonstration, participants were told that they would be given a third gift in the form of posters, so that they would not forget all they had seen that day. The negative poster was shown to participants, and they were asked to describe what the image presented. They were then told that the red cross on the poster indicated the behaviour that should not be done after having gone to the toilet. Intervention providers explained that the poster would be fixed on the door inside the toilet, so that residents would be able to see the image when using the toilet. The positive poster was then shown, and participants were asked to explain the image. They were told that this poster depicted the behaviour that we should all do after having used the toilet. It would be placed on a wall at the toilet entrance, so that residents could see it from the courtyard. Participants were told that the thumbs up indicated that this was expected in the entire compound after having used the toilet. With residents' permission, wooden boards were fixed to the wall at the toilet entrance(s), and on the door(s) inside the toilet, using a hammer and nails. The posters were then pinned to the boards (Pictures 8.25, 8.26, 8.27 and 8.28). Before pinning the posters, the intervention providers thanked participants for their time and having shared the joyful moments with them.

Picture 8.25: Negative poster on a door inside the toilet.

Picture 8.26: Negative poster on a door inside the toilet.

Picture 8.27: A positive poster at the toilet entrance in a compound.

Picture 8.28: A positive poster and a handwashing station at the toilet entrance in a compound.

We aimed to deliver the TNSB-based intervention six times in each compound, with each video group being shown twice. However, during the second round of the intervention delivery, it was decided that the remaining video groups would only be shown once in each compound. This was because, during intervention providers' debriefing sessions, the latter reported that participants did not seem to be as enthused, when realising that they had already seen the group of videos screened.

Additionally, and as the Glo© germ demonstration was the intervention section where some participants tended to leave the session, we decided not to implement it again during the second intervention delivery round. Thus, only the first group of videos screened was implemented twice in each compound. The shortened session took no more than 45 minutes. The posters were changed every time a new group of videos was shown.

One week post initial intervention delivery, intervention providers visited compounds to ensure that there were no problems with the handwashing station (e.g. broken stand, broken tap). In case of any problems, they were either addressed on the spot, when feasible (e.g. tightening of the tap joint), or the station was immediately replaced.

Appendix 9.1. Handwashing observation grid

Observation grid collecting data on handwashing practices by gender and age group

Moment	**Sexe**	**Tranche d'âge**	**LM**	**Utilisation de l'eau et du savon**	**Equipement**	**L'activité qui suit inclue-t-elle l'utilisation de l'eau et du savon ?**
WC.....**1** WC+seridaca.....**2** Nettoyer les fesses d'un enfant.....**3** Autre(s) moment(s)..**4**	Homme...**1** Femme....**2**	Adulte (16+)...**1** 5 à 15.....**2** Moins de 5.....**3**	Non lavées.....**1** Une main.....**2** Deux mains.....**3**	N/A.....**8** Eau simple.....**1** Eau et savon.....**2**	N/A.....**8** Lavabo.....**1** Station.....**2** Autre.....**3**	Oui.....**1** Non.....**2**

Appendix 9.2. Masking observation grid

Grid collecting data on domestic compound activities by gender and age group

Activité	**Sexe**	**Tranche d'âge**
Lessive.....**1**	Homme.....**1**	Adulte (16+).....**1**
Vaisselle.....**2**	Femme.....**2**	5 à 15.....**2**
Préparation de plat.....**3**		
Laver/Nourrir un enfant.....**4**		
Balayage de la cour.....**5**		

Appendix 9.3. Masked handwashing station observation grid

Observation grid collecting data on handwashing stations (e.g. presence of HWS, presence of water and soap at HWS), masked with items mainly collecting information on type of sanitation equipment present in the compound.

		0-5	6-10	11-15	16-20	+20
1.	**Combien de personnes y avait-il dans la cour <u>au début</u> de l'observation?**	1	2	3	4	5
2.	**Combien de personnes y avait-il dans la cour <u>a la fin</u> de l'observation?**	1	2	3	4	5

		Oui	Non	N/A
3	**Est-ce qu'il a plu pendant l'observation?**	1	2	.
4	**S'il a plu, est-ce que ça a interrompu les activités des habitants de la cour ?**	1	2	8

<u>Equipements</u>

		Oui	Non
5.	**Est-ce qu'il y a une poubelle dans la cour ?**	1	2
6.	**Est ce qu'il y a un lavoir dans la cour ?**	1	2
7.	**Est-ce qu'il y a un lavabo dans la cour ?**	1	2
8.	**Est ce qu'il y a une station de lavage des mains dans la cour ?**	1	2
8.1.	**Est ce qu'il y a un autre type de lieu aménagé pour le lavage des mains ?**	1	2
9	**Est-ce qu'il y a un système d'évacuation des eaux usées dans la cour ?**	1	2

10. S'il y a un système d'évacuation des eaux usées dans la cour, quel type est-ce ?

	Oui	Non	Pas observable	N/A
Lavoir	1	2	3	8
'Trou'	1	2	3	8
Puits perdu	1	2	3	8

11. Est--ce qu'il y a un.....a l'entrée de la cour *(à extérieure)?*

	Oui	Non
Caniveau	1	2
Lavoir	1	2
Puits perdu	1	2

	Oui	Non	NA
12. Est-ce qu'il y avait de l'eau dans la station de lavage des mains <u>au début</u> de l'observation?	1	2	8
13. S'il y avait de l'eau, est-ce que la station s'est retrouvée sans eau à un moment de l'observation?	1	2	8

	Aucune action prise	Eau remplacée	N/A
14. S'il n'y avait pas d'eau dans la station au début ou a un moment pendant l'observation, quelle action a été prise par les habitants ?	1	2	8

	Oui	Non	N/A
15. Est-ce qu'il y avait du savon à la station de lavage des mains au début de l'observation?	1	2	8

		Savon liquide dans une bouteille	Savon liquide dans une bouteille avec pompe	Barre de savon	Savon en poudre	N/A
16.	**S'il y avait du savon, quel type de savon était-ce?**	1	2	3	4	8

		Oui	Non	N/A
17.	**Est-ce que le savon s'est achevé à un moment pendant l'observation?**	1	2	8

		Aucune action prise	Bouteille/savon remplacée	Bouteille de savon rempli à nouveau	N/A
18.	**S'il n'y avait pas de savon au début ou a un moment pendant l'observation, quelle action a été prise par les habitants?**	1	2	3	8

Appendix 9.4. Masked handwashing social norms-related scales

Questionnaire sur l'Organisation des Cours

Bonsoir, excusez-nous du dérangement, nous soutenons notre sœur qui fait ses études en Europe. On lui a demandé d'étudier comment les cours sont organisées. En général, quand les hommes et les femmes sont à la maison, quel(s) type(s) d'activité(s) ils font (ex. laver les habits, les assiettes, preparer). Est-ce que les hommes aident les femmes à préparer, faire la lessive, la vaisselle, s'occuper des enfants, etc. Aussi, est-ce qu'il y a la bonne entente dans la cour ? Si ca ne vous dérange pas, on va échanger un peu avec vous. Vous pouvez continuer votre activité, ca ne nous dérange pas.

	Oui	**Non**
Est-ce que vous habitez en permanence dans ce ménage, c'est à dire, vous n'êtes pas un visiteur ? ***(Si l'enquêté est un visiteur, demander-lui si un habitant permanent du ménage est présent. Si la réponse est non, demander à quel moment vous pouvez repasser pour parler à un résident permanant du ménage. Passez au ménage suivant !)***	1	2

	Oui	**Non**
Consentement éclairé du ménage:	1	2

	Homme	**Femme**
Sexe :	1	2

	16-24	**25-34**	**35-44**	**45-54**	**55-64**	**65+**	**Refuse de répondre**
Est-ce que vous avez entre :	01	02	03	04	05	06	66

	NA	**Mur monté**	**Couloir**
Particularité du ménage :	88	01	02

……

Je vais vous demander votre avis sur comment les choses se passe dans la cour, même si vous n'avez pas vu avec vos yeux, il faut me dire ce que vous même vous pensez.

		***(Ah)* ca seulement c'est FAUX !/ vérité/ '…même'/'…deh !/ '…keh !'/ Hmmm ! 'En tout cas…'/Ahh !!!/ Nonnn !!/ Jamais !/ Tu dis rien !/ Pas du tout !/Quand même !Non hein !!/ 'Tout le monde sait…'/ '*(C'est ca)* Ye dis…'/ C'est ça tu dis doucement ?/ Ou ça ?/ C'est pas ici !/Non, t*k-tk/* 'Il faut reconnaitre...'/ Wouhh !**	**C'EST FAUX/ Non/ Non-Non/ C'est pas vrai**	**'C'est PAS faux'/ 'C'est vrai AUSSI'/ DES FOIS aussi…/ SOUVENT aussi…/ C'est pas toujours/ Certains…/ On peut dire ça/ C'est PAS forcé/Si on veut voir…**	**C'EST VRAI/ Oui/ Oui-oui/ Si/Si-si/ Voilà/ Tu vois non ?**	***(Ah)* ca seulement c'est VRAI !/ '…vérité' '…même'/ '…deh !'/ '…keh !'/ 'En tout cas…'/ Wouhh !/ Ouiiiii !!/Tu dis rien/ Quand même !/ 'Tout le monde sait…'/ '(*C'est ca)* Ye dis…'/ C'est ca tu dis doucement ?/ Voiiila ! Effectivement !/ Justement !/ Forcé/ 'Il faut reconnaitre…'**	**N S P**
1.	**Dans votre cour, la majorité des hommes passent plus de temps dehors que dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
2.	**Vous pensez que beaucoup de garçons font la cuisine, dans votre cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
3.	**Ce sont les femmes qui travaillent le plus dans votre cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
4.	**Vous pensez que le travail des femmes dans la cour n'est pas dur *(ex. lessive, vaisselle, cuisiner, s'occuper des enfants…).***	5	4	3	2	1	7
Expression(s) clé(s) :							
5.	**Quand les garçons sont dans la cour, les femmes peuvent se reposer de leur travail *(ex. les garçons font le travail des femmes).***	5	4	3	2	1	7
Expression(s) clé(s) :							

6.	**Les garçons aident les femmes dans leur travail dans la cour *(ex. lessive, vaisselle, cuisiner…)***	5	4	3	2	1	7
Expression(s) clé(s) :							
7	**Dans <u>VOTRE COUR</u>, si c'est <u>PAS VOUS, Y'A PAS ASSEZ</u> de personnes qui lavent leur mains <u>AVEC SAVON APRES LES WC.</u> *(On parle pas d'eau simple, mais avec savon !)***	5	4	3	2	1	7
Expression(s) clé(s):							
8.	**Vous croyez /pensez que y'a <u>PAS BEAUCOUP</u> de gens qui lavent leurs mains <u>AVEC SAVON APRES LES WC</u> dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
9.	**A PART <u>VOUS, Y'A PAS ASSEZ</u> de personnes qui trouvent que c'est important de laver les mains <u>AVEC SAVON APRES LES WC DANS LA COUR.</u>**	5	4	3	2	1	7
Expression(s) clé(s) :							
10.	**<u>LA PLUS PART</u> des gens <u>DANS LA COUR</u> trouvent que laver les mains <u>AVEC SAVON APRES LES WC</u> ca ne leur dit rien *(c'est a dire, ils ne pensent pas a ca).***	5	4	3	2	1	7
Expression(s) clé(s) :							

11.	**Si c'est <u>PAS VOUS</u>, laver les mains <u>AVEC SAVON APRES LES WC</u> n'est <u>PAS</u> dans la tête des gens <u>DE LA COUR</u>.**	5	4	3	2	1	7
Expression(s) clé(s) :							
12.	**Dans la cour, on remarque pas facilement qui lave les mains et qui lavent pas les mains après les WC.**	5	4	3	2	1	7
Expression(s) clé(s) :							
13.	**C'est <u>DIFFICILE</u> de voir qui lave les mains après les WC.**	5	4	3	2	1	7
Expression(s) clé(s) :							
14.	**Vous trouvez que les gens font beaucoup palabres dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
15.	**Les gens de la cour sont comme des ennemis pour vous *(n'aiment pas votre affaire)*.**	5	4	3	2	1	7
Expression(s) clé(s) :							
16.	**Les gens de la cour sont comme une famille pour vous.**	5	4	3	2	1	7
Expression(s) clé(s) :							
17.	**Vous êtes plus à l'aise *(mieux ; plus bien)* avec d'autres personnes, que les gens de la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
18.	**Vous pensez que vous êtes mieux que les gens de la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
19.	**Vous vous sentez pas proche *(ami)* des gens de la cour**	5	4	3	2	1	7
Expression(s) clé(s) :							

20.	**Quand un malheur ou un bonheur arrive à quelqu'un dans la cour, c'est comme si ça arrivait à tout le monde dans la cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							
21.	**Si quelqu'un qui n'est pas de la cour vient et puis commence à mal parler de quelqu'un de la cour, c'est comme si la personne parlait mal de vous aussi.**	5	4	3	2	1	7
Expression(s) clé(s) :							
22.	**Vous pensez que les gens de la cour ne s'aident pas entre eux.**	5	4	3	2	1	
Expression(s) clé(s) :							
23.	**Vous pensez que y a <u>PAS</u> la solidarité dans la cour.**	5	4	3	2	1	
Expression(s) clé(s) :							
24.	**Pour qu'il y'ait l'entente, dans la cour, il faut qu'il y'ait uniquement des personnes de même ethnie dans la même cour.**	5	4	3	2	1	
Expression(s) clé(s) :							
25.	**Pour qu'il y'ait l'entente dans une cour, il faut qu'il y'ait que des Chrétiens ou uniquement des Musulmans dans la même cour.**	5	4	3	2	1	7
Expression(s) clé(s) :							

26. Vous êtes de quelle religion ?

Musulman	01
Catholique	02
Protestant	03
Autre Chrétien	04
Animiste	05
Autre: _____	06
Pas de religion	07
Refuse de répondre	66

27. Y'a combien de ménages dans la cour? (VERIFIER !) _____

28. Y'a combien de personnes qui vivent en permanence dans VOTRE ménage ? _____

	Oui	Non
29. Est-ce que c'est un ménage de célibataire ?	1	2

30. Y'a combien de pièce dans votre maison ? _____

31. Le loyer que vous réglez est de combien comme ca ? _____

	Oui	Non
32. Est-ce que vous avez des enfants qui ont moins de 5 ans ?	1	2

33. **Quelle est l'activité économique du *(premier)* chef de ménage?** ***Ecrivez les mots exactes de l'enquêté et entourez le nombre correspondant SI vous connaissez le corps de métiers. Si c'est un ménage de célibataires, demandez l'activité économique du grand frère/de la grande sœur du ménage.***

_____

Agriculture	01
Employé de maison	02
Manuel non qualifié	03
Manuel qualifié	04
Armée/police et sécurité	05
Services	06
Ventes et commerce	07
Employés	08
Cadre/technicien/dirigeants	09
A la retraite	10
Au chômage	11
Autres (élèves, femmes aux foyers, sportif professionnel, etc…)	12
Refuse de répondre	13

Quelle est l'activité économique du *(second)* chef de ménage? ***Ecrivez les mots exactes de l'enquêté et entourez le nombre correspondant SI vous connaissez le corps de métiers. Si c'est un ménage de célibataires, demandez l'activité économique, du second grand frère/de la seconde grande sœur du ménage.***

34.

_____

Agriculture	01
Employé de maison	02
Manuel non qualifié	03
Manuel qualifié	04
Armée/police et sécurité	05
Services	06
Ventes et commerce	07
Employés	08

Cadre/technicien/dirigeants	09
A la retraite	10
Au chômage	11
Autres (élèves, femmes aux foyers, sportif professionnel, etc…)	12
Refuse de répondre	13
N/A	88

35. **Quel est le niveau d'éducation du *(premier)* chef de ménage? *Si c'est <u>un ménage de célibataires</u>, demandez le niveau d'éducation <u>du grand frère/de la grande sœur du ménage</u>.***

Aucun	01
Primaire/Ecole coranique	02
Secondaire-**ne connaît pas le niveau**	03
Secondaire-BEPC	04
Secondaire-BEPC-Terminal	05
Etudes supérieures	06
Autre :	07
_____	
Refuse de répondre	66

36. **Quel est le niveau d'éducation du *(second)* chef de ménage? *Si c'est un <u>ménage de célibataires</u>, demandez le niveau d'éducation du <u>second grand frère/de la seconde grande sœur du ménage.</u>***

Aucun	01
Primaire/Ecole coranique	02
Secondaire-**ne connaît pas le niveau**	03
Secondaire-BEPC	04
Secondaire-BEPC-Terminal	05
Etudes supérieures	06
Autre :	07
_____	
Refuse de répondre	66
N/A	88

Oui	Non

37.	**Est ce que vous avez une télé?**	1	2
38.	**Est-ce que vous avez une radio ?**	1	2

C'est fini, merci beaucoup...J'aimerais juste vous demander :

39. Qu'est ce que vous avez pensé du questionnaire ?

_____
_____
_____

40. Est-ce qu'il y a des activités importantes dans la cour dont on n'a pas parlé et que vous pensez que je dois rajouter?

_____
_____
_____

41. Je vais aller poser les mêmes questions à d'autres personnes dans votre cour et dans d'autres cours. Si les personnes de votre cour vous demande y a quoi dans le questionnaire comment vous pouvez leur expliquer de quoi le questionnaire parle ?

_____
_____
_____

……

	lm	lm+hyg	lm+cour	lm+hyg+cour	hyg	hyg + cour	cour	autre	NSP
Masque	1	2	3	4	5	6	7	8	77

MERCI BEAUCOUP

Appendix 9.5. TNSB-based intervention process evaluation

1. Disgust triggering emotion vote-recording form

I. Participants

1. **Nombre d'adultes présents au moment du vote :**
2. **Nombre de participants au vote:**
3. **Nombre de participants femmes :**
4. **Nombre de participants hommes :**

II. Résultats

5. **Nombre de participants dégoutés :**

5.1. **Mots, expressions utilisés pour exprimer le dégout :**

_____

_____

6. **Nombre de participants indifférents :**
7. **Nombre de participants amusés :**
8. **Autres observations :**

_____

_____

2. TNSB-based intervention process evaluation questionnaire

Evaluation: Campagne groupe 3

	Oui	Non
Est-ce que vous habitez en permanence dans ce ménage, c'est à dire, vous n'êtes pas un visiteur ? ***(Si l'enquêté est un visiteur, demander-lui si un habitant permanent du ménage est présent. Si la réponse est non, demander à quel moment vous pouvez repasser pour parler à un résident permanant du ménage. Passez au ménage suivant !)***	1	2

	Oui	Non
Consentement éclairé du ménage:	1	2

	Homme	Femme
Sexe :	1	2

	16-24	25-34	35-44	45-54	55-64	65+	Refuse de répondre
Est-ce que vous avez entre :	01	02	03	04	05	06	66

0. L'enquêté n'a pas vu la campagne car :

	Oui	Non	N/A
1. Nouvel habitant	1	2	88
2. En voyage	1	2	88
3. Au travail	1	2	88
4. Autre_____ _____	1	2	88

A. Exposition à la campagne

	Oui	Non	NSP	N/A
1. On est passé plusieurs fois dans votre cour pour partager des moments de joie avec vous. Est-ce que vous étiez là ?	1	2	77	.
2. On est venu vous montrer des vidéos qui font rire. Est-ce que vous avez regardé les vidéos ?	1	2	77	88

	0	1	2	3	4	5+	NSP	N/A
2.1. Vous avez regardé les vidéos combien de fois ?	1	2	3	4	5	6	77	88

	Oui	Non	NSP	N/A
3. Est-ce que vous avez vu la démonstration où on a mis un produit sur la main d'un habitant de la cour et puis sur un couteau, et puis on devait voir à la machine si la main et le couteau étaient propres ?	1	2	77	88

3.1. Qu'est ce que le produit faisait ? *(NE PAS LIRE LES PROPOSITIONS DE REPONSE !). UNE SEULE REPONSE POSSIBLE !*

	Réponse
Montrait les endroits où le caca était	1
Crème pour les mains	2
Montrait les endroits où il y avait la saleté	3
Autre _____	4
NSP	77
N/A	88

	0	1	2	3	4	5	NSP	N/A
3.2. Vous avez vu la démonstration combien de fois ?	1	2	3	4	5	6	77	88

	Oui	Non	NSP	N/A
4. On a donné une station de lavage des mains avec 4 savons liquides à la cour. Est-ce que vous avez vu la station?	1	2	77	88
4.1. Est-ce que vous avez vu les bouteilles de savon ?	1	2	77	88

	Oui	Non	NSP	N/A
5. On a mis des affiches dans votre cour. Est-ce que vous avez vu les affiches ?	1	2	77	88

5.1. Où étaient les affiches ? *(NE PAS LIRE LES PROPOSITIONS DE REPONSE !).*

	Oui	Non
A l'entrée des toilettes	1	2
Dans les toilettes	1	2
A l'entrée des toilettes et dans les toilettes	1	2
Autre _____	1	2
NSP	1	2
N/A	1	2

	Oui	Non	NSP	N/A
5.2. Est-ce que vous pouviez voir les affiches quand vous étiez dans les WC ?	1	2	77	88

6. ***RÉSUMÉ : Les participants ont été exposés à :***

	Réponse
Aucun élément de la campagne	*1*
Un élément de la campagne	*2*
Deux éléments de la campagne	*3*
Trois éléments de la campagne	*4*
Tous les quatre éléments de la campagne	*5*

B. Messages retenus de la campagne

7. Quel(s) message(s) vous avez retenu de la campagne ? *(NE PAS LIRE LES PROPOSITIONS DE REPONSE !). PLUSIEURS REPONSES POSSIBLES !*

	Oui	**Non**	**N/A**
Aucun	1	2	88
Se laver les mains	1	2	88
Se laver les mains avec eau et savon	1	2	88
Se laver les mains avec eau et savon après les WC	1	2	88
Se laver les mains avec eau et savon après avoir nettoyé les fesses d'un enfant	1	2	88
Se laver les mains avec eau et savon après le contact avec les selles (WC+nettoyer les fesses d'un enfant)	1	2	88
Se laver les mains avec eau et savon après le contact avec les selles et à d'autres moments (e.g. avant de manger).	1	2	88
Se laver les mains à tout autre moment que ceux de la campagne (e.g. avant de manger)	1	2	88
Autre _____	1	2	88

_____

7.1. Autres messages *(NE PAS LIRE LES PROPOSITIONS DE REPONSE !). PLUSIEURS REPONSES POSSIBLES !*

	Oui	Non	N/A
Aucun	1	2	88
On a du caca sur les mains, après les WC, mais on ne voit pas	1	2	88
Si on ne se lave pas les mains avec savon après les WC, on mange notre caca	1	2	88
On distribue notre caca aux autres	1	2	88
L'eau simple ne suffit pas pour enlever le caca sur les mains	1	2	88
Seul le savon marche pour enlever le caca sur les mains	1	2	88
Si une seule personne de la cour ne lave pas ses mains avec savon après les WC, tous les autres vont manger son caca	1	2	88
Autre _____	1	2	88
_____			
_____			

Suggestions

	Oui	Non	NSP	N/A
8. Est ce qu'il y a quelque chose que vous voulez qu'on change ou améliore dans ce qu'on a fait ?	1	2	7	8

8.1. Si vous avez répondu oui à la question 8, qu'est ce qu'on doit changer/améliorer ?
_____
_____
_____
_____

Appendix 9.6. Handwashing station sustainability assessment

1. Handwashing station delivery form

Fiche Installation Station

		Oui	Non
1.	**La station est-elle placée à l'entrée des WC ?**	1	2
2.	**Problème(s) rencontrés au niveau de l'emplacement de la station ?**	1	2

2.1 **Types de problème(s) rencontrés et résolution(s):**

_____

_____

_____

3. **Proposition d'organisation pour l'eau à la station:**

_____

_____

_____

Responsabilité de tous	**Organisation définie**
1	**2**

4. Proposition d'organisation pour garder les 3 savons offerts et les remplacer à la fin des 4 savons offerts :

_____

_____

_____

_____

	Responsabilité de tous	Organisation définie
	1	2

5. Autres observations :

_____

_____

_____

_____

2. Handwashing station follow-up form

Fiche Installation Station-Suivit

		Oui	Non
1.	**La station est-elle placée à l'entrée des WC ?**	1	2
2.	**La station a-t-elle été déplacée ?**	1	2
3.	**Problème(s) rencontrés au niveau de l'emplacement initial de la station ?**	1	2

3.1 Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

		Oui	Non
4.	**La station est-elle endommagée ?**	1	2
5.	**Y-a-t-il de l'eau dans la station ?**	1	2
6.	**Y-a-t-il du savon à la station ?**	1	2
7.	**Y-a-t-il un problème de gestion de la station ?**	1	2

7.1. Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

		Oui	Non
8.	**La station est-elle hors service ?**	1	2

8.1. Depuis combien de temps la station est-elle hors service ?

- de 7 jours	Une semaine	2 à 3 semaines	Un mois	Plus d'un mois	N/A
1	2	3	4	5	8

Posters

		Oui	Non	N/A
9.	**Les posters sont-ils toujours présents?**	1	2	8
10.	**Les posters ont-il été déplacé ?**	1	2	8
11.	**Problèmes rencontrés au niveau des posters ?**	1	2	8

11.1 Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

3. Handwashing station process evaluation form

Fiche Installation Station-P.E

		Oui	Non
1.	**La station est-elle placée à l'entrée des WC ?**	1	2
2.	**La station a-t-elle été déplacée ?**	1	2
3.	**Problème(s) rencontrés au niveau de l'emplacement initial de la station ?**	1	2

3.1 Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

		Oui	Non
4.	**La station est-elle endommagée ?**	1	2
5.	**Y-a-t-il de l'eau dans la station ?**	1	2
6.	**Y-a-t-il du savon à la station ?**	1	2
7.	**Y-a-t-il un problème de gestion de la station ?**	1	2

7.1. Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

		Oui	Non
8.	**La station est-elle hors service ?**	1	2

8.1. Depuis combien de temps la station est-elle hors service ?

- de 7 jours	Une semaine	2 à 3 semaines	Un mois	Plus d'un mois	N/A
1	2	3	4	5	8

Posters

		Oui	Non	N/A
9.	**Les posters sont-ils toujours présents?**	1	2	8
10.	**Les posters ont-il été déplacé ?**	1	2	8
11.	**Problèmes rencontrés au niveau des posters ?**	1	2	8

11.1 Type(s) de problème(s) rencontré(s) et résolution(s):

_____

_____

_____

	Oui	Non
12. Est ce qu'il y a quelque chose que vous voulez qu'on change ou améliore au niveau de la station?	1	2

12.1 Si vous avez répondu oui à la question 12, qu'est ce qu'on doit changer/améliorer ? (<u>ECRIRE ET ENTOURER LA REPONSE !</u>)

	Oui	Non	N/A
Le support doit être fait en un matériau plus solide	1	2	88
Le seau doit être remplacé par un seau dans un matériau plus solide	1	2	88
Le robinet doit être remplacé par un robinet dans un matériau plus solide	1	2	88

Autre_____

_____

_____

_____

	Oui	Non	NSP	N/A
13. Est-ce que vous pensez qu'il y'aurait moins de problèmes d'entretien de la station, si chaque porte avait sa station ?	1	2	77	88
13.1. Pourquoi ? _____ _____ _____ _____				

Appendix 10.1 On-treatment analyses of handwashing primary behavioural outcomes

Table 10.1.2: Observed handwashing behaviours after using the toilets, by trial phase and trial arm *(*Baseline: *August-September 2014;* One-month follow-up*: September-November 2016;* Five-month follow-up: *January-March 2017) (On-treatment))*

Event	Control arm n	% (95% CI)	HWS-only arm n (%)	% (95% CI)	TNSB-based arm n (%)*	% (95% CI)
Baseline						
Number of events observed						
Total	668		740		709	
Hands washed with soap	37	5.5 (4.0-7.6)	27	3.7 (2.1-6.2)	46	6.5 (4.2-9.8)
Hands washed with water only ..or gel	205	30.7 (24.8-37.3)	189	25.5 (18.1-34.7)	199	28.1 (22.1-34.9)
Hands not washed	426	63.8 (57.2-69.9)	524	70.8 (61.1-79.0)	464	65.4 (58.6-71.7)
One-month follow-up						
Number of events observed						
Total	566		595		588	
Female	305	53.9	292	49.1	337	57.3
Male	261	46.1	303	50.9	251	42.7
Adults (16≥)	461	81.5	498	83.7	490	83.3
Children	105	18.6	97	16.3	98	16.7
Hands washed with soap	25	4.4 (2.8-6.8)	53	8.9 (6.2-12.7)	143	24.3 (18.2-31.7)
Hands washed with water only or gel	186	32.9 (25.6-41.0)	196	32.9 (26.0-40.8)	195	33.2 (24.9-42-7)
Hands not washed	355	62.7 (55.5-69.5)	346	58.2 (50.0-65.9)	250	42.5 (35.4-49.9)
Five-month Follow-up						
Number of events observed						
Total	425		468		450	
Female	216	50.8	256	54.7	242	53.8
Male	209	49.2	212	92.9	208	46.2
Adults (16≥)	352	82.8	367	78.4	363	80.7
Children	73	17.2	101	21.6	87	19.3
Hands washed with soap	27	6.4 (4.1-9.6)	43	9.2 (6.4-13.0)	98	21.8 (15.4-29.8)
Hands washed with water only or gel	141	33.2 (24.2-43.5)	100	21.4 (15.3-29.0)	122	27.1 (19.4-36.6)
Hands not washed	257	60.5 (50.1-70.0)	325	69.4 (61.3-76.6)	230	51.1 (43.3-58.8)

Table 10.1.3: Unadjusted and adjusted analyses of the association between the interventions and handwashing practices after using the toilets, by follow-up phases *(random effects logistic model) (On-treatment)*			
HWWS vs no HWWS			
One-month follow-up (n=71 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	2.29 (1.15-4.58)	0.02	<0.0001
TNSB-based	8.28 (4.29-15.98)	<0.0001	
Five-month follow-up (n=70 compounds)			
Interventions			
Control	1.0		
HWS-only	1.59 (0.80-3.16)	0.19	0.0001
TNSB-based	4.10 (2.11-7.94)	<0.0001	
*Adjusted**			
One-month follow-up (n=71 compounds)			
Interventions			
Control	1.0		
HWS-only	2.21 (1.13-4.34)	0.02	<0.0001
TNSB-based	7.78 (4.17-14.51)	<0.0001	
Five-month follow-up low-up 2 (n=70 compounds)			
Interventions			
Control	1.0		
HWS-only	1.25 (0.62-2.53)	0.54	0.0005
TNSB-based	3.52 (1.80-6.89)	<0.0001	
*Adjusted for sex, age group, education level of the female head of household, and baseline handwashing estimates			

Table 10.1.4: Observed handwashing behaviours after using the toilets with a container for cleansing, by trial phase and trial arm *(*Baseline: *August-September 2014;* One-month follow-up*: September-November 2016;* Five months follow-up: *January-March 2017) (On-treatment)*

Event	Control arm n	% (95% CI)	HWS-only arm n (%)	% (95% CI)	TNSB-based arm n (%)	% (95% CI)
Baseline						
Number of events observed						
Total	463		515		570	
Hands washed with soap	26	5.6 (4.0-7.9)	21	4.1 (2.2-7.4)	39	6.8 (4.3-10.7)
Hands washed with water only or gel	193	41.7 (37.4-46.1)	170	33.0 (25.5-41.5)	185	32.5 (26.0-39.7)
Hands not washed	244	52.7 (48.0-57.3)	324	62.9 (53.9-71.1)	346	60.7 (53.1-67.8)
One-month follow-up						
Number of events observed						
Total	413		428		427	
Female	226	54.7	210	49.1	241	56.4
Male	187	45.3	218	50.9	186	43.6
Adults (16≥)	337	81.6	373	87.2	358	83.8
Children	76	18.4	55	12.9	69	16.2
Hands washed with soap	13	3.2 (1.9-5.1)	38	8.9 (5.6-13.7)	88	20.6 (13.8-29.5)
Hands washed with water only or gel	171	41.4 (34.2-49.0)	180	42.1 (34.6-50.0)	186	43.6 (36.4-51.0)
Hands not washed	229	55.5 (48.2-62.5)	210	49.1 (42.8-56.4)	153	35.8 (30.8-41.2)
Five months follow-up						
Number of events observed						
Total	319		353		330	
Female	162	50.8	202	57.2	177	53.6
Male	157	49.2	151	42.8	153	46.4
Adults (16≥)	274	85.9	286	81.0	272	82.4
Children	45	14.1	67	19.0	58	17.6
Hands washed with soap	18	5.6 (3.3-9.4)	37	10.5 (7.2-14.9)	65	19.7 (12.3-30.0)
Hands washed with water only or gel	133	41.7 (32.3-51.8)	95	26.9 (20.8-34.1)	117	35.5 (26.9-45.0
Hands not washed	168	52.7 (41.8-63.3)	221	62.6 (55.3-69.4)	148	44.9 (38.8-51.0)

Table 10.1.5: Unadjusted and adjusted analyses of the association between the interventions and handwashing practices after using the toilets, using a container for cleansing *(random effects logistic model) (Intention-to-treat)*			
HWWS vs no HWWS			
One-month follow-up (n=66 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	3.32 (1.37-8.08)	0.008	<0.0001
TNSB-based	9.33 (3.96-22.02)	<0.0001	
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	2.08 (0.93-4.64)	0.08	0.004
TNSB-based	3.38 (1.74-8.61)	0.001	
*Adjusted**			
One-month follow-up (n=66 compounds)			
Interventions			
Control	1.0		
HWS-only	3.30 (1.38-7.85)	0.007	<0.0001
TNSB-based	8.68 (3.79-19.88)	<0.0001	
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	1.58 (0.69-3.63)	0.28	
TNSB-based	3.13 (1.39-7.07)	0.006	0.02
*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates			

Table 10.1.6: Observed handwashing behaviours after cleaning a child's bottom, by trial phase and trial arm *(*Baseline: *August-September 2014* One-month follow-up*: September-November 2016;* Five-month follow-up: *January-March 2017) (On-treatment)*

Event	Control arm n	% (95% CI)	HWS-only arm n (%)	% (95% CI)	TNSB-based arm n (%)	% (95% CI)
Baseline						
Number of events observed						
Total	44		51		53	
Hands washed with soap	11	25.0 (13.7-41.2)	9	17.7 (8.9-32.0)	18	34.0 (16.2-57.8)
Hands washed with water only or gel	16	36.4 (23.4-51.7)	12	23.5 (12.8-39.2)	13	24.5 (13.7-40.0)
Hands not washed	17	38.6 (23.9-55.8)	30	58.8 (40.7-74.8)	22	41.5 (23.7-62.9)
One-month follow-up						
Number of events observed						
Total	31		26		20	
Female	31	100	24	92.3	20	100
Male	0	0	2	7.7	0	0
Adults (16≥)	26	83.9	18	69.2	15	75.0
Children	5	16.1	8	30.8	5	25.0
Hands washed with soap	9	29.0 (17.1-44.8)	13	50.0 (30.6-69.4)	13	65.0 (38.8-84.50
Hands washed with water only or gel	9	29.0 (16.3-46.2)	9	34.6 (21.3-50.8)	3	15.0 (3.7-44.60)
Hands not washed	13	41.9 (24.8-61.3)	4	15.4 (5.3-37.0)	4	20.0 (5.9-49.7)
Five-month follow-up						
Number of events observed						
Total	20		28		18	
Female	19	95.0	26	92.9	18	100
Male	1	5.0	2	7.1	0	0
Adults (16≥)	17	85.0	19	67.9	11	61.1
Children	3	15.0	9	32.1	7	38.9
Hands washed with soap	9	45.0 (25.0-66.8)	9	32.1 (18.4-50.0)	7	38.9 (23.2-57.3)
Hands washed with water only or gel	5	25.0 (10.3-49.3)	4	14.3 (6.3-29.1)	3	16.7 (5.1-42.6)
Hands not washed	6	30.0 (13.7-53.7)	15	53.6 (37.4-69.1)	8	44.4 (33.9-55.5)

Table 10.1.7: Unadjusted analyses of the association between the interventions and handwashing practices after cleaning a child's bottom *(random effects logistic model) (On-treatment)*			
HWWS vs no HWWS			
One-month follow-up (n=32 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	2.15 (0.70-6.58)	0.18	0.05
TNSB-based	5.13 (1.37-19.24)	0.02	
Five-month follow-up (n=28 compounds)			
Interventions			
Control	1.0		
HWS-only	0.61 (0.18-2.10	0.43	0.73
TNSB-based	0.69 (0.17-2.81)	0.60	
*Adjusted**			
One-month follow-up (n=32 compounds)			
Interventions			
Control	1.0		
HWS-only	1.90 (0.61-5.88)	0.27	0.27
TNSB-based	3.22 (0.72-14.45)	0.13	
Five-month follow-up (n=28 compounds)			
Interventions			
Control	1.0		
HWS-only	0.61 (0.18-2.09)	0.73	0.73
TNSB-based	0.72 (0.17-2.99)	0.45	
*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates			

Appendix 10.2. Effect of interventions on handwashing with soap after using the toilet with a container for cleansing (Intention to treat analysis)

Baseline

At baseline, we observed 1,548 (73%) of 2,117 occasions on which the toilet was visited with a container for cleansing (Table 10.2.1). Hands were washed with soap on 29 (6%) of 483 occasions in the control group, 18 (4%) of 495 occasions in the HWS-only intervention group, and 39 (7%) of 570 occasions in the TNSB-based handwashing intervention group.

Table 10.2.1. Baseline observed handwashing behaviours by occasion and trial arm (August-September 2014) (Intention-to-treat

Event	Control arm n	% (95% CI)	HWS-only arm n (%)	% (95% CI)	TNSB-based arm n (%)*	% (95% CI)
Use of the toilet with a container for cleansing						
Number of events observed						
Total	483		495		570	
Female	283	58.6	241	48.7	327	57.4
Male	200	41.4	254	51.3	243	42.6
Adults (16≥)	406	84.1	425	85.9	484	84.9
Children	77	15.9	70	14.1	86	15.1
Hands washed with soap	29	6.0 (4.4-8.2)	18	3.6 (1.9-7.0)	39	6.8 (4.3-10.7)
Hands washed with water only or gel	193	40.0 (35.8-44.2)	170	34.3 (26.3-43.4)	185	32.5 (26.0-39.7)
Hands not washed	261	54.0 (49.3-58.6)	307	62.0 (52.5-70.7)	346	60.7 (53.1-67.8)

- **Effect of the interventions on HWWS practices after using the toilet with a cleansing container**

We observed 1,268 and 1,002 occasions on which the toilet was used along with a container for cleansing, at one month and five-month follow-up rounds respectively (Table 10.2.2). This was also lower than the number of occasions observed at baseline (1,548 occasions), and the decline was observed in all three trial arms. At each follow-up round, we observed similar trends in HWWS after using the toilet with a container as those observed after using the toilet with or without a container.

Control group

In the control arm, we observed minimal change in the proportion of occasions when HWWS after using the toilet with a container for cleansing: 6% at baseline, 4% at one-month and 6% at five-month follow-up round (overall *P*=0.22) (Figure 10.2.1) (Table 10.2.2).

HWS-only intervention group

In the HWS-only intervention group, we found strong evidence of changes over time in the proportion of occasions at which HWWS after using the toilet with a container for cleansing: 4% at baseline to 9% at one-month and 10% at five-month follow-up rounds (overall *P*=0.007) (Figure 10.2.1) (Table 10.2.2)

TNSB-based intervention group

In the TNSB-based intervention group, there was strong evidence of changes over time in the proportions of occasions at which HWWS after using the toilet with a container for cleansing: 7% at baseline, 21% at one-month and 20% at five-month follow-up rounds (overall *P*<0.0001) (Table 10.2.2). Figure 10.2.1 shows the pattern of HWWS after using the toilet with a container for cleansing in each trial arm and by trial phase.

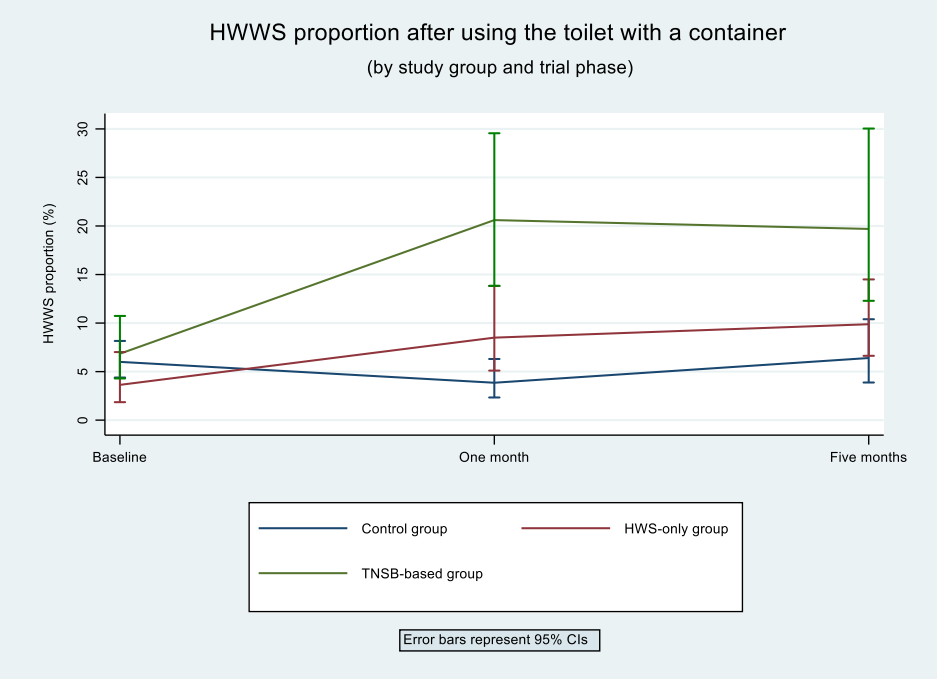


Figure 10.2.1. HWWS after using the toilet with a cleansing container pattern by trial arm and trial phase

Table 10.2.2. Observed handwashing behaviours after using the toilet with a container for cleansing, by trial phase and trial arm (Baseline: August-September 2014; One-month follow-up: September-November 2016; Five months follow-up: January-March 2017) (Intention-to-treat)

Event	Control arm n	% (95% CI)	HWS-only arm n (%)	% (95% CI)	TNSB-based arm n (%)	% (95% CI)
Baseline						
Number of events observed						
Total	483		495		570	
Hands washed with soap	29	6.0 (4.4-8.2)	18	3.6 (2.9-7.0)	39	6.8 (4.3-10.7)
Hands washed with water only or gel	193	40.0 (35.8-44.2)	170	34.3 (26.3-43.4)	185	32.5 (26.0-39.7)
Hands not washed	261	54.0 (49.3-58.6)	307	62.0 (52.5-70.7)	346	60.7 (53.1-67.8)
One-month follow-up						
Number of events observed						
Total	441		400		427	
Female	242	54.9	194	48.5	241	56.4
Male	199	45.1	206	51.5	186	43.6
Adults (16≥)	359	81.4	351	87.8	358	83.8
Children	82	18.6	49	12.3	69	16.2
Hands washed with soap	17	3.9 (2.3-6.3)	34	8.5 (5.1-13.8)	88	20.6 (13.8-29.5)
Hands washed with water only or gel	167	37.9 (31.9-44.2)	184	46.0 (37.6-54.7)	186	43.6 (36.4-51.0)
Hands not washed	257	58.3 (52.0-64.3)	182	45.5 (38.1-53.1)	153	35.8 (30.8-41.2)
Five-month follow-up						
Number of events observed						
Total	328		344		330	
Female	162	49.4	202	58.7	177	53.6
Male	166	50.6	142	41.3	153	46.4
Adults (16≥)	282	86.0	278	80.8	272	82.4
Children	46	14.0	66	19.2	58	17.6
Hands washed with soap	21	6.4 (3.9-10.4)	34	9.9 (6.6-14.5)	65	19.7 (12.3-30.0)
Hands washed with water only or gel	129	39.3 (29.7-49.9)	99	28.8 (22.6-35.8)	117	35.5 (26.9-45.0
Hands not washed	178	54.3 (43.2-64.9)	211	61.3 (54.3-67.9)	148	44.9 (38.8-51.0)

We found strong evidence that the proportion of occasions at which hands were washed with soap varied between the trial arms at the one-month follow-up round (p<0.0001), but only some evidence at the five-month follow-up round (P=0.03) (Table 10.2.3). After controlling for covariates, compound residents who received the HWS-only intervention had 2.66 (95% CI: 1.13-6.22) times the odds of HWWS after using the toilet with a container for cleansing, compared to compound residents in the control arm, at the one-month follow-up round. In the TNSB-based intervention arm, compound residents had 7.29 (95% CI: 3.28-16.16) times the odds of HWWS after using the toilet with a container for cleansing, compared to compound residents in the control arm. At the five-month follow-up round, there was no evidence of a difference in the odds of HWWS after using the toilet with a container for cleansing in the HWS-only intervention group compared to the control group (adjusted OR: 1.18, 95% CI: 0.52-2.69). By contrast, in the TNSB-based intervention group, the odds of HWWS after using the toilet was greater than in the control arm (adjusted OR: 2.60, 95% CI: 1.18-5.72).

Table 10.2.3. Unadjusted and adjusted analyses of the association between the interventions and handwashing with soap after using the toilet, using a container for cleansing (Intention-to-treat random effects logistic mod

HWWS vs no HWWS			
One-month follow-up (n=66 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	2.58 (1.08-6.18)	0.033	<0.0001
TNSB-based	7.74 (3.37-17.80)	<0.0001	
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	1.65 (0.74-3.67)	0.217	0.009
TNSB-based	3.32 (1.52-7.28)	0.003	
*Adjusted**			
One-month follow-up (n=66 compounds)			
Interventions			
Control	1.0		
HWS-only	2.66 (1.13-6.22)	0.024	<0.0001
TNSB-based	7.29 (3.28-16.16)	<0.0001	
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	1.18 (0.52-2.69)	0.69	
TNSB-based	2.60 (1.18-5.72)	0.017	0.03
*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates			

Appendix 10.3. Effect of interventions on any handwashing after the key occasions

Baseline

- Any handwashing after using the toilet

Any handwashing (with or without soap) after using the toilet was observed on 245 (35%) of 698 occasions in the control group, 213 (30%) of 710 occasions in the HWS-only intervention group, and 245 (35%) of 709 occasions in the TNSB-based intervention group (See Chapter 10, Table 10.2).

- Any handwashing after using the toilet with a container for cleansing

Hands were washed after using the toilet with a container for cleansing on 222 (46%) of 483 occasions in the control group, 188 (38%) of 495 occasions in the HWS-only intervention group, and 224 (39%) of 570 occasions in the TNSB-based handwashing intervention group (See Chapter 10, Table 10.2).

- Any handwashing after cleaning a child's bottom

The proportion of observed events where hands were washed after cleaning a child's bottom was 26 (53%) of 49 occasions in the control arm, 22 (48%) of 46 occasions in the HWS-only intervention group, and 31 (59%) of 53 occasions in the TNSB-based handwashing intervention groups (See Chapter 10, Table 10.2).

Effect of the interventions on any handwashing after using the toilet

- Any handwashing after using the toilet

Control group

Similar to the trends observed for HWWS after using the toilet, we observed minimal change in the proportion of occasions when any handwashing occurred after using the toilet, in the control arm. Handwashing remained at 35% (212 of 604 occasions) at the one-month and 38% (167 of 437 occasions) at the five-month follow-up rounds (overall *P*=0.79) (See Chapter 10, Table 10.5 in the main thesis).

HWS-only intervention group

At the one-month follow-up round, there was strong evidence of a change in the proportion of occasions at which hands were washed after using the toilet, in the HWS-only intervention arm (*p*<0.0001). The HW proportion went from 30% at baseline to 45% (248 of 557 occasions). At the five-month follow-up round, there was no evidence of a difference in the observed handwashing proportion (144 (32%) of 456 occasions) compared to the baseline estimate (*P*=0.80) (See Chapter 10, Table 10.5).

TNSB-based intervention group

In the TNSB-based intervention group, we found strong evidence of a change in the proportion of occasions at which hands were washed after using the toilet. The proportion went from 35% at baseline to 58% (338 of 588 occasions) and 49% (220 of 450 occasions) at the one-month and five-month follow-up rounds respectively (overall *P*<0.0001) (See Chapter 10, Table 10.5).

Effect of the interventions on any handwashing after using the toilet

There was strong evidence that the proportion of occasions at which any handwashing occurred varied between the trial arms at the one-month follow-up round (*P*<0.0001) and some evidence that it varied at the five-month follow-up round (*P*=0.01) (Table 10.3.1). After controlling for

covariates, compound residents who received the HWS-only intervention had 1.68 (95% CI: 1.12-2.51) times the odds of washing their hands after using the toilet, compared to residents in the control arm, at the one-month follow-up round. In the TNSB-based intervention group, compound residents had 2.76 (95% CI: 1.85-4.10) times the odds of washing their hands after using the toilet, compared to compound residents in the control arm. At the five-month follow-up round, there was no evidence of a difference between the odds of handwashing after using the toilet in the HWS-only intervention group, compared to the control group (adjusted OR: 0.81, 95% CI: 0.48-1.37). By contrast, in the TNSB-based intervention arm, the odds of handwashing were still greater than that of the control group (adjusted OR: 1.80, 95% CI: 1.06-3.05).

Table 10.3.1. Unadjusted and adjusted analyses of the association between the interventions and handwashing practices after using the toilet, by follow-up phases *(Intention-to-treat random effects logistic model)*

Any handwashing vs. no handwashing			
One-month follow-up (n=71 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	1.61 (1.03-2.51)	0.04	0.0001
TNSB-based	2.69 (1.72-4.21)	<0.0001	
Five-month follow-up low-up 2 (n=70 compounds)			
Interventions			
Control	1.0		
HWS-only	0.80 (0.47-1.36)	0.42	0.03
TNSB-based	1.64 (0.97-2.79)	0.07	
*Adjusted**			
One-month follow-up (n=71 compounds)			
Interventions			
Control	1.0		
HWS-only	1.68 (1.12-2.51)	0.01	<0.0001
TNSB-based	2.76 (1.85-4.10)	<0.0001	
Five-month follow-up (n=70 compounds)			
Interventions			
Control	1.0		
HWS-only	0.81 (0.48-1.37)	0.43	0.01
TNSB-based	1.80 (1.06-3.05)	0.03	
*Adjusted for sex, age group, education level of the female head of household, and baseline handwashing estimates			

- Any handwashing after using the toilet with a container for cleansing

Control group

We observed minimal change in the proportion of occasions at which any handwashing occurred after using the toilet with a container for cleansing in the control arm: 46% at baseline, 42% at the one-month and 46%t five-month follow-up rounds (*P*=0.65) (See Appendix 10.2, Table 10.2.2).

HWS-only intervention group

In the HWS-only intervention arm there was strong evidence of changes in the proportions of occasions at which hands were washed after using the toilet with a container for cleansing: from 38% at baseline, to 55% at the one-month follow-up round, and back to 39% at the five-month follow-up round (overall *P*<0.0001) (See Appendix 10.2, Table 10.2.2).

TNSB-based intervention group

In the TNSB-based intervention group, there was strong evidence of changes in the proportions of occasions at which any handwashing occurred after using the toilet with a container for cleansing: from 39% at baseline, to 64% at the one-month follow-up round, to 55% at the five-month follow-up round (*P*<0.0001) (See Appendix 10.2, Table 10.2.2).

Effect of interventions on any handwashing after using the toilet with a cleansing container

There was strong evidence that the proportion of occasions at which any handwashing occurred varied between the trial arms at the one-month (*P*<0.0001) and at the five-month (*P*=0.01) follow-up round (Table 10.3.2). Compound residents who received the HWS-only intervention had 2.02 (95% CI: 1.38-2.95) times the odds of washing their hands after using the toilet with a container for cleansing, compared to residents in the control arm, one month post intervention delivery. In the TNSB-based intervention group, compound residents had 2.83 (95% CI: 1.93-4.14) times the odds of washing their hands, compared to compound residents in the control arm. Five months post intervention delivery, there was no evidence of a difference between the

odds of handwashing after using the toilet with a cleansing container in the HWS-only intervention group, compared to the control group (adjusted OR: 0.81, 95% CI: 0.48-1.37). By contrast, in the TNSB-based intervention arm, the odds were greater than that of the control group (adjusted OR: 1.80, 95% CI: 1.06-3.05)

Table 10.3.2. Unadjusted and adjusted analyses of the association between the interventions and handwashing practices after the toilet with a container for cleansing (Intention-to-treat random effects logistic model

Any handwashing vs. no handwashing			
One-month follow-up (n=66 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	1.86 (1.26-2.74)	0.002	
TNSB-based	2.51 (1.71-3.68)	<0.0001	<0.0001
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	0.80 (0.48-1.36)	.415	.026
TNSB-based	1.64 (0.97-2.79)	.066	
One-month follow-up (n=66 compounds)			
*Adjusted**			
Interventions			
Control	1.0		
HWS-only	2.02 (1.38-2.95)	<0.0001	
TNSB-based	2.83 (1.93-4.14)	<0.0001	<0.0001
Five-month follow-up (n=68 compounds)			
Interventions			
Control	1.0		
HWS-only	0.81 (0.48-1.37)	.431	.012
TNSB-based	1.80 (1.06-3.05)	.03	
*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates			

Any handwashing after cleaning a child's bottom

We found weak evidence that the proportion of occasions at which any handwashing occurred after cleaning a child's bottom varied between the trial arms at the one-month follow-up round (*P*=0.05) (Table 10.3.3). After controlling for covariates, we found some evidence of an intervention effect in the HWS-only intervention arm (adjusted OR: 6.66, 95% CI: 1.18-37.49, *P*=0.03). In the TNSB-based intervention arm, there was no evidence of a difference in the odds

of handwashing after cleaning a child's bottom, compared to the control group (adjusted OR: 2.93, 95% CI: 0.55-15.58, *P*=0.21). At the five-month follow-up round, there was no evidence of a difference in the odds of handwashing after cleaning a child's bottom, in the HWS-only intervention group (adjusted OR: 0.64, 95% CI: 0.19-2.11), and the TNSB-based intervention group (adjusted OR: 0.76, 95% CI: 1.19-3.02), compared to the control arm (*P*=0.76).

Table 10.3.3. Unadjusted analyses of the association between the interventions and handwashing practices after cleaning a child's bottom (Intention-to-treat random effects logistic model)

Any handwashing vs. no handwashing			
One-month follow-up (n=32 compounds)			
Unadjusted			
	OR (95% CI)	p-value LRT	Overall model p-value
Interventions			
Control	1.0		
HWS-only	5.84 (1.17-29.23)	0.03	0.09
TNSB-based	2.65 (0.54-12.97)	0.23	
Five-month follow-up (n=28 compounds)			
Interventions			
Control	1.0		
HWS-only	0.62 (0.19-2.02)	0.42	0.72
TNSB-based	0.70 (0.18-2.70)	0.61	
*Adjusted**			
One-month follow-up (n=32 compounds)			
Interventions			
Control	1.0		
HWS-only	6.66 (1.18-37.49)	0.03	0.05
TNSB-based	2.93 (0.55-15.58)	0.21	
Five-month follow-up (n=28 compounds)			
Interventions			
Control	1.0		
HWS-only	0.64 (0.19-2.11)	0.46	0.76
TNSB-based	0.76 (0.19-3.02)	0.70	
*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates			

Appendix 10.4. Effect of interventions on HWWS after using the toilet with a container for cleansing by age group

We conducted post-hoc analyses to assess whether the effect of the interventions on HWWS after toilet with a container for cleansing varied by age group (adults vs. children).

After adjusting for covariates and baseline estimates, there was some evidence that the effect of the intervention on HWWS after using the toilet with a container for cleansing varied by age groups, one month post interventions delivery (*P*=0.03) (Tables 10.4.1 and 10.4.2). In the HWS-only intervention group, adults had 2.73 (95% CI: 1.09-6.87) times the odds of washing their hands with soap compared to adults in the control arm. However, the intervention seemed not to have an effect on children. There was no evidence of a difference between the odds of HWWS after using the toilet with a container for cleansing among children in the HWS-only trial arm compared to children in the control group (OR: 1.84, 95% CI: 0.39-8.75).

In the TNSB-based trial arm, the intervention effect was considerably greater among children compared to adults (Tables 10.4.1 and 10.4.2). Children had 16.88 (95% CI: 4.52-62.96) times the odds of washing their hands with soap after using the toilet with a container for cleansing compared to children in the control group. By contrasts, adults had 5.54 (95% CI: 2.31-13.28) times the odds of washing their hands with soap compared to adults in the control group. Five months post intervention delivery, there was no evidence of a difference within age groups between the odds of washing hands with soap after using the toilet with a cleansing container in the HWS-only intervention arm and in the TNSB-based intervention arm, compared to the control arm (*P*=0.08).

Table 10.4.1. Age-group stratified analysis of observed HWWS practices after using the toilet with a container for cleansing, by intervention arm and follow-up point (Intention-to-treat)

	Adult			Children (under 16 years old)		
	Total	n	% (95%CI)	Total	n	% (95%CI)
Occasion						
After using the toilet						
Baseline						
Control	406	26	6.4 (4.6-8.8)	77	3	3.9 (1.4-10.5)
HWS-only arm	425	14	3.3 (1.6-6.6)	70	4	5.7 (2.1-14.4)
TSNB-based arm	484	35	7.2 (4.3-11.9)	86	4	4.7 (1.8-11.6)
One-month follow-up						
Control	359	13	3.6 (2.1-6.2)	82	4	4.9 (1.3-16.4)
HWS-only arm	351	29	8.3 (4.8-14.0)	49	5	10.2 (3.1-28.5)
TSNB-based arm	358	60	16.8 (10.1-26.5)	69	28	40.6 (27.4-55.3)
Five months follow-up						
Control	282	15	5.3 (2.6-10.5)	46	6	13.0 (5.9-26.6)
HWS-only arm	278	26	9.4 (5.9-14.5)	66	7	12.1 (4.7-27.9)
TSNB-based arm	272	40	14.7 (9.1-22.4)	58	25	43.1 (24.4-63.9)

Table 10.4.2. Age group-stratified odds ratios of the association between the interventions and HWWS practices after using the toilet with a container for cleansing (Intention-to-treat)

	Adult	Child (<16 years old)	Adjusted* test for effect modification p-value
One-month follow-up (66 compounds)			
	OR (95% CI)	OR (95% CI)	
Intervention arm			
Control	1.0	1.0	
HWS-only arm	2.73 (1.09-6.87)	1.84 (0.39-8.75)	0.025
TNSB-based arm	5.54 (2.31-13.28)	16.88 (4.52-62.96)	
Five-month follow-up (68 compounds)			
Intervention arm			
Control	1.0	1.0	
HWS-only arm	1.51 (0.61-3.69)	0.66 (0.18-2.48)	0.08
TNSB-based arm	2.33 (0.98-5.54)	3.63 (1.06-12.35)	

*Adjusted for sex, age group, education level of the female head of household and baseline handwashing estimates

Appendix 13.1. Adjusted analyses of the difference in the way respondents rated the perceived descriptive norm scale items by trial arm and trial phase (Intention-to-treat random effects logistic model)

Table 13.1 1. Adjusted analyses of the difference in the way respondents rated the perceived descriptive norm scale items by trial arm and trial phase (Intention-to-treat random effects logistic model)		
Disagree vs agree		
One-month follow-up (n=71 compounds)		
Unadjusted		
	OR (95% CI)	p-value LRT
Descriptive norms		
Item d1		
Trial phase		
Control	1.0	
HWS-only	3.41 (1.74-6.67)	<0.001
TNSB-based	15.38 (5.49-43.04)	<0.001
Item d2		
Control	1.0	
HWS-only	4.46 (2.22-8.99)	<0.001
TNSB-based	13.63 (5.31-34.93)	<0.001
Five months follow-up (n=62 compounds)		
	OR (95% CI)	p-value LRT
Item d1		
Trial phase		
Control	1.0	
HWS-only	2.09 (0.45-9.60)	0.34
TNSB-based	4.26 (0.66-27.36)	0.13
Item d2		
Control	1.0	
HWS-only	4.19 (0.42-42.06)	0.22
TNSB-based	7.13 (0.52-96.93)	0.14

Table 13.1.2. Adjusted analyses of the difference in the way respondents rated the perceived behaviour publicness scale items by trial arm and trial phase (Intention-to-treat random effects logistic model)		
Disagree vs agree		
One-month follow-up (n=71 compounds)		
Unadjusted		
	OR (95% CI)	p-value LRT
Behaviour publicness		
Item bp1		
Trial phase		
Control	1.0	
HWS-only	2.11 (1.07-4.15)	0.03
TNSB-based	2.48 (1.25-4.93)	0.01
Item bp2		
Control	1.0	
HWS-only	1.98 (1.05-3.76)	0.04
TNSB-based	2.40 (1.25-4.58)	0.008
Five months follow-up (n=62 compounds)		
	OR (95% CI)	p-value LRT
	Item bp1	
Trial phase		
Control	1.0	
HWS-only	1.03 (0.38-2.75)	0.96
TNSB-based	1.02 (0.36-2.93)	0.97
	Item bp2	
Control	1.0	
HWS-only	0.78 (0.30-2.05)	0.62
TNSB-based	0.98 (0.35-2.74)	0.97

Table 13.1.3. Adjusted analyses of the difference in the way respondents rated the perceived injunctive norm scales items by trial arm and trial phase (Intention-to-treat random effects logistic model)		
Disagree vs agree		
One-month follow-up (n=71 compounds)		
Unadjusted		
	OR (95% CI)	p-value LRT
Injunctive norms		
Item i1		
Trial phase		
Control	1.0	
HWS-only	2.15 (0.97-4.76)	0.06
TNSB-based	4.95 (1.83-13.34)	0.002
Item i2		
Control	1.0	
HWS-only	2.18 (1.15-4.10)	0.016
TNSB-based	3.92 (1.89-8.16)	<0.001
Item i3		
Control	1.0	
HWS-only	2.12 (0.98-4.55)	0.06
TNSB-based	12.01 (4.26-33.90)	<0.001
Five months follow-up (n=62 compounds)		
	OR (95% CI)	p-value LRT
Item i1		
Trial phase		
Control	1.0	
HWS-only	0.87 (0.26-2.95)	0.83
TNSB-based	1.98 (0.44-8.96)	0.37
Item i2		
Control	1.0	
HWS-only	0.56 (0.16-1.96)	0.37
TNSB-based	4.78 (0.97-23.54)	0.05
Item i3		
Control	1.0	
HWS-only	0.54 (0.17-1.74)	0.30
TNSB-based	2.06 (0.55-7.69)	0.28

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