

A pilot study of the effect of improved hygiene kits on handwashing with soap among internally displaced persons in Ethiopia.

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Abstract

Background Internally displaced persons (IDPs) forced to flee from their homes due to conflict and drought are at particular risk of morbidity and mortality due to diarrhoeal diseases. Regular handwashing with soap could substantially reduce the risk of these infections, but the behaviour is challenging to practice routinely while living in resource-poor, informal settlements. To mitigate these challenges, humanitarian aid organisations distribute hygiene kits including soap and handwashing infrastructure. Our study aimed to assess the effect of improved kits on handwashing behaviours among IDPs in Moyale, Ethiopia.

Methods The pilot study evaluated three interventions separately; liquid soap, a good quality scented bar soap and a mirror as additions to a regular hygiene kit. The kit was distributed to all study groups, with 3 of the study groups receiving one of the interventions each. Three to six weeks after distribution, behaviour change was assessed through structured observations, surveys and focus group discussions.

Results Handwashing with soap was rare at key times both in all study groups. In the group that received liquid soap, handwashing with soap was seen at 20% of key times. In the control arm this was 17%, while in the two other intervention arms prevalence was <11%. Both quantitative and qualitative data collection indicated that liquid soap encourages handwashing with soap at key times. The good quality scented bar soap and mirror were not found to have an observed effect on behaviour but were viewed as desirable by participants who also reported that the standard bar soap distributed in hygiene kits was not nice to use.

Conclusion This study was to our knowledge the first randomised intervention study on handwashing among IDPs living in a non-camp setting. The study shows that improved kits have potential to make handwashing more desirable and easier to practice, and further research including formative assessments prior to the design of hygiene kits should be conducted to ensure maximal uptake. The challenges of doing research in conflict-affected regions had considerable implications on the design and implementation of this study.

Trial registration The trial was registered at www.ClinicalTrials.gov 6 September 2019 (reg no: NCT04078633)

Background

The seemingly simple act of handwashing with soap (HWWS) is associated with 30–48% reduction in diarrhoea morbidity (1–4). Nonetheless, diarrhoea is the fifth leading cause of death among children under five years of age and the eighth most common cause of mortality across all age groups (3). Humanitarian crises such as disasters, disease outbreaks and conflict are significant contributors to ill health and vulnerability worldwide. Crisis-affected populations are at increased risk of diarrhoeal morbidity and mortality. For example, in conflict-affected settings children under five years of age are 20 times more likely to die from diarrheal disease than from violence associated with the conflict itself (5). This is because crises often force populations to flee to crowded and informal living environments. At the same time many of the institutions, infrastructure and social support systems that would normally support health break down, allowing infectious disease to flourish. Inadequate access to water, sanitation and hygiene remains a global challenge but these challenges are particularly pronounced in crisis-affected regions (6).

Convenient access to handwashing products (soap) and infrastructure (handwashing facilities) is a crucial determinant for enabling handwashing behaviours (7). Handwashing facilities with water and soap present, act as a reminder or cue to perform handwashing behaviour at critical times. When infrastructure is lacking, the perceived psychological trade-off (such as perceiving handwashing to be a strenuous physical endeavour to complete) makes HWWS less likely to be performed (7). It has been argued that during humanitarian crises, the determinants of handwashing behaviour may differ from stable settings because crises typically cause such substantial disruptions of cultural and habitual norms (8). In such circumstances, health-protecting behaviours such as HWWS may be compromised given the multitude of other challenges that populations are dealing with. However, evidence about these behavioural shifts or the determinants of handwashing behaviour during crises remains limited (6, 7, 9).

Humanitarian crises differ from stable settings in other important ways. In a crisis, humanitarian actors are obliged to provide soap and handwashing infrastructure to populations rather than assuming communities can provide this themselves as is the case in stable settings. The Sphere handbook sets out universal standards for humanitarian response (10). For hygiene, this includes among other things, laundry soap, body soap and handwashing facilities. Hygiene kits are distributed as a standalone intervention or as a part of the distribution of non-food items (blankets, cutlery and cooking pots) and combined with hygiene messaging (10). An increasing trend of distributing cash or voucher based assistance in combination or in place of hygiene kits has been seen the last years (10, 11).

The kits aim to reduce the risk of disease transmission by encouraging increased levels of hygiene at the household level, but distribution of hygiene items has achieved mixed results in crisis settings (8, 12–15). After increased soap provision in a South Sudanese refugee camp, handwashing with water only was more commonly observed (< 70%) than handwashing with soap (< 20%), although over 95% of participants reported that soap was available and more than 84% reported exposure to handwashing promotion where messages of the importance of soap had been shared (8). In refugee camps in Sub-Saharan Africa and South-East Asia, handwashing facilities distributed to households or installed by camp management were found to be missing or not working (13–15). Provision of soap and handwashing facilities are only effective in protecting against disease if used as intended.

There is a limited evidence base for the distribution of hygiene kits in crisis settings (8, 13, 16) and a systematic review of health interventions for emergency settings has called for further research into the behaviour change potential of hygiene kit components, particularly soap.

This pilot study aimed to address this research gap by exploring the potential for hygiene kits to improve HWWS at critical times among internally displaced persons in southern Ethiopia. We hypothesised that providing better quality soap products would make HWWS more desirable and more likely to be practised at critical times. Accordingly, we trialled the inclusion of a good quality scented bar of soap or liquid soap within the hygiene kits. Our rationale was based on patterns of global soap usage; use of bar soap in stable and higher income settings is declining, and liquid soap now accounts for 47% of personal soap use (17). A study of perceptions of bar soap in the US found that over half of consumers found liquid soap more convenient to use than bar soap and 48% of consumers believed germs would remain on the bar soap after use (17). The desire to smell nice has been found as key motivator for HWWS and therefore this was included as an intervention in our study (18). We also hypothesised that changes to the physical environment surrounding the handwashing facility could cue behaviour and make it seem more desirable and therefore result in handwashing facilities being used more frequently or for a longer duration. To test this, we distributed a mirror with the hygiene kits to be placed over the handwashing station. Adding a mirror is a feature that makes a handwashing facility more desirable (19), but its effect on handwashing behaviour has been poorly documented to date (20).

Methods

Study site

The research took place between September and November 2019 in Moyale District which is located on the southern border of Ethiopia. At the time of the research the district was facing a protracted and complex emergency due to prolonged drought and armed conflict. There have been repeated cholera outbreaks in the district with a larger outbreak in 2016 (21). During the study period cases were reported by local health officials and an outbreak was confirmed in January 2020 (22). Regular violent clashes between unidentified armed groups and security forces (23) and recurring clashes between the district's two ethnic groups, the Borena Oromo and Garreh Somalis leave the district unstable (24). The area remains a priority area for delivery of life-saving health services by the Ethiopian government and aid agencies due to the ongoing conflict, the high number of IDPs and the threat of infectious disease outbreaks (22).

Moyale District has experienced a substantial influx of internally displaced persons (IDPs) who settled within and around existing villages in the district. There were no official displacement camps at the time of the study. As of October 2019 an estimated 110,

000 IDPs were thought to be living in the area (25). IDPs were responsible for constructing their own shelters which were typically dome-shaped and made of wood and plastic sheeting. Over time IDPs would improve their houses by adding solid mud walls and thatched roofs. The majority of the IDP population were pastoralists and typically lived in close proximity to their animals including cows, goats, sheep, camels and donkeys. Water was predominantly collected from surface water sources (lakes and ponds) and public taps, standpipes and boreholes, but often included an extended journey by foot for collection or extended waiting times at public sources.

Moyale district was chosen as the study location because of the large influx of IDPs in the area and the identified need for hygiene kit distribution in the region and because the study partner, Action Against Hunger, were working in the area. Prior to this research commencing our partner organisation had not distributed hygiene products or conducted hygiene promotion in the area in the last year, but they had been running nutrition programmes. To the best of our knowledge, no other distributions of hygiene kits were taking place in the area prior to the research.

Study design

This was a mixed-methods pilot study with three intervention groups and one control group. The villages for the study were purposefully selected based on similarity, convenience and security by the Moyale District Disaster Risk Management Office who provided lists of IDPs in each study site. The four study groups were randomised to receive one of the three interventions or the control using a random number generator. Figure 1 shows the pilot study design. In total, 400 households were recruited to the study (100 per study group). This relatively small sample size was determined due to logistics, budget and security constraints.

Intervention description

All four study arms received the intervention between the 18th to 24th September 2019. The standard hygiene kit which consisted of 25 × 100 grams body soap (0.36USD per bar of soap), 8 × 250 grams laundry soap (0.42USD per bar of soap) and a handwashing facility (5 USD per facility). The handwashing facility is pictured in picture A, B and C of Fig. 2 and was of 20 litre capacity, had a large round body with a tap and a narrow opening on top covered by a lid. The contents of the hygiene kit was informed by the Sphere Handbook of minimum standards in humanitarian response (10). In each of the intervention arms, 100 households received the standard hygiene kits and, in addition to this, they received one of the three interventions: Intervention group 1 (IG1-Liquid) received liquid soap (Pictured in Fig. 2A, 2 × 500 ml bottles costing 1.48 USD per bottle), intervention group 2 (IG2-Scented) received a good quality scented bar soap (Pictured in Fig. 2B 2 × 250gr bars, costing 1.2 USD per 180gram bar), and Intervention group 3 (IG3-Mirror) received a mirror (Pictured in Fig. 2C, size was 297 × 420 mm and the price per mirror was 7.77USD). In the control group (G-Control) 100 households received the standard hygiene kit only. All products tested in our study were available from local shops and markets in the study villages.

Implementation of the intervention was conducted by Action Against Hunger hygiene promotion staff. These individuals were not involved in any other study procedures and were unaware of the planned process for the data collection on HWWS behaviour. A record was compiled of all households receiving the kits. Hygiene promoters were instructed to assist households in IG3-Mirror to hang up the mirror next to the handwashing facility. All households were encouraged to build a stand for the handwashing facility and to keep the soap near the facility at all times.

Structured observations and household surveys

The primary outcome of the study was the prevalence of handwashing behaviours at critical times. Data was collected at one time-point 3–6 weeks after the hygiene kit distribution in minimum 50 households per study group. Handwashing events were measured through three-hour long structured observation sessions (these took place from 7:30am to 10:30am or 8:30am to 11:30am, depending on security restrictions). Structured observation, while having its limitations, is considered the most reliable method of studying handwashing behaviours (26) and is regarded as much more accurate than self-reported measures. The research assistants were trained to document critical handwashing events which were defined as 1) after using the latrine or open defecation, 2) after cleaning a child's bottom, 3) before food preparation, 4) before eating, 5) before feeding a child or serving another person food. The research assistants captured who conducted the action (adult female/adult male, child between 5–18 or child under 5 years of age), if soap was used and if so, which type of soap was used. Missed opportunities for

handwashing were also captured. The three-hour structured observations were conducted among a randomly selected sample of 50 households within each study arm using a random number generator. Random selection was drawn from the sampling frame that was developed by the delivery team of all households who received a hygiene kit. If a randomly selected household could not be located on follow-up, a new household was randomly selected for data collection.

Written informed consent was sought from all the household's members over the age of 18. Parents or guardians provided consent for household members under the age of 18. Participants were informed that the data collectors were hoping to understand the 'daily routines of people in the area' and were not explicitly told that hand hygiene was being observed so as to minimise reactivity bias. A survey was administered once the observation was concluded to capture sociodemographic data. This included a spot-check which documented whether the handwashing facility was available, whether there was water in the facility and whether there was soap next to the facility.

Focus Group Discussions

Focus group discussions (FGDs) were conducted in parallel with the quantitative data collection. The FGDs aimed to explore the acceptability and perceived usefulness of the hygiene kit products. Participants were randomly selected using a random number generator from a list of eligible participants. The list included those that received a hygiene kit in any of the 4 study arms but were not selected for structured observations or surveys. Three FGDs with men and three FGDs with women were carried out, each with 4–8 participants. A total of 33 people participated. A focus group discussion standard operation procedure (SOP) was developed and is available in Additional File 1. The facilitator first asked participants about current challenges faced by IDPs concerning handwashing with soap. The facilitator then introduced the participants to six different types of soap: liquid soap, standard bar soap, antibacterial bar soap, good quality scented bar soap, cheap bar soap and laundry bar soap (Fig. 3). This included the products distributed to households in the study. Participants then tried out each of the soaps and reflected on what they enjoyed and did not enjoy about handwashing with each product. During the second part of the FGD the facilitator introduced a mirror of the same kind that had been distributed in IG3-Mirror. Participants were then asked about what they liked and disliked about the mirror, where they would hang the mirror and why, and whether they would consider hanging it by the handwashing facility and what the advantages there might be for doing so.

Data Collection

The data collection team was comprised of sixteen people; 15 research assistants recruited locally by Action Against Hunger and one researcher from the London School of Hygiene and Tropical Medicine (AHT). All the data collection staff were women. Prior research has found that female observers are considered less intimidating in most cultures and allow for reactivity bias to be minimised (27). The research assistants received a half-day training by AHT on the study methods and then practised observation within the classroom and in a pilot study site. The research team were not connected to the intervention delivery to reduce bias. At the end of each day of data collection, the lead author (AHT) checked all surveys and structured observation forms. If any discrepancies were found, the team would return to the household the following day to correct any inconsistencies. One of the data collection team played the role of a field supervisor whose job it was to visit every research assistant once per day to check their observation and surveying technique and provide feedback. These visits were discreet and lasted only a few minutes to avoid disturbing the structured observation session.

Data Analysis

Data were double entered into Microsoft Excel and cleaned. AHT checked discrepant entries against original paper surveys and did consistency checks. Observational data and survey data were analysed descriptively in Stata 16 (StataCorp 2015, College Station, TX, USA).

Focus group discussions were recorded, transcribed and translated from Afaan Oromo to English. The transcripts underwent thematic analysis with the aid of NVivo 12. An inductive approach to identifying themes was used based on the topics covered by the FGD standard operating procedure. This included barriers to handwashing with soap and the use of mirrors in the household. Ranking data from the FGD were summarised according to gender and analysed descriptively.

Ethics statement

The research received ethical approval from the London School of Hygiene and Tropical Medicine Ethics Review Committee (Ref: 17604) and Oromia Regional Health Bureau (Ref: BEFO/11BTP4/79/2011). The study was also approved by the Disaster Risk Management Office and Health Office at zonal level (Borena) and district level (Moyale) through face-to-face meetings with the study coordinator and Action Against Hunger representatives.

Results

Sociodemographic characteristics

In total, 400 households received a hygiene kit as part of the research. Of these, 203 households were enrolled for structured observation. Despite the study regions being selected for their similarity, we found variation within population demographics. The G-Control was a mixture of people of the Borena and Gabbra ethnic group, while the populations in the intervention arms consisted entirely of people from the Borena ethnic group. Animal ownership was over 90% in the three intervention arms but only 54% in the G-Control. In G-Control results also showed slightly lower rates of educational attainment and household income and people in this region had to spend more time queuing to access water compared to the intervention arms. However, the majority of participants in all study arms had received no formal education. The mean number of people per household was similar across all study arms. All households in IG1-Liquid and the G-Control were Muslims, while in IG2-Scented and IG3-Mirror participants were Protestants, Muslims or practiced Wakefata (a local religion). The majority of respondents were displaced due to conflict, but eight percent and thirty percent of respondents in IG2-Scented and IG3-Mirror respectively were displaced due to drought (Table 1).

Table 1
Sociodemographic data and household characteristics of the four intervention groups

Variable	IG1-Liquid N = 50	IG2- Scented N = 51	IG3-Mirror n = 52	G-Control N = 50
Number of people per household, mean (SD)	6.52 (2.56)	7.22 (2.15)	6.60 (2.62)	6.94 (2.65)
Number of children < 5 per household, mean (SD)	1.72 (0.86)	1.86 (1.51)	1.15 (0.89)	1.4 (1.01)
Respondents education, n (%)				
No education	31 (62%)	31 (63%)*	38 (73%)	39 (80%)
Primary school completed	13 (26%)	12 (24%)*	11 (21%)	8 (16%)
Secondary school completed	5 (10%)	5 (10%)*	3 (6%)	2 (4%)
Higher education completed	1 (2.00%)	1 (2%)*	0 (0%)	0 (0%)
Household Income per week (ETB), mean (SD)	219.79 (223.98)*	269.36 (272.53)*	222.06 (286.11)	189.29 (212.85)
Animal ownership (owning at least one domestic animal cow, camel, donkey, goat, sheep or chicken)	46 (92%)	50 (98%)	51 (98%)	27 (54%)
Religion, n (%)				
Muslim				
Wakefata (local religion)	50 (100%)	31 (61%)	24 (46%)	50 (100%)
	0 (0%)	17 (33%)	20 (38%)	0 (0%)
	0 (0%)	2 (4%)	8 (15%)	0 (0%)
Protestant	0 (0%)	1 (2%)	0 (0%)	0 (0%)
No religion				
Reason for displacement				
Conflict	49 (98%)	37 (74%)*	28 (56%)	50 (100%)
Drought	0 (0%)	4 (8%)*	15 (30%)	0 (0%)
Other**	1 (2%)	9 (18%)*	7 (14%)	0 (0%)
Water collection duration (round trip) in minutes, mean (SD)	74 (60.19)	56 (65.54)	102 (71.29)	103 (77.15)
* Percentages were estimated from slightly smaller denominators than those shown at the top of the table for the following variables due to unanswered survey questions/missing values.				
** Other reasons for displacement included moving for job opportunities or family reasons.				

Availability of handwashing facilities, soap and water

Table 2 presents the results from the household survey. Out of the 400 households that received the hygiene kits 16 households did not have the handwashing facilities available during the follow up visit. Among the households which had the handwashing facility present during the follow up visit, 88% of facilities had water in them. Soap presence at the handwashing facility (any type of soap) was highest in G-Control (66%) while in IG-Liquid, IG-Scented and IG-Mirror soap was present in 44%, 27% and 42% of households respectively. At the time of distribution, households had been encouraged to build a stand for the handwashing facilities and this had been done in more than 83% of households in all study groups. Stands were created from locally available materials such as wood. In IG3-mirror, 77% of households had hung the mirror by the handwashing facility. Presence of soap in the household was high across all study groups (96–100%).

Table 2
Survey results – Access to hygiene materials

Variable	IG1- Liquid N = 50	IG2- Scented N = 51	IG3- Mirror n = 52	G- Control N = 50
Handwashing facility available on premises, n (%)	46 (92%)	45 (88%)	48 (92%)	48 (96%)
Water available at handwashing facility n, (%)	43 (93%)**	39 (87%)**	40 (83%)**	44 (92%)**
Soap available at handwashing facility n, (%)	22 (44%)**	14 (27%)**	22 (42%)**	33 (66%)**
Constructed a stand or other mechanism to raise the facility off the ground, n (%)	42 (91%)*	39 (87%)	40 (83%)	44 (92%)
Mirror available by handwashing facility	0 (0%)*	0 (0%)	37 (77%)	0 (0%)
Soap available in household	50 (100%)	49 (96%)	51 (98%)	49 (98%)
Types of soap available in household				
Liquid soap	46 (92%)	11 (22%)	14 (27%)	8 (16%)
Good quality, scented bar soap	13 (26%)	26 (51%)	9 (17%)	13 (26%)
Laundry soap	33 (66%)	32 (63%)	42 (81%)	36 (72%)
Normal bar soap	35 (70%)	39 (76%)	37 (71%)	44 (88%)
Number of households reporting that they have enough soap to meet their family's needs	26 (52%)	23 (45%)	25 (48%)	22 (45%)*
Number of households reporting that soap is affordable for them	25 (51%)*	26 (52%)*	22 (42%)	20 (41%)*
* Percentages were estimated from slightly smaller denominators than those shown at the top of the table for the following variables due to unanswered survey questions/missing values.				
** Percentages were estimated from the total number of handwashing facility present in the respective study group.				

Reported benefits of soap

Despite the distribution of hygiene kits, a large number of respondents, 45–54% across all groups, still reported that they felt that their family did not have sufficient access to soap and that it was not affordable for them. When asked about the advantages of

soap, most respondents freely reported that handwashing with soap could protect health or prevent disease (see Table 3). A few respondents particularly mentioned diarrhoea as a disease that can be prevented by HWWS. Respondents also listed cleanliness and comfort as advantages of HWWS.

Table 3
Advantages of soap freely listed by participants in the household survey

Variable	IG1-Liquid N = 50	IG2-Scented N = 51	IG3-Mirror n = 52	G-Control N = 50
To remove germs and protect against disease in general	24 (48%)	26 (51%)	24 (46%)	17 (34%)
To prevent diarrhoea	1 (2%)	3(6%)	0(0%)	2(4%)
To prevent malnutrition	1 (2%)	0 (0%)	1 (2%)	1 (2%)
To prevent antibiotic resistance	2 (4%)	0 (0%)	2 (4%)	3 (6%)
To keep healthy	22 (44%)	18 (35%)	25(48%)	24 (48%)
To remove dirt and maintain cleanliness and hygiene	21 (42%)	27 (53%)	16 (31%)	17 (34%)
To reduce absence from school	1 (2%)	0 (%)	0 (0%)	0(0%)
To feel comfortable	2 (4%)	4 (8%)	1 (2%)	4 (8%)
Don't know	1 (2%)	2 (4%)	0 (0%)	0 (0%)

Observations of handwashing

In total, 1458 opportunities for handwashing were observed by our research team. Out of those opportunities, HWWS was observed only 218 (14.95%) times. HWWS prevalence is presented in (Table 4). IG1-Liquid had the highest prevalence of HWWS at four of the key times as well as overall for all key times. In this study group, HWWS prevalence was 36% after toilet use, 16% before preparing food, 12% before eating food and 9% before serving or feeding another person food. G-Control had the highest prevalence of HWWS after cleaning a child's bottom (41%). When HWWS did not occur, hands were either not washed or washed with water only. After defecation, hands were more often (> 40%) washed with water only (> 40%) than not washed at all (< 33%).

Table 4

Observed handwashing behaviour at key times (after defecation, before preparing food, before eating, before serving/feeding another person food, after cleaning a child's bottom).

	IG1-Liquid N = 50	IG2-Scented N = 51	IG3-Mirror n = 52	G-Control N = 50
Handwashing at all key times (after defecation, before preparing food, before eating, before serving/feeding another person food, after cleaning a child's bottom), n (%)				
Did not wash hands	169 (41%)	187 (49%)	139 (46%)	137 (38%)
Washed hands with water	158 (39%)	158 (41%)	130 (43%)	162 (45%)
Washed hands with water and soap	82 (20%)	40 (10%)	33 (11%)	63 (17%)
After defecation, n (%)				
Did not wash hands	24 (22%)	30 (33%)	25 (33%)	22 (21%)
Washed hands with water	47 (42%)	43 (48%)	32 (43%)	49 (48%)
Washed hands with water and soap	40 (36%)	17 (19%)	18 (24%)	32 (31%)
Before preparing food, n (%)				
Did not wash hands	30 (55%)	31 (52%)	30 (57%)	21 (38%)
Washed hands with water	16 (29%)	25 (42%)	22 (42%)	30 (54%)
Washed hands with water and soap	9 (16%)	4 (7%)	1 (2%)	5 (9%)
Before eating, n (%)				
Did not wash hands	77 (53%)	81 (58%)	43 (41%)	55 (43%)
Washed hands with water	52 (36%)	51 (36%)	56 (53%)	59 (47%)
Washed hands with water and soap	17 (12%)	8 (6%)	7 (7%)	13 (10%)
Before serving/feeding another person food, n (%)				
Did not wash hands	30 (52%)	37 (61%)	36 (61%)	35 (74%)
Washed hands with water	23 (40%)	22 (36%)	12 (36%)	11 (23%)
Washed hands with water and soap	5 (9%)	2 (3%)	1 (2%)	1 (2%)
After cleaning a child's bottom, n (%)				
Did not wash hands	8 (21%)	8 (24%)	5 (26%)	4 (14%)
Washed hands with water	20 (51%)	17 (50%)	8 (42%)	13 (45%)
Washed hands with water and soap	11 (28%)	9 (26%)	6 (32%)	12 (41%)

Reported barriers to handwashing from focus group discussions

When asked about current barriers to HWWS the most common challenge was the affordability of soap. Participants made it clear that knowledge was not the problem as most people knew about the importance of handwashing to protect them against disease and to maintain their health.

"Everyone now knows that it's important to wash our hands with soaps, but affording it [soap] is the problem" (Woman, FGD2)

"In the old times, the problem was illiteracy. Nowadays though, everyone including the kids have the knowledge [about handwashing]. But people are different, in that some are tidy while others don't care a lot about cleanliness. But I can generalize and say the main problem is the lack of money for soap affordability." (Man, FGD1)

"There are variety of challenges, among which affording soap is an issue. People also don't buy soaps on a regular basis in the same way they buy other home goods when they run out of it. So people also don't look at soaps as a priority" (Man, FGD3)

In addition to affordability, forgetting to HWWS or only doing it when absolutely necessary were mentioned as reasons for not washing hands regularly. Some people reported only washing their hands when they were visibly dirty, or when participants had been in contact with chemicals such as paint.

"Some cannot afford soaps. The other factor is people's style of life. Some are not used to washing with soap after using the toilet, they don't remember to wash their hands with soaps after normal routines except when we deal with some rare activities where the need of using soap become a necessity, like after painting." (Man, FGD3)

IDPs shared that humanitarian organisations would sometimes provide soap in hygiene kits and do hygiene promotion in the area. The irregularity of distributions appears to have created variations in handwashing behaviour, since when distributions cease populations often resort to handwashing with ash or not handwashing at all. Some mentioned long distances from their house to shops and markets as barriers to purchasing soap regularly.

"We do not get soap distributions regularly. We used to wash our hands properly when the supplies were given to us, but once they were done with the distributions, we could not go out and buy soap because of money issues." (Man, FGD4)

Water scarcity was also a common challenge raised, with participants explaining that water was prioritised for other household tasks rather than HWWS.

"In this zone when water becomes scarce, people don't even wash their faces, let alone washing hands, so water shortage could be a reason" (Man, FGD1)

"Due to drought, famine, and conflict in our area, there is a water and money shortage which means we don't have enough water for hand washing and money for affording soap, even though we have the knowledge about cleanliness. (Man, F1)

Ranking of different types soap by focus group participants

Table 5

Results from soap ranking activity where FGD participants were asked to rank different types of soap against a list of criteria describing different qualities of the soap (1 = the highest ranking and 6 = the lowest ranking).

	Desirability		Pleasantness		Long lasting		Familiarity		Something that I really would want to use		A soap the kebele leader would be likely to use		Effective at killing germs		Easy to use		Water saving	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Liquid soap	5	1	3	3	4	2	5	4	3	3	6	3	3	2	1	1	6	1
Good quality, scented bar soap	1	2	1	1	2	1	2	5	1	1	4	6	6	3	5	3	1	2
Normal soap	3	3	2	4	3	4	4	3	2	2	2	5	4	4	4	2	2	5
Antibacterial soap	2	4	5	2	5	5	6	6	5	4	5	4	1	1	3	5	4	3
Cheap bar soap	6	6	6	6	6	6	1	1	6	6	1	1	5	6	2	6	5	6
Laundry bar soap	4	5	4	5	1	3	3	2	4	5	3	2	2	5	6	4	3	4

Table 5 summarises the results from the soap ranking activity, in which FGD participants were asked to rank each soap against a number of criteria. They were asked to consider the use of the soap for handwashing only rather than also for other purposes. The good quality, scented bar soap came out the highest overall, ranking first or second for both women and men for five criteria; desirability, pleasantness, long-lasting, 'A soap I would like to use' and water saving. Participants from one focus group (F1) remarked that they enjoyed the smell of the good quality, scented bar soap and that they had not seen a green soap before. However, one participant said that nice smelling bar soap might be a 'waste' in their community because they regularly touch and come into contact with animals which have an unpleasant smell. Men and women both found the liquid soap easy to use, and believed that the antibacterial soap was the most effective in killing germs, but ranked these soaps inconsistently in other categories. The cheap bar soap was most familiar to the participants as it was available to purchase in most local shops and markets, but otherwise ranked consistently poorly. It was ranked as the soap that utilised the most water, was least pleasant to use and was consumed the quickest. Men and women generally ranked soaps similarly, but had mixed attitudes on liquids soap's ability to be water saving. On this criterion, men considered liquid soap to be the most water saving while women considered it to be the soap that wasted the most water. There were mixed attitudes towards the use of laundry soap for handwashing. Laundry soap was ranked highest by women as the soap that would last the longest, however the women did not find this type of soap easy to use.

Perceptions about the mirrors based on FGD discussions

The last part of the focus group discussion aimed to understand community perceptions towards mirrors placed in close proximity to handwashing facilities. The mirror was very well received by the participants who valued the size of the mirror, reflecting that it would allow them to see their entire bodies and not just the face. The only thing participants listed as a concern about the mirror was that they did not think it would be affordable to them should they have to buy it themselves.

"This mirror is big enough to show the all of my body. This is why we say it's so good." (Woman, FGD2)

"I like the way it allows me to see my whole self, what I don't like about it is the money I lack to get such a mirror," (Man, FGD4)

When asked where they would place a mirror like this, most participants said that a nice mirror like this should be kept inside the house. Participants expressed concerns about keeping the mirror outside because they believed that the reflection of the sun shining onto the mirror was harmful to their health. They were also concerned that it might get stolen or that children or animals might break it.

"When it is sunny, the mirror gives out a reflection which is not good for our health. It might get stolen too, cattle might break it also" (Man, FGD3)

"It should not be kept outside because it might get broken, it is meant to be inside the house." (Man, FGD3)

The majority of participants said they would not want to keep the mirror by the handwashing facility, as this was often located near the toilet, some distance from the house.

"Firstly, that place is at a distance from our house. Secondly, children might just grab it away, the other factor is that our toilet has no suitable wooden place where we can hang the mirror." (Woman, FGD7)

Nonetheless, participants did see that there could be some benefits by keeping the mirror next to the handwashing facility. Some participants said keeping the mirror close to the toilet would allow them to identify dirt and therefore make cleaning themselves an easier task. Some also reported that if they had two mirrors, they would consider keeping one in the household, and one by the handwashing facility.

"Yeah it has a benefit and that is that after toilet usage we would stand there to see which part to clean and wash our hands and our face." (Man, FGD4)

"It shows me the cleanliness of my body, for example, after toilet usage, it shows me whether I have gotten rid of the dirt or not." (Man, FGD1)

"It can show you dirt. Had we had other extra mirrors, we would spare one for that spot." (Woman, FGD4)

Discussion

Our study explored the potential for locally available and rapidly deployable hygiene kit interventions to increase HWWS soap among IDPs living outside of camp settings. To the best of our knowledge this is the first randomised intervention study on handwashing to be conducted among IDPs in an out-of-camp setting. IDP populations residing outside of camps are systematically less studied due to the complexities of conducting research in these settings. For example, a recent systematic review found that of all water, sanitation and hygiene (WASH) literature published about crisis-affected settings only 17% related to populations residing outside of camps and that only 41% relates to IDP populations (28). This is concerning given that in 2019 there were 15.4 million more IDPs than refugees globally and an estimated 29 million IDPs who live in out-of-camp settings (29). In such settings, IDPs are more vulnerable because they are often overlooked by both governments and non-government organisations (29).

The challenges of the research setting, particularly that the setting was experiencing an ongoing conflict, created numerous limitations for interpreting the findings from our work. The heterogeneity of socio-demographic characteristics across the study arms means that it is impossible to draw clear conclusions from this research. In addition to the variations described, there were other visible characteristics that we did not formally collect data on but which may have influenced the findings. For example, IG1-Liquid, IG2-Scented and G-Control were located close to the main road. In contrast IG3-Mirror was located 13 km off the main road in an area that was more affected by drought and water availability. This water scarcity may contribute to the low rates of HWWS observed in this study arm. The control arm was the site of a violent conflict in 2018, and households in the area still carried the scars of this conflict, with some houses damaged and many water points destroyed. Settlements in the three intervention arms did not bear these visual scars of the ongoing conflict in the region. The study sites also experienced change between the delivery of the intervention and the data collection. For example, the long-term drought was interrupted with heavy rains that caused flooding and damage in IG3-Mirror and G-Control. Of the randomly selected households, six households in IG3-

Mirrors were not available for data collection as floods hindered data collectors from reaching the household. Four households in IG1-Liquid and six households in IG2-Scented were not available on follow-up because the ongoing economic hardships, drought and conflict had caused them to move on. These variations between study arms were unfortunately unable to be identified prior to the study due to security limitations in accessing the sites.

Despite these limitations, it is likely that the distribution of liquid soap in IG1-Liquid had some positive effect on handwashing behaviour as this pattern was observed across most of the critical handwashing occasions. This finding is supported by the fact that during FGDs study participants reported that liquid soap was the easiest type of soap to use. However liquid soap did not rank that highly across some of the other criteria. It is possible that the increased rates of handwashing with soap observed within IG1-Liquid occurred because liquid soap together with a dedicated handwashing facility helped to cue behaviour at the right time and make it more convenient for the population to practice. This was particularly the case for handwashing after using the toilet, given that most families chose to locate their handwashing facilities near the toilet.

The scented bar soap was generally well-liked by the participants and considered desirable and pleasant to use. However, rates of HWWS were poor in IG2-Scented which received this type of soap in their hygiene kits. In FGDs participants reported that they had never seen a green bar of soap before and it is possible that this new, foreign type of soap caused participants to use it more sparingly or prioritise it for purposes other than HWWS. Due to frequent interactions with their animals, one participant was also concerned that using a nice smelling soap would be “wasted” as the smell would not last long.

In IG3-Mirror we found that the distribution of mirrors and the placement of these above the handwashing facility did not result in rates of HWWS that were higher than the control group. Similar ‘nudges’, or environmental cues designed have been successful in increasing handwashing with soap after toilet use, however, most of these interventions have been tested in schools or areas where there is already good quality infrastructure and a constant supply of soap and water - something not available in the IDP settlements in Moyale (30, 31). In our study, FDG participants shared some challenges with hanging a mirror outside by the handwashing facility. Nonetheless, in IG3-Mirror 77% of households had placed the mirrors by the handwashing facility at the time of the follow-up visit. These high levels of use by communities and the expressed desirability for mirrors merit further studies to explore the potential impact on handwashing behaviour.

Given that it was not feasible for us to conduct a baseline as part of this study it is not possible to comment on the overall improvement that the hygiene kits have on HWWS. It is clear that handwashing rates remained sub-optimal at the point of follow up and that on many critical occasions hands were washed with water only. Other studies of handwashing behaviour in refugee camps receiving regular soap distributions in Ethiopia found HWWS rates of 4% (15) and 19% (13). A recent review of national survey data estimated that rates of HWWS after toilet use are likely to be about 8% within the World Health Organisation African region (32). It is possible that it was the distribution of the handwashing facility itself, rather than soap or mirrors, that made a more substantial contribution to encourage handwashing behaviour (both with water only and with soap) but this study was not designed to measure this. In other settings the presence of a dedicated handwashing facility has been found to increase handwashing behaviour (7). In our study it was clear that the handwashing facilities that we distributed were highly valued because 83% of people were willing to invest time and effort into constructing stands to make them easy to use. This may be an early indication that the provision of higher quality handwashing products encourages higher levels of ownership and maintenance among crisis-affected populations. The soap products distributed in this study do not come at a substantially higher cost; 250 grams of the body soap normally distributed in the hygiene kits would 0.9 USD while a good quality, scented bar soap of the same size cost 1.65 USD and a 500 ml bottle of liquid soap is 1.48USD making it a feasible intervention to implement by humanitarian actors.

Our results also indicated that there were high rates of handwashing with water only despite the availability of soap in households. Further work may be needed to explore this pattern. However, it may act as a reminder that distributions in the absence of hygiene behaviour change activities may only go part of the way to enabling the desired behaviour. If our intervention was combined with hygiene promotion it may have been possible to conduct activities which emphasised the importance of using soap and that handwashing with water only doesn't leave hands truly clean.

For others considering research of this nature in dynamic, crisis-affected settings we would recommend including a baseline study and taking time to understand qualitatively and quantitatively the characteristics of these settings so as to understand in advance how they could impact the research outcomes. The pilot study recruited 400 households and the study team had capacity to observe 13 households per day, meaning that it took four weeks of data collection to reach the target of 50 households per study group. For a small scale-study, it would have been preferable to have a narrower data collection period but that was not feasible in our setting as it would have required a larger study team and this was not possible due to logistics and security constraints. To mitigate this issue, data was collected rotating schedule, with one day in IG1-Liquid, next in IG2-Scented, IG3-Mirror, G-Control and then back in IG1-Liquid. Given that we faced limitations in drawing conclusions from our primary outcome data it was valuable to be able to learn from the complementary qualitative methods and this is something that should be included where possible in future research in such environments.

Conclusion

This pilot study indicates that there is likely to be some value in distributing higher quality handwashing products within hygiene kits. Use of liquid soap achieved the highest rates of handwashing at key times and the mirror that was distributed was a desired item by participants. Crisis-affected populations should be consulted about soap and handwashing preferences prior to the distribution of kits to ensure that products are well used and contribute to making handwashing a desirable and easy-to-practice behaviour. This insight was supported by the fact that FGD participants reported that laundry bar soap, normal bar soap and cheap bar soap, (similar to that distributed in most hygiene kits) was not desirable to use. A more detailed qualitative and quantitative assessment of the comparability of the study arms and an assessment of handwashing behaviours at baseline may have aided this study in achieving clearer results on the impact its interventions. Given the limitations of this research we recommend further studies into the use of hygiene kit products, prior to major changes in humanitarian practice. Theory-driven formative research prior to hygiene kit distribution, investigating perceptions of hygiene kit items would give further insights into the effectiveness of the kit to encourage behaviour and could help to design complementary hygiene promotion activities.

List Of Abbreviations

FGD: Focus group discussion

IDP: Internal Displaced Person

HWWS: Handwashing with soap

HWWW: Handwashing with water only

WASH: Water, Sanitation and Hygiene

Declarations

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Authors' contributions

SW and TH secured the funding for this study. AHT and SW designed the study. AHT and MH conducted the data collection. AS, TH and SW assisted with logistics and field operations. AHT and SW conducted data analysis. This paper was written by AHT and SW. All authors have reviewed and approved the submitted manuscript.

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Competing interest

The authors and their institutions have no financial or other conflicts of interest.

Ethics approval and consent to participate

The research received ethical approval from the London School of Hygiene and Tropical Medicine Ethics Review Committee (Ref: 17604) and Oromia Regional Health Bureau (Ref: BEFO/11BTP4/79/2011). The study was also approved by the Disaster Risk Management Office and Health Office at zonal level (Borena) and district level (Moyale) through face-to-face meetings with the study coordinator and Action Against Hunger representatives. Informed consent was gained from all participants in the study.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent for publication

Not applicable

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Figures

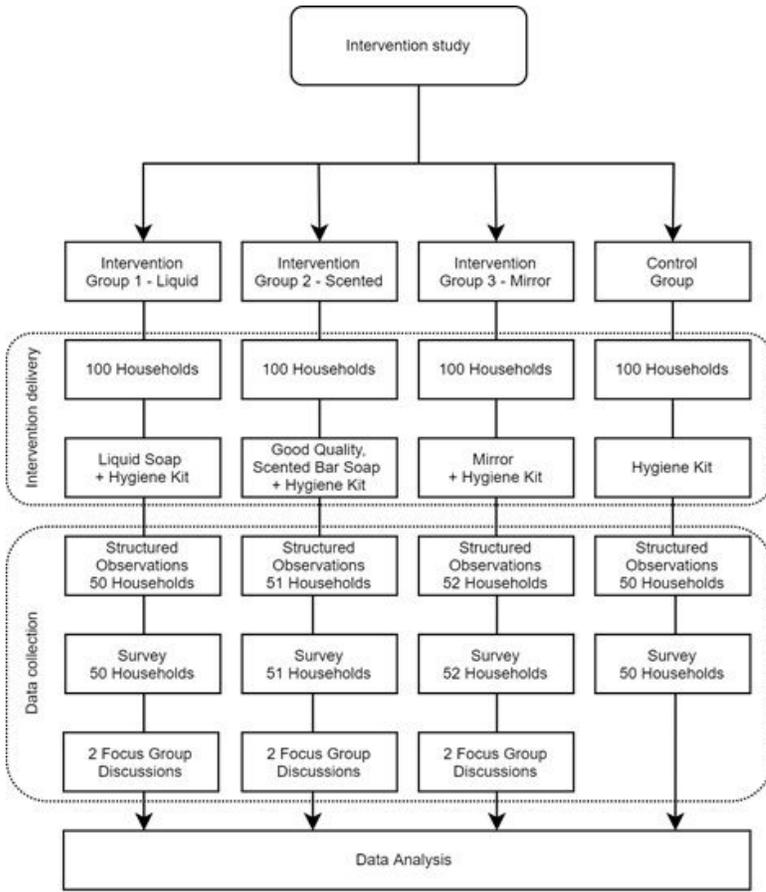


Figure 1

Study design of 4 armed mixed-methods pilot study of improved hygiene kits on handwashing with soap among internally displaced persons in Moyale District, Ethiopia.



Figure 2

Picture A, B and C displays the handwashing facility distributed in all study groups. The first picture shows a handwashing facility and liquid soap from IG1-Liquid, the second picture shows a handwashing facility and a good quality, scented bar soap in IG2-Scented and the third picture shows a mirror and handwashing facility as distributed in IG3-Mirror.



Figure 3

The soaps used for the soap ranking activity. These soaps were purchased at a local market in Moyale District.

Supplementary Files

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- [AdditionalFile1.docx](#)