



SCHOOL HANDWASHING AND HEALTH STUDY | KIBOGA DISTRICT, UGANDA 2022



Acknowledgements



The school handwashing and health program in Uganda was implemented by **Pauline Juliet Uganda (PJ)** with support and guidance from **Eco-Soap Bank**.

Pauline Juliet is a grassroots, community-led non-governmental organization registered and operating in Kiboga District, Uganda. PJ exists to provide women, children, and other marginalized groups the education and resources to effect change within themselves and within their communities. Over the years, their work has included activities such as the provision of reusable sanitary pads to students, health education in communities, partnership with 30 local schools, promotion of education through bursaries, fighting the spread of HIV/AIDs, and women's empowerment. For more information see: <https://paulinejulietinc.com/mission>

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School Handwashing and Health Study |

Kiboga District, Uganda

1. Introduction

Vulnerable communities across the least developed world, and young children in particular,¹ disproportionately suffer the plight of preventable illnesses. Handwashing with soap (HWWs) is the most cost-effective method to prevent hygiene-related illnesses and deaths.² Despite this life-saving potential, 2.3 billion people still lack basic access to soap and water for handwashing.³ Without this basic hygiene protection, impoverished families are left, and will remain, powerless as (highly) avoidable illnesses cause irreparable damage to the life and development of their young children.⁴

In Uganda, the absence of soap and handwashing opportunities continues to negatively affect hundreds of thousands of children. Diarrhea alone kills 33 children per day,⁵ and in the rural Kiboga District it has been estimated that, pre-COVID 19, as many as 70% of students were denied the lifesaving protection offered by access to basic handwashing facilities with soap.

When the COVID-19 pandemic hit, many of Kiboga's under-resourced schools lacked all forms of defense, and a prolonged mandatory school closure soon followed. The school closure became one of the longest in the world. As restrictions eventually eased, new standard operating procedures made handwashing facilities a requirement for reopening. For schools in this impoverished and largely unsupported rural area, fulfilling the new requirement represents a major financial and organizational challenge. Urgent assistance was needed to mitigate existing hygiene paucities and ensure that thousands of rural students in Kiboga, Uganda could reclaim the right to education and a safe return to school.

In response, Eco-Soap Bank, in cooperation with Pauline Juliet (PJ), implemented a handwashing outreach program in 24 rural schools. The aim of the project was 1) to provide 12,000 students with the basic tools and environment needed to improve handwashing practices and protect themselves and their families against the spread of COVID-19 and other hygiene related illnesses, and 2) give 24 schools the handwashing infrastructure needed to safely reopen in the aftermath of the COVID-19 pandemic.

This report summarizes the findings from the project evaluation. Using a pre-post (baseline/endline) study design, results show a significant improvement in handwashing practices among participants. Four weeks after the intervention, children reporting to never/rarely wash their hands in school had decreased by 82-83%. Correspondingly, around 80% of children reported to wash their hands sometimes/most of the time both after using the toilet and before eating.

As handwashing practices improved over the duration of the project, there were also indications of a decrease in illness prevalence. Compared to the pre-project measurements:

- Children were 87% less likely to have experienced illness symptoms in the two weeks preceding the endline study
- They were 67% less likely to have had diarrhea symptoms, and
- They were 46% less likely to have missed school due to illness.

¹ McMichael Celia & Robinson Pricilla (2016): Drivers of Sustained Hygiene Behaviour Change: A Case Study from Mid-Western Nepal, *Social Science and Medicine*, Vol. 163.

² Black, et al (eds.) (2016): *Reproductive, Maternal, Newborn, and Child Health. Disease Control Priorities*, third edition, the World Bank

³ UN Water (2020): "Handwashing/Hand hygiene", available at: <https://www.unwater.org/water-facts/handhygiene/>

⁴ Biran Adam, Wolf-Peter Schmidt, Kiruba Sankar Varadharajan, Divya Rajaraman, Raja Kumar, Katie Greenland, Balaji Gopalan, Robert Aunger, Val Curtis (2014): Effect of a behaviour-change intervention on handwashing with soap in India (SuperAmma): a cluster-randomised trial, *Lancet Global Health*, Vol. 2, pp. 145-154

⁵ UNICEF Uganda 2021, What we do, WASH, available at: <https://www.unicef.org/uganda/what-we-do/wash>

2. The Intervention

To accurately capture needs and assure appropriate intervention measures, the project design was informed by a short formative research study. The study – administered remotely due to COVID-19 restriction – targeted key members of the school management staff and gave them the opportunity to express their most pressing concerns and possible avenues of improvement.⁶

The interviews helped identify the most prevalent handwashing barriers and suitable intervention targets. The results showed that schools lacked adequate handwashing infrastructure, soap, and a clear notion of ownership over hygiene and handwashing issues.

Based on these findings, three main activities were deemed to be the most effective and sustainable means to improve the situation.

2.1. Activity 1: Improve soap and water access by 1a) Providing schools with water tanks and increasing the number of available handwashing stations, and 1b) Donating 35,000 Eco-Soap bars and distribute together with handwashing and hygiene education

Soap and water are essential precursors for handwashing with soap. However, these basic hygiene precursors are consistent, often unaffordable, expenses in many underprivileged areas.⁷ As a result, 7 out of 10 schools in least developed countries cannot afford to provide handwashing facilities with soap and water for students – and 355 million children go to schools that have handwashing facilities but cannot afford to provide an adequate supply of soap.⁸



To improve water access, the project donated water tanks and handwashing stations to all project schools with non- or inadequate coverage. In total, 2 new water tanks and 24 new handwashing stations were provided to project schools. Handwashing stations were visibly placed at strategic points around the school premises. New and previously existing water tanks were mobilized to assure that the handwashing stations can be refilled and remain functional throughout the entire year.

To improve soap access, all schools received an initial donation of a yearly supply of recycled Eco-Soap bars. In addition, Eco-Soap Bank established and introduced all schools to a convenient soap resupply system through which they will be able to easily, and highly affordably, secure access to soap in subsequent post-project years.

All soap donations were accompanied by hygiene education. Professional health personnel were hired to deliver expert advice and training in schools on the importance of handwashing with soap to fight COVID-19 and other illnesses. Students were also sensitized on the importance of handwashing with soap to kill common germs and reduce illnesses such as flu and diarrhea. After the hygiene education sessions, students received soap bars to bring home.

⁶ We would also have liked to include students in the formative research study. Unfortunately, the school closures meant that this was outside of the financial/practical realm of possibilities for the project.

⁷ Ross et al (2021) Costs of hand hygiene for all in household settings - estimating the price tag for the 46 least developed countries, New York UNICEF

⁸ UN Water (2020): "Handwashing/Hand hygiene", available at: <https://www.unwater.org/water-facts/handhygiene/>



2.2 Activity 2: Encourage sustained handwashing practices by distributing posters and stickers

While knowledge remains an important part of behavior change, recent research shows that environmental cues can be crucial complementary components in handwashing promotion. Instead of targeting the conscious decision-making processes which are the focus of pure knowledge dissemination, handwashing cues – or “nudges” – appeal to an automatic response through simple, cost-effective additions to the physical handwashing environment. The introduction of “nudges” has been a highly useful addition to hygiene promotion, and there is now a growing body of evidence that strongly links it to improved handwashing.⁹

To capture this important dimension and create more enabling handwashing environments, posters and stickers were deployed as visual cues and constant reminders of the virtues and needs of handwashing. The posters were pinned on common areas around the schools, in toilets, and on notice boards. Stickers were also attached directly on handwashing stations.

2.3 Activity 3: Anchor the intervention within the wider community by 3a) Establishing handwashing committees and appoint handwashing champions, and 3b) donating soap to the very poor and the churches and mosques where the community gathers

The sustainability of development efforts is often contingent on the ability to instill a sense of ownership and personal responsibility among participants and the wider community.¹⁰ In addition to introducing a reliable soap resupply system for all schools, ownership and sustainability was encouraged by training handwashing champions, making community soap donations, and establishing handwashing committees.



Student handwashing champions were trained directly by the project and then helped spread the handwashing message to their own households and the wider community. To further anchor the effort and disseminate project benefits to communities surrounding the schools, soap was donated directly to local churches, mosques, and the very poor. In total, these distributions reached 5 churches and mosques and 2,000 community members.

⁹ Dreifelbis et al (2016): Behavior Change without Behavior Change Communication: Nudging Handwashing among Primary School Students in Bangladesh, *International Journal of Environmental Research and Public Health*, Vol. 13, No. 129; Watson Julie & Dreifelbis Robert (2020): Using Environmental Nudges to Improve Handwashing with Soap Among Children, *London School of Hygiene and Tropical Medicine, COVID-19 HygieneHub*

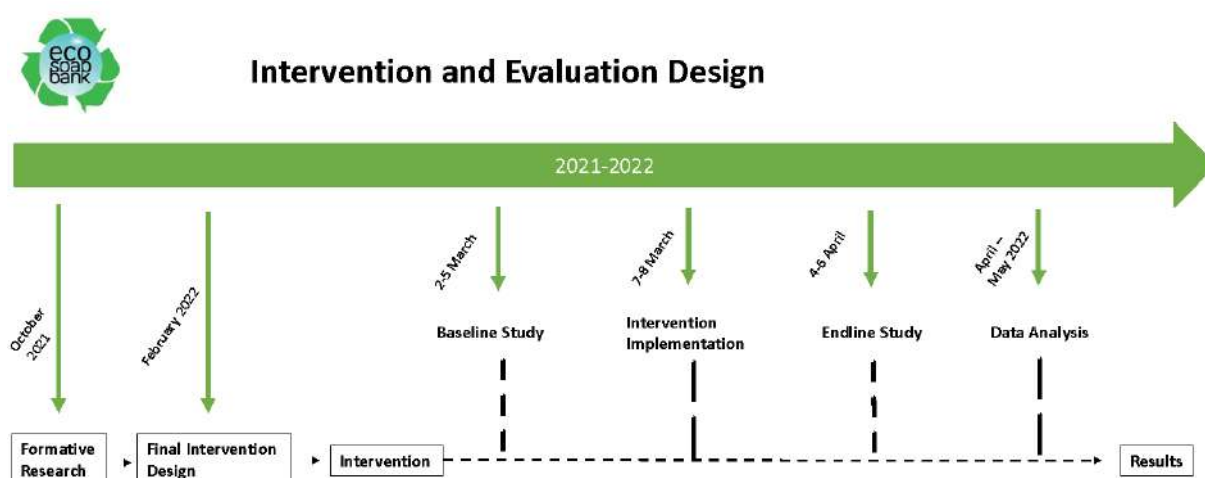
¹⁰ See pp 121, Chambers, Robert (2008): *Revolutions in Development Inquiry*, Institute of Development Studies, Earthscan:UK



To improve sustainability, dedicated handwashing committees were established at all 24 participating schools. The committee members were elected by the students and staff. Once appointed, committee members were, and remain, responsible for maintaining the handwashing infrastructure and assuring that soap is placed at handwashing stations every day.

3. Evaluation Methodology

Project outcomes were measured based on changes within a predetermined set of key handwashing indicators. The objective of the evaluation was to better understand how the intervention affected soap accessibility and hygiene behavior among students at target schools. A simple pre-posttest evaluation design was used to facilitate comparison and data was collected using a combination of observations and surveys.



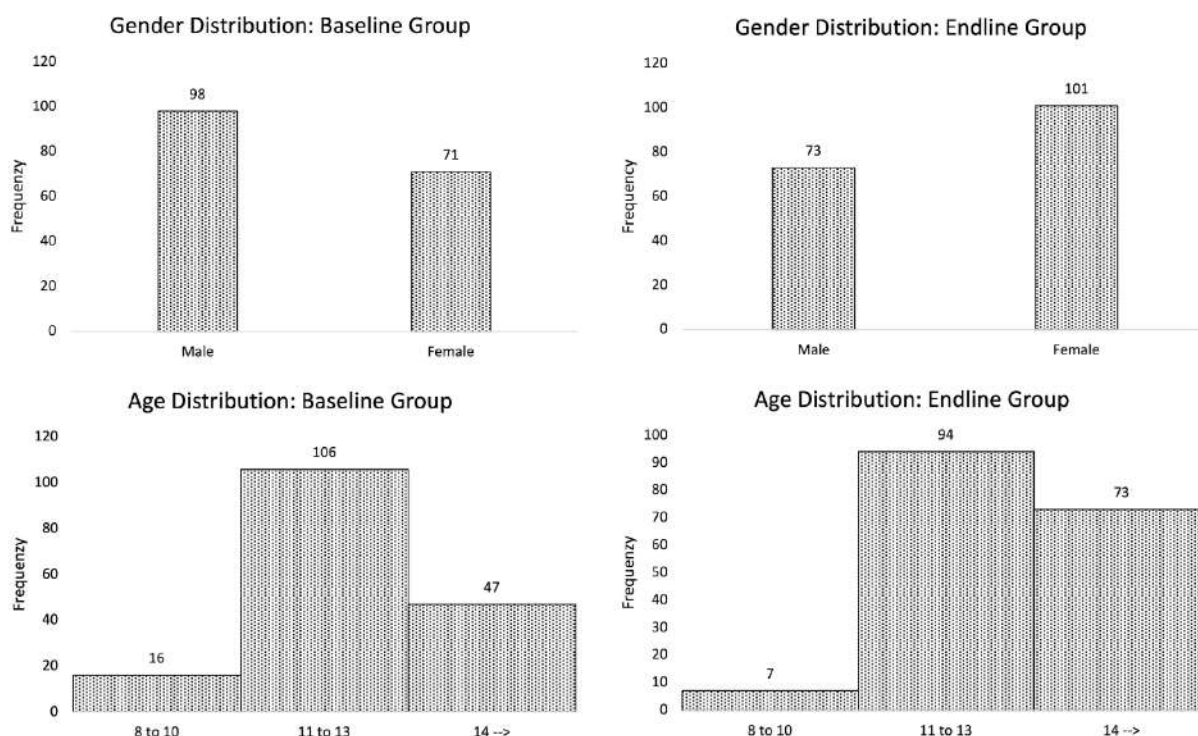
3.1 Sampling

Since resource constraints prohibited data collection at all participating schools, some sampling was required. As all 24 intervention schools were found to be similar regarding key geographic and demographic characteristics (rural, low-income areas, etc.), simple random sampling procedures were used to select 8 schools for the evaluation study.¹¹ The sample size was as large as possible given the practical constraints of the project. Once the 8 schools had been selected, students were randomly chosen to participate in the handwashing behavior study.

¹¹ 1 school was subsequently removed from the handwashing behavior sample due to influence from an unrelated handwashing scheme

In total, 343 students completed the surveys. The baseline and endline groups were slightly unevenly balanced. We therefore controlled for age and gender, but no significant correlations could be found between these characteristics and overall handwashing scores.

Figure 1. Group distributions and differences



Baseline Group	n	r	r ²	p-value
Gender and Handwashing Behavior Score	169	0,09988337	0,00997669	0,19632929
Age and Handwashing Behavior Score	169	0,01037924	0,00010773	0,89345608
Endline Group				
Gender and Handwashing Behavior Score	174	0,0807843	0,0065261	0,28929458
Age and Handwashing Behavior Score	174	-0,1118354	0,01250716	0,14772458

3.2 Outcome Indicators, Data Collection, and Analysis Methods

Handwashing with soap is the most-cost effective method to mitigate the detrimental effects of preventable illness, and the aim of handwashing promotion programs is to improve handwashing practices (which will reduce disease and save lives). However, working in small teams makes it difficult, and not very cost-effective, to assess project outcomes through statistically significant observations of change in handwashing behavior. For this project, it was therefore more appropriate/feasible to use soap accessibility and self-reported handwashing behavior as proxies for observed behavior.

Since an enabling handwashing environment has been strongly linked to improved handwashing practices, the soap accessibility conceptualization was widened to encompass 4 key indicators:

- 1) if soap and water were present together at handwashing stations
- 2) the number of available, fully functioning, handwashing stations
- 3) if soap was kept in close proximity to the handwashing stations, and

4) if the handwashing facilities were visibly located.

To assess handwashing behavior, the team collected data on 3 main variables – each defined by a series of indicators:

- 1) handwashing knowledge
- 2) self-reported handwashing practices, and
- 3) illness prevalence

Data collection was completed using a predetermined observation guide and handwashing behavior survey. Evaluation data was collected at two separate occasions – at baseline (one week before the intervention) and at endline (four weeks after the intervention).

To measure change, the main outcome concepts were operationalized through a series of sub-variables and indicators. Each indicator was assigned a score value, and a baseline/endline comparison of total scores provided an overall assessment of change.¹² In addition, changes within individual variables were used to pinpoint and assess more specific pre-posttest differences.

4. Results

Results were tested for statistical significance and effect size using bivariate analysis methods conducted in Microsoft Excel. Since overall scores were not fully normally distributed, Mann-Whitney U-tests were used to determine the statistical significance for the mean difference in baseline and endline overall scores. Chi-square tests and odds ratios were then used to test for differences and calculate effect sizes within individual handwashing variables.

Table 1. Overall Scores

	Baseline Group		Endline Group		Difference			
	n	Average Score	n	Average Score	Average Score	p	Effect	Effect Size
1. Handwashing Behavior	169	13,4*	174	17,6	+4,2	<0.001	0,423***	Large
2. School Soap Accessibility	7	2,5**	7	8,7	+6,2	0,0037	0,600***	Large
* Min = 2, Max = 27								
** Min = 0, Max = 11								
*** Eta Squared (N²)								

Table 2. Handwashing Behavior Results

	Baseline Group (total n = 169)				Endline Group (total n=174)				Difference				
	n	%	Lower 95% CI	Upper 95% CI	n	%	Lower 95% CI	Upper 95% CI	n	%	p	Effect	Effect Size
1. Handwashing knowledge													
1.1 Mentioned HWWS as a way to prevent diarrhea	122	72%	65%	79%	130	75%	68%	81%	+8	+3%	0,596	0,028*	None
1.2 Mentioned HWWS as a way to prevent respiratory illness and COVID-19	137	81%	75%	87%	137	78%	72%	84%	0	-3%	0,590	0,029*	None
1.3 Identified that soap is needed to completely remove some material, like germs	132	78%	72%	84%	131	75%	69%	85%	-1	-3%	0,537	0,033*	None
1.4 Identified at least 3 critical times for HWWS	159	94%	91%	98%	155	89%	84%	94%	-4	-5%	0,095	0,089*	None

¹² See attachment 1 for full details and a complete list of indicators and assigned score values

2. Self-Reported HWWS Practice														
2.1 HWWS Yesterday														
2.1.1 0 times	59	35%	28%	42%	11	6%	2%	10%	-48	-29%	<0,001	0,412**	Large	
2.1.2 1-2 times	46	27%	21%	34%	32	18%	12%	24%	-14	-9%	<0,001	0,412**	Large	
2.1.3 3 times or more	64	38%	31%	45%	131	75%	69%	82%	+67	+37%	<0,001	0,412**	Large	
2.2 Self-reported HWWS after using the toilet (in school)														
2.2.1 Never/Rarely (1-3)	152	90%	85%	94%	13	7%	4%	11%	-139	-83%	<0,001	0,826**	Large	
2.2.2 Sometimes/Most of the time (4-7)	13	8%	4%	11%	140	80%	75%	86%	+127	+72%	<0,001	0,826**	Large	
2.2.3 Almost Always/Always (8-10)	4	2%	<0,1%	5%	21	12%	7%	17%	+17	+10%	<0,001	0,826**	Large	
2.3 Self-Reported HWWS before eating (in school)														
2.3.1 Never/Rarely (1-3)	157	93%	89%	97%	20	11%	7%	16%	-137	-82%	<0,001	0,814**	Large	
2.3.2 Sometimes/Most of the time (4-7)	11	6,5%	3%	10%	141	81%	75%	87%	+130	+75%	<0,001	0,814**	Large	
2.3.3 Almost Always/Always (8-10)	1	0,5%	<0,01%	1%	13	7%	4%	11%	+12	+7%	<0,001	0,814**	Large	
3. Illness														
3.1 Children missing school days due to illness during preceding 2-week period	76	45%	37%	52%	53	30%	24%	37%	-23	-15%	0,005	0,535***	Medium	
3.1 School days missed due to illness during preceding 2-week period	139				115				-24					
3.2 Children experience illness symptoms during preceding 2-week period	143	85%	79%	90%	73	42%	36%	49%	-70	-43%	<0,001	0,131***	Large	
3.3 Children experiencing diarrhea symptoms during the preceding 2 weeks	68	40%	33%	48%	32	18%	13%	24%	-36	-22%	<0,001	0,334***	Medium	
* Phi Coefficient														
** Cramer's V														
*** Odds Ratio														

Table 3. Soap Accessibility Results

	Baseline (n=7)		Endline (n=7)		Difference	
	n	%	n	%	n	%
1. Functioning handwashing stations						
1.1 No functioning handwashing stations	4	57%	0	0%	-4	-57%
1.1.1 1-2 functioning handwashing stations	1	14%	4	57%	3	+43%
1.1.2 More than 3	2	29%	3	43%	1	+14%
2. Soap and water at handwashing stations						
2.1 Water available at all handwashing station	1	14%	3	43%	2	+29%
2.2 Water available at some handwashing station	1	14%	4	57%	3	+43%
2.3 No water	4	57%	0	0%	-4	-57%
2.4 Soap available at all handwashing station	0	0%	3	43%	3	+43%
2.5 Soap available at some handwashing stations	2	29%	3	43%	1	+14%

2.6 No soap	5	71%	1*	14%	-4	-57%
3. Soap placement						
3.1 Soap kept close to all handwashing stations	2	29%	6	86%	4	+57%
3.2 Soap kept close to some handwashing stations	1	14%	1	14%	0	0%
3.3 No soap	4	57%	0	0%	-4	-57%
4. Location of handwashing facilities						
3.1 Visibly placed	4	57%	6	86%	2	+29%
3.2 Not visibly placed	3	43%	1	14%	-2	-29%

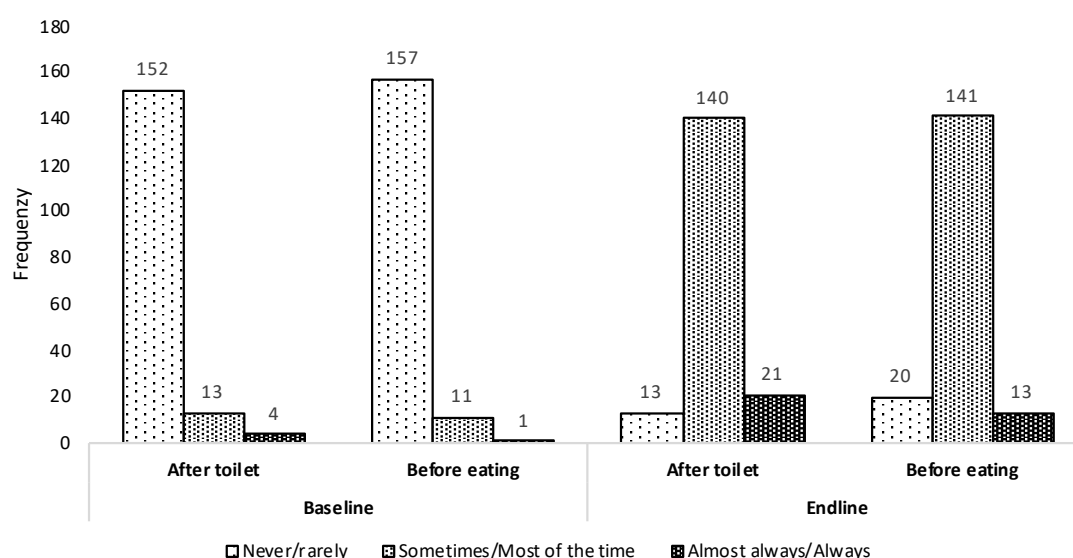
* This school stored the soap away from the handwashing facility

As reflected above, soap accessibility was highly limited at schools before the intervention. On average, schools scored just 2.5 on an 11-point scale. 57% of schools lacked any functioning handwashing stations. 57% had no water for handwashing. A worrying 71% had no soap at all for handwashing.

At the endline observations (4 weeks after the intervention), all schools remained open, and the average school soap accessibility score had increased from 2.5 to 8.7 – reflecting an overall increase of over 56%. Schools had on average 3 functioning handwashing stations at school premises. 100% of schools still had at least one functioning handwashing with soap and water, and 86% of schools had handwashing facilities that were visibly placed and easily accessible by students.

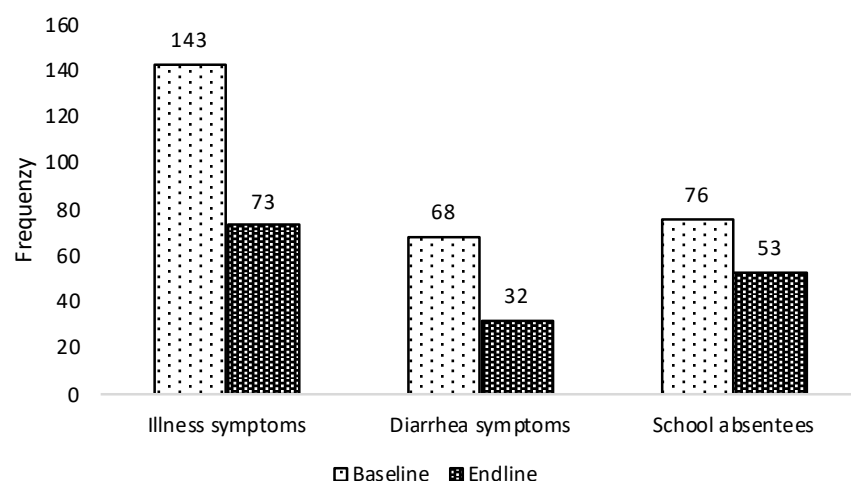
A similarly encouraging tendency was found in the handwashing behavior results. Overall, there was a large, statistically significant increase in the post-project handwashing behavior score of students ($N^2 = 0,423$, $p = <0.001$). While handwashing knowledge levels remained largely unchanged between the pre- and post-intervention surveys, self-reported handwashing practices improved significantly. Four weeks after the intervention, children reporting to never/rarely wash their hands in school had decreased by 82-83%. Correspondingly, around 80% of children now reported to wash their hands sometimes/most of the time both after using the toilet and before eating.

Figure 2. Self-reported handwashing practices



As handwashing practices improved, there were also indications of a decrease in illness prevalence. Compared to the pre-project measurements, children were 87% less likely to have experienced illness symptoms in the two weeks preceding the endline study (OR = 0,131 CI 95% [0,07, 0,2]). They were 67% less likely to have had diarrhea symptoms (OR = 0,334 CI 95% [0,2, 0,5]), and they were 46% less likely to have missed school due to illness (OR = 0,535 CI 95% [0,3, 0,8]).

Figure 3. Illness Prevalence



5. Conclusions

The results of the intervention in Kiboga District, Uganda, show how a small-scale, strategically targeted hygiene program can have a real and important influence on handwashing opportunities and, by extension, the behavior among rural school children. Utilizing a combination of subtle infrastructural improvements, supportive education, and sustained access to soap, the project was able to establish enabling handwashing environments and improve handwashing practices among students. Even when considering the usual measurement caveats relating to sample size and self-reported behavior, these findings are important.

As handwashing practices improved, there were also indications of a decrease in illness prevalence. Compared to the pre-project measurements, children were 87% less likely to have experienced illness symptoms in the two weeks preceding the endline study. They were 67% less likely to have had diarrhea symptoms, and they were 46% less likely to have missed school due to illness.

The results illustrate the continued need, and growing significance, of well-designed, basic handwashing infrastructure interventions. While handwashing knowledge appears to be well established, 2 billion people worldwide remain excluded from basic access to handwashing facilities with soap and water.¹³ As the price of soap is increasing dramatically in places like Uganda, this number risks growing even further. Without the basic tools, it will remain impossible to instill and maintain long-term improvements of handwashing behavior.¹⁴ Considering this, improving the access to soap and water for handwashing among children and vulnerable populations can help save millions of lives,¹⁵ and billions of dollars,¹⁶ a year as a direct consequence of reduced disease burdens.

¹³ UN Water (2021): "Handwashing/Hand hygiene", available at <https://www.unwater.org/water-facts/handhygiene/>

¹⁴ Ross et al (2021) Costs of hand hygiene for all in household settings - estimating the price tag for the 46 least developed countries, New York UNICEF

¹⁵ GHP (2020): Global Handwashing Day 2020, Fact Sheet, available at: <https://globalhandwashing.org/wp-content/uploads/2020/09/GHD-2020-Fact-Sheet-English.pdf>; Ross et al (2021) Costs of hand hygiene for all in household settings - estimating the price tag for the 46 least developed countries, New York UNICEF

¹⁶ Townsend et al (2017): Costs of diarrhoea and acute respiratory infection attributable to not handwashing the cases of India and China, *Tropical Medicine and International Health*, Vol. 22

Attachment 1. List of Soap Accessibility and Handwashing Behavior Indicators (with assigned score values)

Self-reported Handwashing Behavior	Max. Score	Min. Score
Handwashing knowledge (total)	8	0
Knowledge of illness prevention	2	0
Knowledge of benefits of HWWS	2	0
Knowledge of critical times for HWWS	2	0
Knowledge of different reasons for HWWS	2	0
Self-reported handwashing practices (total)	15	2
Number of times HWWS yesterday	2	0
Moments HWWS yesterday	2	0
Self-reported HWWS soap after using the toilet in school (scale from never to always)	5	1
Self-reported HWWS soap before eating in school (scale from never to always)	5	1
Soap in Household	1	0
Illness prevalence (total)	4	0
School days missed due to illness in preceding two weeks	2	0
Experienced diarrhea symptoms during preceding two weeks	1	0
Experienced other forms of illness symptoms (list provided) in preceding two weeks	1	0
Grand Total Handwashing Behavior Score	27	2

Soap accessibility	Max. Score	Min. Score
Soap and water present together at all handwashing stations (total)	6	0
Water at all handwashing station	2	0
Soap at all handwashing stations	2	0
Soap and water at all handwashing stations	2	0
Number of available handwashing stations	2	0

Soap visibly placed near handwashing stations	2	0
Handwashing facilities visibly placed	1	0
Grand Total Soap Accessibility Score:	11	0