

Researchers pioneer use of video surveillance to better understand essential hygiene behavior

April 15 2014, by Rob Jordan



A new study used video to observe hand washing behavior to gain insights that could improve design, monitoring and evaluation of hygiene campaigns.

(Medical Xpress)—One of the best defenses against infectious disease is one of the most simple – hand washing.

Still, despite years of global public awareness campaigns, [hand washing](#)

rates remain low. Caregivers of young children in low-income, developing world settings are found to wash their hands only 17 percent of the time after using the toilet.

A new study finds that video surveillance can provide insights into hand washing behavior. When another person is present, for example, hand washing rates increase 23 percent. These findings could, in turn, inform the design, monitoring and evaluation of hygiene campaigns.

"Hopefully, video surveillance will be added to the toolbox for accurately measuring hand hygiene behavior, thus improving monitoring and evaluation of interventions around the world," said Amy Pickering, the study's lead author and a research associate at the Stanford Woods Institute for the Environment.

Co-author Jenna Davis, a senior fellow at Woods, added, "Hand washing is notoriously difficult to study. Video surveillance looks to be a promising strategy for obtaining reliable information, even in resource-constrained settings."

The study, published in the journal *PLOS One*, was carried out using video cameras installed in the washing areas outside latrines of four public schools in the sprawling Kibera slum of Nairobi, Kenya. Parents and administrators gave permission for the study, and teachers were informed in advance.

Pickering acknowledged that the students' awareness of the cameras – teachers alerted them – likely affected their behavior. Still, Pickering pointed to the study's findings as valuable data showing advantages of video surveillance over in-person observation.

Those advantages include lower cost, less time commitment and faster, more reliable data processing. Having two research assistants watch

video and record data is possible with in-person observation, but would add significant cost and logistical complications, while likely influencing hand washers' behavior to an even greater extent.

Among the study's findings:

- Both methods of observation found the hand cleaning rate after toileting was higher among girls – a 4 percent difference, according to video surveillance, and a 3 percent difference, according to in-person observation.
- Both video observation and in-person observation demonstrated longer hand cleaning times for hand washing with soap as compared to rubbing with sanitizer.
- Students at schools equipped with soap and water, instead of sanitizer, were 1.3 times more likely to wash their hands during simultaneous [video surveillance](#) and in-person observation when compared with periods of in-person observation alone.
- Overall, when students were alone at a hand cleaning station, hand cleaning rates averaged 48 percent, compared to 71 percent when at least one other student was present.

Hand cleaning rates showed an overall trend of increasing as the number of other people present at hand cleaning stations increased, with the exception of a slight decrease in hand cleaning when more than 10 people were observed.

Based on the findings, the authors suggest the following strategies for better hygiene:

- Placement of hand cleaning materials in public locations
- Scheduling specific times for bathroom breaks between classes
- Designating specific students to be hand hygiene "champions"
- Formation of student clubs to demonstrate and promote [hand](#)

[hygiene](#) to classmates

More information: Pickering AJ, Blum AG, Breiman RF, Ram PK, Davis J (2014) "Video Surveillance Captures Student Hand Hygiene Behavior, Reactivity to Observation, and Peer Influence in Kenyan Primary Schools. " *PLoS ONE* 9(3): e92571. [DOI: 10.1371/journal.pone.0092571](#)

Provided by Stanford University

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