Research in Developmental Disabilities 34 (2013) 95–101

Contents lists available at SciVerse ScienceDirect

Research in Developmental Disabilities

Fostering hand washing before lunch by students attending a special needs young adult program

Christopher Walmsley [a], Amanda Mahoney [a,b], Amy Durgin [a,b], Alan Poling [a,*]

[a] Western Michigan University, Kalamazoo, MI 49008-5200, USA
[b] APOPO, Morogoro, Tanzania

ARTICLE INFO

Article history:
Received 28 July 2012
Accepted 3 August 2012
Available online 30 August 2012

Keywords:
Hand washing
Hygiene
Token system
Feedback
Developmental disabilities

ABSTRACT

A multiple baseline across groups design was used to investigate the effects of a treatment package on hand washing before lunch by five students with disabilities who attended a young adult educational program. To evaluate hand washing, a lotion called Glo Germ was applied to participants' hands. Glo Germ is visible under a black light, which allowed the quality of hand washing to be assessed by comparing the amount visible before and after hand washing using a 3-point scale. Following a baseline period in which hand washing was assessed, participants were exposed to a hand washing training procedure, which improved one participant's hand washing. Next, a lottery system was imposed in which the number of lottery tickets earned each day depended on the quality of hand washing, specifically, on the rating assigned (0, 1, or 2). This condition was associated with improved hand washing by the other four participants. Finally, a condition adding feedback to the lottery system resulted in further improvements in the quality of hand washing for all participants. Follow up data indicated modest maintenance of hand washing after lunch. These results suggest that treatment packages similar to that used in the present study merit further investigation and that Glo Germ is of value in ascertaining the quality of hand washing.

1. Introduction

Washing hands with soap and water or alcohol-based hand sanitizers can substantially reduce the risk of respiratory infections and diarrheal diseases, including food borne illnesses (Rabie & Curtis, 2006; World Health Organization, 2001). Unfortunately, many people do not regularly wash their hands or wash them in a superficial fashion that fails to remove pathogens. Several studies have attempted to address this issue by examining programs for fostering appropriate hand washing. Results indicate that a variety of procedures substantially improve performance and some studies further demonstrate that the improved hygiene decreases employee or student absenteeism, fosters productivity, and reduces health costs (e.g., Blackman, Zoutman, & Marck, 2008; Chen & Chiang, 2007; Guinan, McGuckin, & Ali, 2002; Dyer, Shinder, & Schinder, 2000; Hammond, Ali, Fendler, Dolan, & Donovan, 2000; Yates, 1984), although sustaining appropriate hand washing is often difficult (Haas & Larson, 2008).

Interestingly, to our knowledge only two published studies report attempts to foster appropriate hand washing in people with development disabilities. In one (Day, St. Arnaud, & Monsma, 1993), described by its authors as a pilot study, 13 first-grade

* Corresponding author at: Department of Psychology, Western Michigan University, Kalamazoo, MI 49008-5200, USA. Tel.: +1 269 387 4483; fax: +1 269 387 4550.
E-mail address: alan.poling@wmich.edu (A. Poling).

0891-4222/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.ridd.2012.08.002

students were exposed to an educational program in which nurses prompted them to wash their hands at appropriate times (e.g., after toileting, before eating), proper hand washing was demonstrated, the effect of hand washing on the growth of microorganisms was demonstrated, and hand stamps intended as rewards were given following hand washing. An observational checklist was used to quantify hand washing. Results indicated that exposure to the program produced substantial increases in the likelihood of hand washing after toileting and before eating and a smaller increase in the quality of hand washing, although performance declined over a five-month period. Although these results suggest that the treatment package was effective in improving hand washing, and participants had fewer infectious illnesses following the intervention than during a comparable period of the preceding school year, the design of the study and the absence of detail regarding the observational checklist and other aspects of procedure make the results difficult to interpret.

In the other study (Rosenberg, Schwartz, & Davis, 2010), three preschool children with autism were exposed to a commercially available video modeling appropriate hand washing in a bathroom. One participant acquired 80% of the modeled hand washing steps, but the other two children did not benefit from exposure to the model. Exposure to a second video model, prepared by the authors, resulted in some improvement in the hand washing of the two children who did not benefit from the initial video. Performance was not, however, consistently good and the practical benefit, if any, of exposure to either video was not evaluated.

Several studies have used behavior-analytic procedures, such as shaping, chaining, verbal instruction, and systematic reinforcement of target responses, to foster health-related behaviors, such as tooth brushing, in people with developmental disabilities (e.g., Horner & Keilitz, 1975; Lattal, 1969; Martens, Frazier, Hirt, Meskin, & Proshek, 1973; Poche, McCubbrey, & Munn, 1982; Swain, Allard, & Holborn, 1982). For example, Iwata and Becksforth (1981) compared the effects of an oral hygiene education program with the effects of the same program plus systematic reinforcement on improving dental health. Thus, in addition to an educational component that consisted of instruction, guided practice, and feedback on proper brushing and flossing techniques, participants assigned to the reinforcement condition were also given a reduced fee (intended to serve as a reinforcer) for reduced levels of plaque on their dental visits. Of the 17 patients assigned to the reinforcement group, 15 met the criterion of 10% plaque or lower, whereas only one out of 14 patients in the education condition achieved such low plaque levels. Furthermore, a six-month follow up showed continued superior performance for participants in the reinforcement group. Such results indicate that interventions utilizing operant conditioning are useful in fostering hygiene skills other than hand washing and suggest that they would also be useful in teaching hand washing.

The primary purpose of the present study was to evaluate the effectiveness of a multi-component treatment package on hand washing before lunch by young adults with developmental disabilities who attended a public educational program. Hand washing before meals is especially important, because pathogens are readily transferred from the hands to foods such as bread, then into the mouth. The package involved teaching the students about good hand washing, having them practice appropriate hand washing to criterion, implementing a lottery system that arranged daily opportunities for conditioned reinforcement (token deliveries), and arranging consistent feedback for appropriate and inappropriate hand washing. A secondary purpose was to evaluate a novel procedure for quantifying the quality of hand washing.

2. Methods

2.1. Participants

Five participants, four men and a woman (Erica), were recruited for this study. All were between 20 and 25 years old and diagnosed with a developmental disability. Participants were eligible to participate in this study if their classroom teacher reported that they did not thoroughly wash or regularly sanitize their hands. The criteria for exclusion were a history of disruptive behavior related to hand washing or other self-care/hygiene routines or an inability to follow simple directions.

All participants attended a young adult program (YAP), which is a post-secondary education service intended to teach a range of transition skills to students with disabilities from 17 to 26 years of age. Participation was requested by speaking to YAP teachers who spoke individually to eligible students. Informed consent was obtained from parents or guardians and assent was received from each participant prior to her or his entering the study and permission to conduct the study was obtained from the Human Subjects Institutional Review Board of Western Michigan University.

2.2. Setting and materials

All hand washing training sessions were conducted at the YAP building in a classroom containing a sink or, if such a classroom was not accessible, in a bathroom with the door open. If training was done in a bathroom, the experimenter posted a sign outside of the bathroom door to notify passing students and teachers that a session was underway. The participant's teacher and paraprofessionals were also notified before the start of the session.

Materials used in this study included Glo Germ (Glo Germ Company, Moab, Utah), a lotion that is rubbed onto the hands and gives off a blue radiance under a black light, hand washing task-analysis data sheets, lottery tickets, and McDonald's restaurant coupons. A 30.5 cm $\times$ 30.5 cm cardboard box with an open top and a square slot cut in the middle of one side was also used. The box was lined with black felt to reduce glare and a black light was fitted inside of the box. Participants placed their hands inside the box to make Glo Germ visible in the dimly lit observation area.