

Educators Teach Effective Hand Washing with a Simplified Method

Abstract

We conducted a study to determine the effectiveness of a 30-min hand-washing instruction among youths in kindergarten through fifth grade. Two months after implementing the instruction, we gathered survey data to assess knowledge gained and student behaviors. Results revealed that high proportions of youths in kindergarten through second grade ($n = 90$) were able to recognize various situations requiring hand washing and that majorities of youths in third grade through fifth grade ($n = 172$) tended to wash their hands at relevant times (e.g., after using the bathroom). Overall, we concluded that youths taught a 30-min hand-washing lesson reduced microbial counts on washed hands, maintained knowledge, and made positive behavior changes.

Keywords: [hand washing](#), [youths](#), [behavior change](#), [Extension](#)

Julie Buck

Family Consumer
Sciences Educator
jhbuck@uidaho.edu

Surine Greenway

Family Consumer
Sciences Educator
surineg@uidaho.edu

Katie Hoffman

Family Consumer
Sciences Educator
khoffman@uidaho.edu

Grace Wittman

Family Consumer
Sciences Educator
gwittman@uidaho.edu

Jang Ho Kim

Extension Food Safety
Specialist
janghok@uidaho.edu

University of Idaho
Extension
University of Idaho
Moscow, Idaho

Introduction

University of Idaho Extension receives frequent requests for hand-washing education. Schools and teachers recognize the need for their students to use proper hand-washing skills because illness is a major contributor to absenteeism in schools (Nandrup-Bus, 2009). In general, inadequate hand washing by youths has been a concern for decades. In one study of a group of middle and high school students, 58% of female students and 48% of male students reported washing their hands, and of those respondents, 33% of the females and 8% of the males reported using soap (Guinan, McGuckin-Guinan, & Severeid, 1997). An observational study of hand washing among youths at the 2004 Minnesota State Fair revealed that 66% of females and 18% of males used soap and water to wash their hands (Allwood & Minnesota Food Safety Planning Group, Division of Environmental Health, n.d.). Teaching children how to properly wash their hands has been shown to be the most effective form of intervention for reducing the spread of infection (Aiello, Coulborn, Perez, & Larson, 2008). Additionally, studies have indicated that Extension should play an active role in educating youths about proper hand washing (Comer, Ibrahim, McMillan, Baker, & Patterson 2009; Fenton, Radhakrishna, & Cutter, 2010). Through collaborations with school districts, University of Idaho Extension educators meet this need by reaching nearly 3,000 youths annually with an effective and simplified hand-washing instruction.

Recurrent requests for hand-washing instruction place a strain on Extension educators across Idaho. Historically,

the Washington State University Extension Germ City hand-washing education program was used throughout the state (Parsons, n.d.). This program was expensive to purchase, required access to electricity, necessitated that four persons work several hours to set up the tunnel where germs are represented, and took extensive time to teach. Longer hand-washing instruction, more than 30 min, has shown positive results (Centers for Disease Control and Prevention, 2015). However, research on the use of shorter hand-washing lessons also has provided evidence of effectiveness (Hyde, Wilson, & Raab, 2016; Snow, White, & Kim, 2008). Due to lack of money to pay for materials, limited time available for teaching in school classrooms, and evidence suggesting that shortened instruction is effective, our team of University of Idaho Extension family and consumer sciences professionals created a 30-min lesson for teaching hand washing by adapting the Germ City program. The 30-min hand-washing education involves the use of portable lesson materials that require little to no setup, as compared to a bigger system requiring larger instruction space and much more preparation time. After developing the lesson, we conducted pilot testing of it. Our objectives were (a) to ensure that hand-washing education provided via the lesson is consistent and effective, (b) to evaluate any change in participant knowledge regarding hand washing, and (c) to assess the effectiveness of the hand-washing technique taught in the lesson, using the microbiological method.

Description

We conducted pilot testing of the program with 313 youths in kindergarten through fifth grade at eight elementary schools in four Idaho counties. We used the following step-by-step method:

1. The educator explained why proper hand washing was needed to remove food-borne pathogens.
2. The educator shared a poster showing situations in which hand washing should occur, such as after using the bathroom, before eating, after playing with pets, and after cooking food.
3. The educator taught students how to wash their hands using proper technique—20 sec of vigorous hand washing with warm water and soap followed by drying with a paper towel.
4. The educator sampled students' hands using 3M Petrifilms Plates to assess microbial counts before hand washing. 3M Petrifilm Plates replace one agar dish and are a "rehydratable, dry-film, sample-ready, culture-medium system that contains nutrients, a cold water-soluble gelling agent and indicator dye(s) that facilitate colony enumeration" (Howland & Bakken, 2015, "Introduction," para. 1).
5. The educator applied fluorescent lotion (Glitter Bug, Brevis Corp) to the students' hands, and the students observed their hands under a black light, where the lotion represented germs.
6. The students washed their hands using the technique they had learned and then checked their hands again under the black light for any residual lotion ("germs").
7. The educator resampled students' hands, again using 3M Petrifilms Plates, to assess microbial counts and, accordingly, the effectiveness of the hand-washing instruction.

Two months after the instruction, we provided paper surveys to participating youths and teachers to assess student retention of the concepts taught and teacher observation of behavior changes. Students in kindergarten through second grade responded to pictures of five situations by indicating whether hand washing was or was not

needed in each situation. Students in third grade through fifth grade indicated their frequency of hand washing after each of four activities. Teachers responded to an observational survey by identifying when they saw students washing their hands according to concepts taught in the hand-washing lesson.

Findings

Results of our surveys indicated that most youths participating in the 30-min hand-washing instruction retained knowledge and made positive behavior changes. As shown in Table 1, responses to the creative pictorial survey by students in kindergarten through second grade ($n = 90$) indicated understanding of the hand-washing lesson. As shown in Table 2, majorities of students in third grade through fifth grade ($n = 172$) reported performing appropriate hand-washing behavior at least most days for each situation identified. All of the responding teachers ($n = 4$) reported observing students washing their hands more frequently after using the bathroom and before eating. Three of the four teachers reported observing students using proper hand-washing technique and washing their hands after playing outside and after touching a scrape or cut. Teachers observed 66.67% of the students washing their hands after playing with pets. In addition, data we collected during program implementation indicated that microbial counts were significantly lower following the hand-washing instruction.

Table 1.

Recognition by Students in Kindergarten
Through Second Grade of Situations
Requiring Hand Washing

Situation	% (f)
After playing with pets	81.11 (73)
Before cooking	81.11 (73)
After playing outside	81.11 (73)
After using the bathroom	96.67 (87)
After coughing and sneezing	96.67 (87)

Table 2.

Frequencies of Hand Washing Reported by Students in Third Grade Through Fifth
Grade for Four Situations

Situation	Almost never % (f)	Some days % (f)	Most days % (f)	Every day % (f)
After using the bathroom	2.32 (4)	7.95 (14)	13.91 (24)	75.83 (130)
Before I eat food	10.93 (19)	18.87 (32)	30.79 (53)	39.40 (68)
After playing with pets	18.87 (32)	16.23 (28)	17.88 (31)	47.02 (81)
After cooking food	10.96 (19)	13.95 (24)	14.62 (25)	60.47 (104)

Implications

Using this shortened version of a hand-washing education can decrease the burden on Extension educators by allowing them to teach hand washing in a more time-efficient and manageable way in schools and community program settings. Follow-up studies addressing barriers to hand washing and comparison of hand-washing rates between male and female youths are necessary. Extension educators wishing to conduct a successful 30-min hand-washing instruction with youths may use the tip sheet available through the University of Idaho Extension Bingham County website: <https://www.uidaho.edu/-/media/UIIdaho-Responsive/Files/Extension/county/Bingham/30-minute-hand-washing-educator-tip-sheet.pdf>.

Acknowledgment

Funding for the hand-washing study described in this article was provided by the University of Idaho Extension competitive Topic Team Proposal grant program.

References

- Aiello, A., Coulborn, R., Perez, V., & Larson, E. (2008). Effect of hand hygiene on infectious disease risk in the community setting: A meta-analysis. *American Journal of Public Health, 98*(8), 1372–1381. doi:10.2105/AJPH.2007.124610.
- Allwood, P. B., & Minnesota Food Safety Planning Group, Division of Environmental Health. (n.d.). *Handwashing among public restroom users at the Minnesota State Fair*. Retrieved May 21, 2018, from <http://www.health.state.mn.us/handhygiene/stats/fairstudy.html>
- Centers for Disease Control and Prevention. (2015). *Hand washing experiment*. Retrieved from <https://www.cdc.gov/bam/teachers/epi-handwashing.html>
- Comer, M. M., Ibrahim, M., McMillan, J. V., Baker, G. G., & Patterson, S. G. (2009). Reducing the spread of infectious disease through hand-washing. *Journal of Extension, 47*(1), Article1RIB7. Available at: <http://www.joe.org/joe/2009february/rb7.php>
- Fenton, G., Radhakrishna, R., & Cutter, C. (2010). Participation in "Handwashing University" promotes proper handwashing techniques for youth. *Journal of Extension, 48*(1), Article 1RIB7. Available at: <https://joe.org/joe/2010february/rb7.php>
- Guinan, M. E., McGuckin-Guinan, M., & Severeid, A. (1997). Who washes hands after using the bathroom? *American Journal of Infection Control, 24*(5), 424–425.
- Howland, J., & Bakken, H. (2015). *Reduction in primary energy demand, blue water consumptions and greenhouse gas emissions from 3M™ Petrifilm plates compared to traditional microbiological analysis method*. Retrieved from <http://multimedia.3m.com/mws/media/11426480/3m-petrifilm-plates-sustainability-white-paper.pdf>
- Hyde, G., Wilson, B., & Raab, C. (2016). *High-speed hand-washing*. Retrieved from http://extension.oregonstate.edu/deschutes/sites/default/files/high_speed_hand_washing_2016.pdf
- Nandrup-Bus, I. (2009). Mandatory handwashing in elementary schools reduces absenteeism due to infectious illness among pupils: A pilot intervention study. *American Journal of Infection Control, 37*(10), 820–826. doi:10.1016/j.ajic.2009.06.012

Parsons, W. (n.d.). *Kids take a trip through Germ City, learn healthy hand-washing technique*. Retrieved July 6, 2017, from <http://cahnrs.wsu.edu/blog/2009/12/kids-take-a-trip-through-germ-city-learn-healthy-hand-washing-technique/>

Snow, M., White, G., & Kim, H. (2008). Inexpensive and time-efficient hand hygiene interventions increase elementary school children's hand hygiene rates. *Journal of School Health, 78*(4), 230–233.

Copyright © by *Extension Journal, Inc.* ISSN 1077-5315. Articles appearing in the Journal become the property of the Journal. Single copies of articles may be reproduced in electronic or print form for use in educational or training activities. Inclusion of articles in other publications, electronic sources, or systematic large-scale distribution may be done only with prior electronic or written permission of the *Journal Editorial Office*, joe-ed@joe.org.

If you have difficulties viewing or printing this page, please contact [JOE Technical Support](#)