

## Periodic overview of handwashing literature: Summary of selected peer-reviewed and grey literature published January – June 2013

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### Risk factors and disease prevalence

- The first paper of the Lancet series on childhood pneumonia and diarrhea estimates that, in 2010, there were 1.73 billion episodes of diarrhea and 120 million episodes of pneumonia in children less than five years old globally. In 2011, an estimated 700,00 episodes of diarrhea and 1.3 million episodes of pneumonia led to death with a high proportion of deaths occurring in the first two years of life for both diseases (72% for diarrhea and 81% for pneumonia). (Walker et al. 2013)
- Ashraf and colleagues found that children under five years old from a cohort of 873 households in Karachi, Pakistan were at a 6% increased risk of pneumonia for every additional day of diarrhea within a two week period. This suggests that public health programs that prevent diarrhea may also reduce the risk of respiratory illness. (Ashraf et al. 2013)
- A case-control study in a Cairo hospital that compared children with diarrhea (cases) to children without diarrhea (controls) found that not having soap at the toilet, having no towels in a bathroom and sharing a toilet with other families were (modifiable) risk factors for a child having diarrhea. (Mansour et al. 2013)
- Among school-aged children in Tajikistan, handwashing after using the toilet (OR=0.78) and after handling animals (OR=0.66) were significant protective factors against *E. vermicularis* infections (the most prevalent intestinal helminth infection among population tested) in a cross-sectional survey. (Sherkhonov et al. 2013)

### Takeaway for implementers:

- In 2010 and 2011, diarrhea and pneumonia episodes among children less than five years old remained high and led to a large number of deaths, especially in the first two years of life.
- Programs that prevent diarrhea may also reduce the risk of pneumonia.
- Lack of soap at a toilet, no towels in the bathroom and sharing a toilet may be more frequently observed among children with diarrhea than among well children.
- Handwashing after using the toilet and after handling animals may be protective against certain helminth infections but more rigorous investigation is needed to assess this relationship.

### Handwashing and health outcomes

- A cluster randomized controlled trial evaluating an at-scale handwashing behavior change program in Vietnam (WSP) showed those exposed to the campaign had slightly higher availability of handwashing materials in the household and reported washing hands at some of the times promoted by the campaign compared to those who were not exposed to the program. However, observed handwashing with soap at critical times was low and not different between those exposed and unexposed to the handwashing campaign. They found no impact of the program on health or productivity. The authors conclude that, even where knowledge and access to soap and water are not constrained, large scale behavior change campaigns must balance intensity of the intervention with effectiveness. (Chase and Do 2012)

- A randomized controlled trial evaluating new approaches to promoting handwashing with soap in Peru (WSP) found that mass media alone had no significant effect on exposing target communities to handwashing promotion messages and thus no effect on knowledge or behavior. However, a community-level intervention (included community and school activities) was able to reach the audience with handwashing promotion messages, improve knowledge related to handwashing, and improve self-reported and observed handwashing with soap at critical times. They did not observe any significant improvements in health of children less than five years old. The authors conclude that changing behavior to improve health requires intensive and more personalized interventions. (Galiani et al. 2012)
- In a cluster randomized intervention trial, Bieri and colleagues assessed the effects of an interactive education package (include handwashing) on incidence of helminth infection among school children in rural China. The incidence of soil-transmitted helminth infection was 50% lower (4.1%) among schoolchildren (9-10 years old) that received the interactive learning package compared to the control group that received posters (8.4%). Schoolchildren that received the intervention had 90% higher mean score for knowledge of helminths and had twice as high prevalence of handwashing after using the toilet in the school compared to the control group. The authors concluded that culturally appropriate, age-appropriate, relatable education approaches to health behavior related to prevention of helminth infections that are based in behavioral theory can improve education, change behavior and improve health outcomes. (Bieri et al. 2013)
- In Sofala Province, Mozambique, Davis and colleagues examined the nutrition-related behavior of mothers, and nutrition status of children less than two years old, before and after an intervention that used a care group model to teach newborn survival and nutrition skills. A community volunteer for every 12 households and 6.6 paid project staff per 100,000 people delivered messages to 50,000 households. Volunteers were trained to teach messages and skills, one of which included handwashing as an essential nutrition action (construction of a handwashing station, critical times). There were 30 to 50% differences in reported handwashing of mothers of children less than two years before preparing food, before eating, after defecating and after attending to a child who has defecated. Undernutrition (weight-for-age Z-score less than two standard deviations below international standard median/mean) declined by 8.1 percentage points over a five year period in children under two years old, four times the rate of decline in children under five years nationwide in Mozambique. The project cost was \$0.55 per capita per year and \$2.78 per beneficiary per year. This evaluation did not include a comparison group and therefore, the reader cannot be sure the observed effects are attributed to the program only. However, the difference between the effects seen in the evaluation and the national rates suggest the project may have contributed to the observed effects. (Davis et al. 2013)
- Evaluation of the *Fit For School Program* in the Philippines showed that, after one year, children in the intervention group had significant increase in body mass index, and lower prevalence of moderate or severe soil-transmitted helminth infection compared to the control group. The intervention group had daily supervised handwashing with soap and clean water as a group, daily supervised tooth brushing as a group and biannual deworming at school. (Monse et al. 2013)
- Lin et al. found that children from “cleaner” households (includes having soap and water at a handwashing station) had 0.5 standard deviation higher height-for-age Z-score (indicator of growth), 0.32 lower L:M ratio in urine (indicator of intestinal absorption) compared to children from “less clean” households. These results support the hypothesis that fecal contamination of the environment could be a cause of growth faltering in young children and is mediated through environmental enteropathy. However, more robust evidence of this mechanism is needed. (Lin et al. 2013)

- Systematic review of evidence of the effects of WASH interventions (individually or in combination) on nutritional status of children reports there is no evidence of effect on weight-for-age Z-score, weight-for-height Z-score and borderline significant effect on height-for-age Z-score. Authors report the duration of the studies included in the meta-analysis were relatively short and none were of high methodological quality. However, larger trials are underway to understand this with more rigor. (Dangour et al. 2013)

#### Take-away for implementers:

- Where knowledge and access to materials are not notable barriers, large scale handwashing promotion programs may need more rigor or intensity to improve handwashing behavior.
- Community and school level interventions appear to work better than large mass media campaigns at reaching community members and improving handwashing behavior in Peru.
- Two different participatory school-based approaches (that include hand hygiene) demonstrated improvements in helminth infection among school children.
- A community level intervention using a care group model was able to improve mothers' handwashing behavior at certain critical times and improve the nutritional status of their children over a 5 year period at a cost of \$0.55 per capita per year and \$2.78 per beneficiary per year.
- Households with better WASH environments (including having a handwashing station with soap and water) had better growth indicators and gut absorption compared to children with worse WASH environments in the household.
- Current evidence about the effects of WASH interventions on children's nutritional status show little benefit but are low in quality. A number of trials are on-going to better assess this relationship.

#### **Factors that affect handwashing behavior**

- A follow-up of the Karachi Soap Health Study (Luby et. al Lancet 2005) showed that intervention households (those that received soap and weekly handwashing education for 9 months in 2003) were 3.4 times more likely to have soap at the household handwashing station, knew more key times to wash hands, and reported purchasing more soap than control households 5 years after the study completion. The authors state these result suggest habituation of improved handwashing practices but they cannot be certain these indicators correspond to handwashing behavior because these are proxy indicators. (Bowen et al. 2013)
- Based on an evaluation of BRAC's WASH program using a pre- / post-intervention design among 26,404 households in rural Bangladesh, researchers reported a gap between knowledge of handwashing at critical times and self-reported practice of handwashing at those critical times. Education, water access and access to media were predictive of reporting handwashing with soap. (Rabbi and Dey 2013)
- In a cross-sectional study, researchers found that adolescents (10-19 years old) from rural Indian households who reported washing their hands with soap after defecation and before eating food were more likely to have a reported good handwashing practice by their mother, have a sanitary latrine, have soap at a handwashing location, have in-house water supply, and had a higher per capita income compared to adolescents who reported not to wash their hands with soap before eating or after defecation. Some of the predictors of good handwashing behavior found here are consistent with previous work. About 32% of the 442 adolescents interviewed reported washing hands with soap after defecation and before eating. (Dobe et al. 2013)
- One study qualitatively assessed a teacher-centered participatory handwashing with soap intervention among multi-ethnic primary schools in rural Vietnam. From semi-structured interviews, focus group discussions and observations, the authors reported children, schoolteachers and parents viewed the

intervention as positive and feasible, regardless of ethnicity, the schoolchild's gender and the schoolteachers' background. Important barriers to maintaining and transferring good handwashing behavior to the home were: lack of hygiene lessons in the standard curriculum of schools, lack of prioritization and time dedicated to practical teaching methods and lack of guidance and reminders to wash hands regularly at home. Continuous access to soap and water may be a challenge at schools but did not seem to be a barrier at home. (Xuan le et al. 2013)

- Formative research from Southern Tanzania explored hygiene practices at birth and newborn care practices in home-deliveries. Respondents reported that insertion of any family member's hands into the vagina of a delivering woman to check for labor progress was common practice — highlighting an important role for hand hygiene during birth for women in this community. Birth attendants did not discuss handwashing and wearing of gloves as being important for newborn health and the practice of handwashing and wearing gloves varied. Respondents cited that lack of water, lack of gloves and lack of awareness are significant barriers to good hand hygiene practice during delivery. Respondents deemed most recommended birth hygiene and newborn care behaviors acceptable and could be changed with improved awareness. (Shamba et al. 2013)
- In Nepal, researchers found that a community hygiene intervention reduced child diarrhea by 40% using quantitative methods but qualitative methods showed the intervention did not reach the ultra-poor. The authors argue that social marketing approach focuses on individual factors instead of structural limitations to good behavior and can thus exacerbate health inequity. Social marketing should be used within a range of interventions that also address structural drivers of behavior change. Qualitative methods in formative research and evaluation phases of a health intervention can address issues of equity from programs/interventions. (Langford and Panter-Brick 2013)

#### Takeaway for implementers:

- Frequent handwashing promotion and provision of soap to households may influence habit adoption but current evidence is suggestive.
- Level of education, water access and access to media remain important predictors of reported handwashing practice among adults. Access to a sanitary latrine, soap and water at handwashing place, in-house water supply, higher per capital income and reporting that their mother has good handwashing practice were predictors of good handwashing behavior (self-reported) by adolescents.
- School-based handwashing programs that are motivating and engaging to students and teachers can still face structural barriers to good handwashing practice such as continuous access to soap and water.
- Birth attendants and mothers from a community in Tanzania deemed improved awareness as the key to better hand hygiene behavior at birth and for newborn care, especially to mitigate risk for certain practices around the birth.
- One study showed a social marketing approach should be deployed with interventions that also address structure determinants of behavior change. Qualitative work during the formative and evaluation phases of a program can help identify inequity issues to program implementation.

#### **Handwashing measurement**

*We did not find any articles published between January and June 2013 that assessed methods to measure handwashing behavior.*

#### **Advocacy**

- Paper two of the Lancet series on childhood pneumonia and diarrhea outlines interventions to address deaths equitably from these causes by looking at what works and at what cost. The authors explore environmental interventions (like WASH), nutritional, vaccinations and treatment along with delivery platforms. Authors assessed the potential effect on lives saved if interventions were scaled up to reach 80% coverage by 2025. WASH interventions could prevent almost the same amount of child deaths as Hib, pneumococcal and rotavirus vaccines (500,000). Handwashing alone was estimated to avert about 170,000 deaths from diarrhea and pneumonia. Cost analysis shows WASH interventions are historically less expensive than vaccines and would be marginally less expensive to scale up by 2025 in 75 “countdown countries.” (Bhutta et al. 2013)
- Paper three of the Lancet series on childhood pneumonia and diarrhea explores bottlenecks, barriers and solutions from multi-country consultations focused on reducing child deaths from diarrhea and pneumonia. Advocacy for WASH interventions to increase awareness and support was one of five main proposed solutions. Social marketing was recommended to be used to “aggressively promote desirable behaviors and discourage undesirable practices”. Advocacy should include multiple stakeholders such as national governments and policy makers to support childhood survival programs, train effective and motivated health workers, invest in long-term, large-scale public infrastructure to develop sanitation systems, and convince communities of the benefits of hand, water, and food hygiene. (Gill et al. 2013)

*Takeaway for implementers:*

- Handwashing with soap is estimated to avert a large number of deaths from diarrhea and pneumonia with substantial scale up over the next 10 years and remains less expensive to scale up than vaccines.
- Advocacy for WASH is 1 of 5 recommended solutions to reduced childhood morbidity and mortality from diarrhea and pneumonia.

**Additional resources**

- WaterAid hygiene framework outlines their strategic guidance for country programs to develop or refine approaches to hygiene. This is an example of a framework for hygiene promotion and behavior change. (<http://www.wateraid.org/~media/Publications/hygiene-framework.pdf>)
- DFID evidence paper outlines the strength of current evidence for effect of WASH interventions on health and development and identifies knowledge gaps. ([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/193656/WASH-evidence-paper-april2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/193656/WASH-evidence-paper-april2013.pdf))

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