Promoting Safe Hygiene Practices in Public Restrooms: A Pilot Study

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Abstract **The study described in this article examined the impact of hygiene posters in promoting safe hygiene practices for used toilet tissue disposal in public restrooms. Although the long-held hygiene norm in homes for the disposal of used toilet tissue in a container may occur in the rural U.S., it is critical in public environments to promote proper toilet tissue disposal in toilets to reduce potential transmission of bacteria and viruses. A control group time series design was used for observations of used toilet tissue disposal on the floor or in large trash cans in restrooms with and without signage for a two-week period. A significant decrease in observations was reported at intervention sites with posters (p = .025). No significant differences were reported at the control site. Posters were effective in motivating behavior change beyond hand hygiene. Further research may examine the impact of health posters in other environmental settings.**

Introduction

Safe hygiene practices are vital for infection control in community and health care settings to reduce the transmission of diseases and infections (Aiello, Coulborn, Perez, & Larson, 2008; World Health Organization, 2009). Primary prevention educational efforts suggest hand hygiene campaigns are effective precautions (Centers for Disease Control and Prevention [CDC], 2013; Davis, Fante, & Jacobi, 2013; Ford, Boyer, Menachemi, & Huerta, 2013; Mathai et al., 2010; White, Kolble, Carlson, & Lipson, 2005). Direct contact for transmission may include touching an infected person. Indirect contact for transmission may include touching contaminated surfaces or objects in environments and then touching the nose, eyes, or mouth (Otter, Yezli, Salkeld, & French, 2013).

Compelling evidence shows public restroom environments have a high frequency of contaminated surfaces or objects for the potential transmission of bacteria or viruses including antibiotic-resistant bacteria (Flores et al., 2011; Mkrtchyan, Russell, Wang, & Cutler, 2013; Zapka et al., 2011). The contaminated surfaces or objects may include sinks, faucets, floors, or bulk refillable soap dispensers (CDC, 2013; Flores et al., 2011; Mkrtchyan et al., 2013; Zapka et al., 2011). Public restroom floors particularly in toilet stalls may be used to place purses or dispose of used toilet tissue. The floors or toilet tissue placed on the floor may not be perceived as contaminated surfaces or objects. Moreover, the public and especially children may touch or pick up the used toilet tissue if they have low risk perception. A greater likelihood may exist in public restroom environments for contamination and transmission of bacteria or viruses with a high volume of people using the public restrooms. Thus, public awareness for a greater understanding of preventive measures for the disposal of toilet tissue in public restrooms is needed so community members take more precautions.

The promotion of safe hygiene practices in public restrooms is important for infection control yet it is not well discussed, recognized, or understood by the public. A public knowledge gap may exist about perceived contamination or transmission modes and risk (Burnett, Johnston, Kearney, Corlett, & MacGillivray, 2013). To close the knowledge gap, growing research brings attention to how farm worker safe field hygiene education overlaps with environmental factors (Park et al., 2013). Personal hygiene factors including how to use portable toilets or hand washing may be associated with reduced produce microbial contamination rates such as generic *E. coli* even at the preharvest level (Park et al., 2013). Beyond farm management, safe hygiene practices are slowly becoming recognized as important factors in public environmental settings. It is critical to provide community education for safe hygiene in public restroom use since it also has public health implications.

The educational strategy for toilet tissue disposal should include, but not be limited to, a full understanding of accepted home hygiene norms. In the rural U.S., U.S.-Mexico border, or other parts of the world, the long-held accepted hygiene norm of used toilet tissue disposal in containers by toilets may occur in homes (Phaswana-Mafuya & Shukla, 2005). The personal hygiene practice may be attributed to poor home plumbing or septic tank problems. Most public restrooms have adequate plumbing for flushing toilet tissue in the toilets. The hygiene practice may be continued in public restrooms as a perceived safe hygiene practice. The used toilet tissue may be placed on the floor by the toilet if no containers are in the public restroom toilet stalls. This understanding may have implications for the design of the hygiene education promoting disposal of used toilet tissue in public restroom environments.

Recent studies suggest health posters are simple and effective tools for health communication and behavior change prompts (Bass & Keathley, 2008; Davis et al., 2013; Schneider, Feufel, & Berkel, 2011). Health posters with persuasive messages as motivating factors may change the public's knowledge, attitudes, or health behaviors. Davis and co-authors (2013) found hand hygiene signs with positive messages were more effective than fear-arousing hand hygiene signs to promote hand hygiene compliance in public restrooms. Schneider and co-authors (2011) examined the impact of posters to promote colorectal cancer screenings. A 30% increase in sales of fecal occult blood test kits were reported at pharmacies displaying colorectal cancer screening posters with persuasive messages compared to pharmacies displaying no posters. Bass and Keathley (2008) found that a poster campaign was effective on campus to promote no drinking while driving. Nearly 67% of the students reported the alcohol awareness poster campaign as an effective strategy and 45% reported their intention to avoid drinking and driving.

The purpose of our study was to examine the impact of health posters to increase public awareness of the safe hygiene practice for disposal of used toilet tissue in public restrooms. Although previous studies suggest hand hygiene as effective education, no study to our knowledge examined safe hygiene education for toilet tissue disposal in public restrooms. The pilot study will add to the knowledge base of health communication and environmental health. This health concern may not be unique to one area in the U.S. Therefore, results from our study may be used to develop larger campaigns using posters to promote safe hygiene practice in public environments.

Methods

The long-held practice of placing used toilet tissue in a container was identified by the community members as a home hygiene norm in the rural region of southern New Mexico. An academic-community partnership was formed to address this public health concern. Community-based participatory research (CBPR) principles of sharing knowledge and building collaboration based on trust were used among partners for social change and improved health outcomes (Christopher, Watts, McCormick, & Young, 2008; Faridi, Grunbaum, Gray, Franks, & Simones, 2007). A control group time-series design was used to examine the impact of the posters to increase public awareness and behavior change for disposal of used toilet tissue in public restrooms. Approval to conduct the study was received from the university and medical center institutional review board.

We conducted the study in southern New Mexico, which covers a large geographical area with mostly rural populations. Fluid movement occurs at the U.S.-Mexico border crossings for health care, employment, or family visits (Bergmark, Barr, & Garcia, 2010; Reinger et al., 2012). Possible clashes of cultural norms or misperceptions of hygiene practice may occur (Bergmark et al., 2010). The border region also faces challenges with *colonias* that have limited infrastructure with no paved roads, limited potable water, and a lack of sewer systems. For example, Doña Ana County in New Mexico is a border county with 37 *colonias* (Doña Ana County, n.d.)

Setting

The men's and women's public restrooms in a health care facility were chosen as the pilot site since the facility had many public restrooms. Other community sites considered were public buildings, a large shopping store, schools, or restaurants. In the public facility, sites included three intervention sites (sites 1–3) for poster signage and the control site (site 4) for no poster signage. The restroom locations included were the lobby (site 1, four toilets in each restroom), women's health area (site 2, one toilet in each restroom), hallway (site 3, two toilets in each restroom), and cafeteria area hallway (site 4, one toilet in each restroom). Site 4 was used by the public and staff members since it was near the cafeteria. It was not possible to identify if restroom users were visitors or employees since tracking was not part of this study. Informal discussions with housekeeping, however, included the identification of the home hygiene norm for toilet paper disposal outside the toilet was practiced in the facility by some employees.

Data Collection

Graduate students from the master of public health program were recruited using flyers on campus and trained by the principal investigator for documentation of observations at the medical center. Students were selected to eliminate any potential bias in reporting results since most students were not from the region. An observation form was developed for daily documentation. The frequencies indicated only the toilet tissue disposal on the floor or in a trash bin in the public restrooms in each public restroom (yes/no). Recording observations (yes/no) was appropriate since some restrooms had more than one toilet. An incentive ($50 each day) was provided to students for their time. Seven trained students rotated their time with only one student present to conduct the observations.

Observations of the used toilet tissue in the trash can or on the floor in public restrooms took place during a two-week period in late 2010. The first one-week observation period was the baseline with no poster displays in all public restrooms. The second one-week observation period included poster displays in the intervention sites. The 8.5 x 11 inch laminated bilingual posters were mounted on the back of each stall door at a visible level or on the side wall in the men's and women's public restrooms in the intervention sites (Figure 1). The culturally sensitive posters were pretested in a focus group with community members prior to our study. No containers were located in the restroom stalls.

The observation times were determined by housekeeping-environmental services and scheduled between the first and second shift.

The process was coordinated between housekeeping staff members and students. The principal investigator observed the graduate students during their first observation in the facility. Any questions were answered to ensure inter-rater reliability agreement for observations. Observations occurred only when visitors were not in the restrooms to ensure privacy and anonymity. After the student's observation, the housekeeping staff member conducted an observation. High levels of agreement occurred (100%) among observers as an inter-rater reliability assessment. The restrooms were cleaned by housekeeping if toilet tissue was not disposed of properly. The observation forms were returned by the students daily to the researcher for daily documentation review.

Data Analysis

Descriptive statistics with frequency distributions and percentages were calculated and differences in observation weeks (baseline and poster display weeks) were examined using Chi-square tests. Fisher's exact Chi-square statistic was reported when appropriate. Statistical significance of this study was $p < .05$ and analysis was conducted using SPSS v. 20.

Results

Figure 2 shows the observation frequencies for the sites during the two-week period. In the intervention sites, the total number of observations decreased from 20 (48%) at baseline to 12 (29%) at measurement (posters). In the control site, the total number of observations decreased from eight (57%) at baseline to six (43%) at measurement (no posters). At the intervention sites, observations in the second week were significantly lower than observations in the first baseline week (χ^2 [1] = 5.05, p = .025). At the control site, no significant relationship was found (χ^2 [1] = .389, p = .627).

Discussion

The findings suggest that the impact of posters as communication tools to promote safe hygiene practices and influence behavior change was effective as supported in previous studies (Bass & Keathley, 2008; Davis et al., 2013; Schneider et al., 2011). Observations in the intervention sites with posters for disposal of used toilet tissue in the public restrooms were significantly lower than observations in the control site with no posters. Although the total number of observations was small, the results are encouraging. Our pilot study demonstrates the importance of evidence-based strategies in hygiene pilot studies to measure the impacts of health communication posters. Findings may be used to support poster messages in larger studies and health campaigns.

The findings also raise important questions for shifts in the U.S. demographic trends. A dramatic increase has occurred in Hispanic populations and other immigrants in many U.S. areas. Our study may help to determine possible hygiene norms in various environmental and cultural settings. This may warrant attention for future studies in larger cities. The findings also confirm the role of family members in teaching hygiene practices at home and in public settings. Discussions by public health professionals with communities about safe hygiene practices may help to minimize risks for infections and diseases and address any misconceptions.

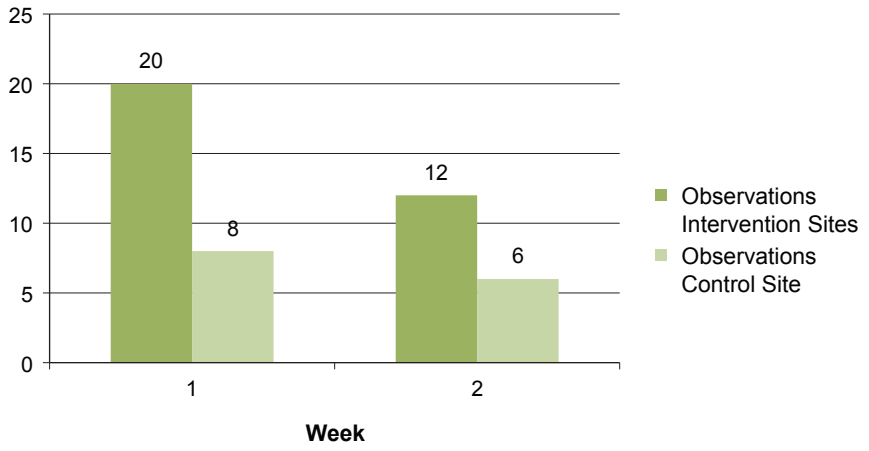
Another important contribution of our study is the reinforcement of the need to work with community members in different capacities. Our CBPR approach was action oriented and was built on the strengths of partners as in previous studies (Flores et al., 2010). The planned time commitment for partners, however, took longer and the time was extended four months to complete the pilot study. Findings further suggest the need to understand the complexity of health communication, culture, and literacy with community members. Low literacy and culturally appropriate material development must be considered in the design phase (Kreuter, Lukwago, Bucholtz, Clark, & Sanders-Thompson, 2003; Resnicow, Baranowski, Ahluwakia, & Braithwaite, 1999). The poster pictures were used for "tell-

FIGURE **1**

Health Poster

FIGURE **2**

Number of Observations at Intervention and Control Sites for Used Toilet Tissue Disposal in Public Restrooms During Week 1 and Week 2



ing the story" as a visual cue. Thus, costly mistakes in production of posters by not pretesting were avoided.

The data suggest the poster's persuasive message was attractive and gained the public's attention. Influencing perceptions with motivating messages may change social norms and prompt action for behavior change (Davis et al., 2013). The message and wording broke the silence about this norm by providing the need for cognition as to "why" the behavior change was important. The wording on the final poster included, "Used toilet paper carries germs that can spread disease." Otherwise, the message may be perceived as a forceful message and challenge the long-held values, etiquette, and norms for hygiene practices.

Our study had a few limitations. Evaluating the impact of the posters was limited to a two-week period with three intervention sites and one control site in a public facility. The observation frequencies were counted only as observed or not observed (yes/no) and not the number of misplaced toilet tissues for disposal in each public restroom. A longer time period for more observations and more than one building to increase the sample size may provide different results. A potential diffusion effect was reduced by using the location of the cafeteria hallway restrooms on the ground floor as the control site. Visitors may use these restrooms without signage before or after walking to the cafeteria and not use other intervention sites. Finally, the study took place in southern New Mexico and the findings must be generalized with caution. Larger studies in other areas in the U.S. may determine if findings can be generalized.

Conclusion

Our study has made important contributions to the health education knowledge base for the use of health posters in environmental settings. The findings are promising for the use of posters in a campaign to influence public health awareness and promote health behavior changes. With field testing, the design process of health communication materials is critical before a health campaign implementation. Community members may provide valuable insights for the message wording and design. The findings may also influence policy changes on the organization, local, or regional level to include public display of posters promoting safe hygiene practices in public restroom settings. Further research can build on this study to assess the impact of the health posters in other environmental health settings.

Acknowledgements: This study was supported by funding from the College of Health and Social Services at New Mexico State University. The authors would like to thank Dr. Charles Gerba, professor, Departments of Microbiology and Immunology, and Soil, Water and Environmental Science, University of Arizona, who provided review of the initial manuscript.

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