

Research Proposal:

Public Restroom Interventions and the Effects on Hand-Washing Behavior

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Abstract:

This research proposal intends to study the effects of hand hygiene interventions in public restrooms among the college population. Hand washing after using the restroom is a very important step in reducing the spread of bacteria, virus, and other illness causing germs. Studies have shown that many students will self-report that they properly wash their hands after using the restroom, but few actually do. Various previous studies have suggested that the effects of an observer, visual prompts, and other communication channels reminding hand hygiene necessity have prompted an increase in hand washing behavior in public restrooms. Due to the density of college classrooms and dormitories, infectious diseases are commonly spread through poor hand hygiene. Such infections impact academic performance and burdens college health centers.

There is a need to study hand-hygiene behavior modifications. It is hypothesized that the use of intervention in the design of a public restroom can enhance hand washing behavior of its users. A survey is conducted to study of the impact of different interventions in a public restroom and whether each method will increase hand washing behavior. Some of the interventions I plan to explore including: the posting of signs, automatic faucets, automatic soap dispenser, and automatic towel dispenser, location of soap or towel, and having an observer present in the restroom. The advantages of an anonymous internet survey include conveniences for both the researcher and the respondents, but the results may not be representative of all college students due to a lack of diversity. Data will be analyzed using regression and multivariable analysis. Findings can suggest for public policies to address interventions needed in the design of public restrooms to enhance hand hygiene behavior.

I. Introduction

Proper hand-washing has always been thought of as an important behavior to control the spread of infection. According to Julie Gerberding, Director of the Hospitals Infections Program for the Centers for Disease Control and Prevention, hand-washing is the most effective thing one can do to reduce the spread of infectious diseases. Infectious diseases are the leading cause of death and disease worldwide and the third leading cause of death in the United States (Ryan, Christian, & Wohlrake, 2001). Hand-washing aides to control the spread of bacteria and viruses, thus preventing infectious diseases. The act of washing one's hands, especially after using the restroom, is a necessary procedure to ensure sanitation and good hygiene. The behavior of hand-washing is also seen as a social norm to. However, with the exception of small children and food handlers, this norm is not monitored. For many people, hand-washing has become something that is forgotten or take for granted. In addition, it has become an act done out of social expectation instead of sanitary reasons.

Hand-washing practices on college campuses also pose public health concerns. Low hand-washing compliance has been linked to the rapid spread of influenza both in classrooms and in dormitories (Drankiewick & Dundes 2003). In addition, many college students also work in restaurants, where unsanitary practices my pose a risk to the general population. There is ample evidence that infectious diseases are spread in college settings due to poor hand hygiene. Even though various studies have documented hand-washing non-compliance among health care workers and middle and high school students, not much is known about practices among college students. Study is necessary to discover how college students perceive this behavior and their thoughts on possible interventions that can help them to engage in this behavior. The study will benefit not only the college students themselves, but also the general public who come across

students at different occasions, such as at meetings, in restaurant, and other general public places. It is hypothesized that the use of intervention in the design of a public restroom can enhance hand washing behavior of its users. It is necessary to gather data regarding hand-washing behavior of college students and possible impacts of various restroom design interventions to enhance hand-hygiene.

II. Literature Review:

For more than a century, hand-washing has been a primary practice recommended by health professionals to control the spread of infectious agents transmitted by contact. Since most diseases spread through points of surface touched by hand, hand-hygiene is necessary to reduce the rate of infectious diseases. A study by Larson, Cloonan, Sugrue, and Parides (2000) suggests an inverse relationship between hand-washing and infectious disease. The study consisted of a quasi-experimental intervention trial that assessed the impact of organizational intervention on staff handwashing habits. Researchers inserted counting device in soap dispenser in four critical care units in one hospital, while another similar hospital was used for comparison. Over period of eight months, the rates of VRE (vancomycin-resistant enterococci) infections were significantly reduced in the experimental locations. The study supported that hand-washing helps to reduce spread of infectious diseases.

A study by Pinfold (1999) suggests that handwashing also reduces diarrhoeal disease transmission. In a rural village in Thailand, Pinfold used both active and passive interventions to emphasize hand-washing after defecation and before handling food. Active interventions consisted of field methods where researchers and of tower speakers were present to constantly remind people the need for hand-wash. Passive interventions consisted of the posting of signs or

posters, and occasional education programs teaching villagers the importance of hand-hygiene. The study showed that the interventions totaled a 60% reduction in diseases occurrences.

Hateley and Jurnaa (1999) observed the hand-washing behavior of 200 healthcare workers after using the restroom in a medical facility. Over 200 male and female workers including doctors, nurses, and students were observed and only 34% of men and 56% of women washed their hands. Even at a hospital setting where hygiene is the top priority, users ignore the importance of hand-washing after using the restroom. It is suggested that such ignorance can be seen much more drastically in the general public.

In a study conducted by Dewan (1996), researchers either concealed themselves in restroom stalls or combed their hair while observing 6,333 men and women. The observation was done in a variety of cities including New York City, Chicago, and New Orleans. In New York City, about 60% of those using the restroom in Penn Station washed their hands after using the restroom. This was the lowest rate of hand washing prevalence. In Chicago, 78% of the restroom users washed their hands and in New Orleans, about 71% of it users washed. However, in a telephone survey done later, random citizens from these cities were asked whether or not they wash their hands after using a public restroom. Of those surveyed, 95% claimed to have always washed their hands after using the restroom.

In 2003, Wirthlin Worldwide conducted 1,000 telephone interviews to better understand hand-washing among Americans and had similar results (Johnson, Sholcosky, Gabello, Ragni & Ogonosky 2003). They found that Americans characteristically ignored the act of washing their hands. Most adults (95%) surveyed said they always washed their hands after using public restrooms. When Wirthlin Worldwide conducted an observational study of people in washrooms or airports in five major cities (New York, Chicago, San Francisco, Dallas/Fort Worth and

Miami) and found that only 78% of users actually washed their hands. This study replicated an earlier study by the same group, Wirthlin Worldwide in year 2000. In the 2000 study of 1,021 adults, the vast majority (95%) said they washed their hands, but observations later revealed only 67% actually washed (Johnson, Sholcosky, Gabello, Ragni & Ogonosky 2003).

A similar survey was conducted using American Online's browser system (HyGenius 2001). Internet users were asked of their hand-washing behavior and over 35,000 people responded to the survey. Almost everyone acknowledged the importance of hand-washing. Most participants (56%) said they washed their hands with soap and dried them. About 25% said they would usually do a quick rinse without using soap. About 16% claimed their hand-washing practice varies depending on the cleanliness of the facility and 3% states that they did not feel like they need to wash their hands.

Most Americans seem to get the message of hand-washing but they do not carry out the action. Similar results are found when looking at America's college population. Scott and Vanick (2007) conducted a survey of residential college students. They collected over 994 anonymous survey and found that over 94% of the college population recognizes the importance of hand washing after using the restroom, but only 90% reported they actually wash their hands. Some of the reasons for not washing their hands include 63% forgot and 52% too busy to wash hands. Another study on college female students show less than reported actually washes their hands (Drankiewicz & Dundes 2003). More than 600 students were surveyed and the majority reported they usually or always washed their hands after using the restroom. When observations of 100 female students were conducted, only 68% washed their hands. Of those that washed, 38% used soap, 32% washed for more than five seconds, and only two percent washed for more than ten seconds.

Hand-washing is the commonly recommended practice to decrease the spread of possible disease and infection. Besides health reasons, there are other factors that play into whether or not a person engage in hand-washing behavior in a public restroom. According to Munger and Harris (1989), hand-washing after restroom use is considered a social norm for all individuals. The social norms of society often guide the actions and routines of people. The notion of social norm also creates self-awareness for people to wash their hands. If another person is present in the restroom, users may increase their level of self-awareness and thus more likely to wash their hands in order to abide to social norm. Munger and Harris observed female hand-washing behavior among 59 subjects both with, and without, an observer present. Significantly more women washed their hands when there was an observer present. Of those observed, 77% washed when another person was present and only 39% washed when no observer was seen.

As adherence to social norm can increase a user's hand-washing practice, intervention is necessary in a public restroom to increase self-awareness of hand-washing. Handwashing is thought of as a social norm, having someone present at the sink area might encourage people to wash their hands. In settings when no one else is present in the restroom, visual prompts may help users to attend to the needs of hand-hygiene. Munger and Harris reported that hand-washing frequency increased when one was reminded of the appropriateness of the behavior.

The literature review reveals a need for research that focuses on users' thoughts on the various types of visual prompts or interventions would be most helpful to determine what can be used to enhance hand-washing behavior. College students are a high risk group that carries low hand-washing compliance. Such poor hand hygiene is linked to the spread of infectious diseases among peers, thus hindering academic performance. Since many college students also work in restaurants, serve as tutors, and comes into contact with many different groups in the society,

good hand hygiene is critical to the well being of the general public. There is ample evidence that infectious diseases are spread in college settings due to poor hand hygiene. It is necessary to gather data regarding hand-washing behavior of college students and their thoughts on various restroom design interventions in order to formulate needed policies for public restroom design.

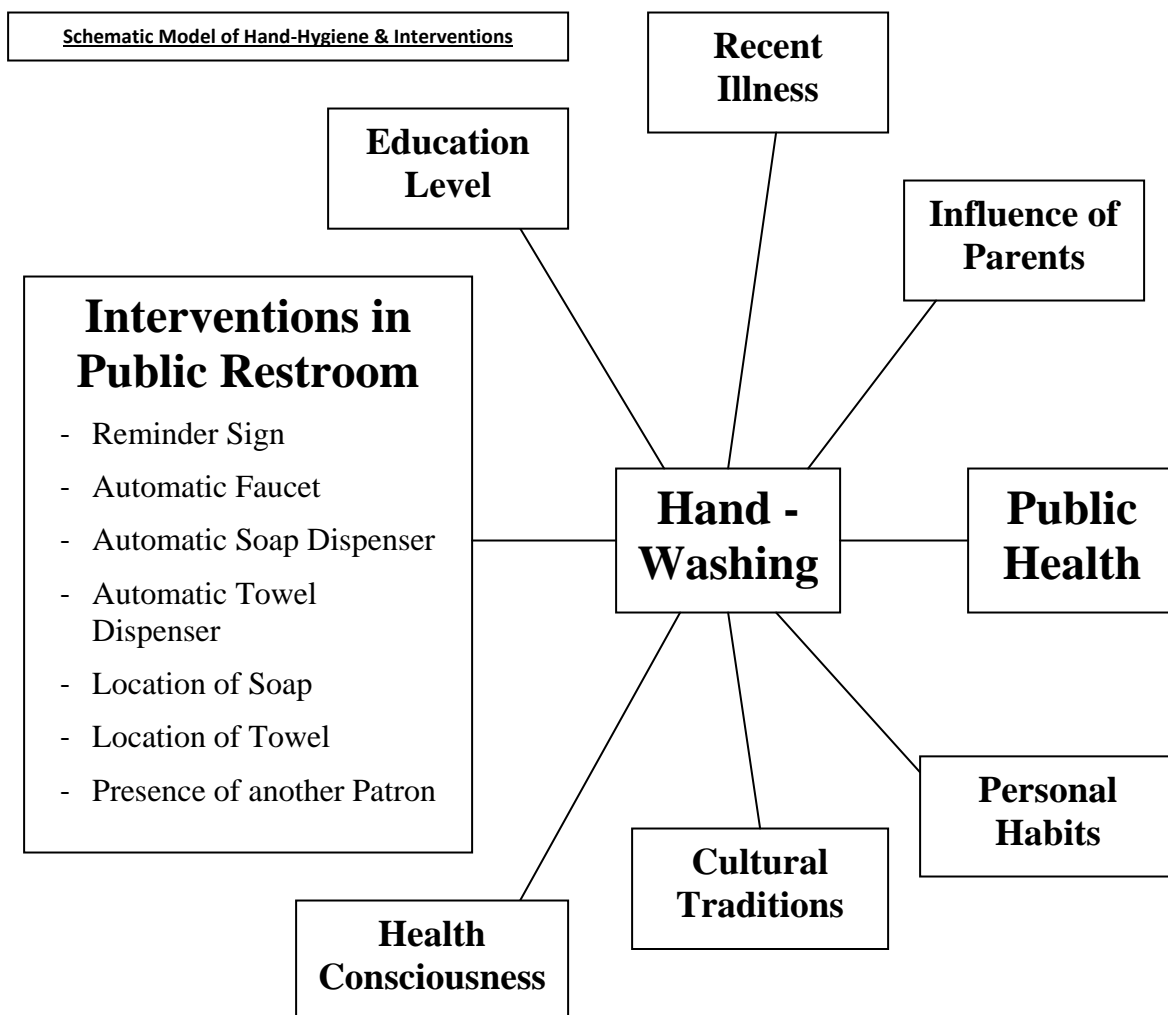
III. Conceptual Framework: Models and Hypotheses

This study hypothesizes that the use of interventions in the design of a public restroom can enhance hand-washing behavior of its users. The hypotheses regarding the use interventions is based on the theory by Munger and Harris (1998) that hand-washing frequency will increase as users are reminded of the appropriateness of the socially expected behavior. Due to the social norm that hand-washing after using the restroom is an expected behavior, users will be more likely to wash their hands if they are reminded of this expectation. Proper hand-washing is defined as using warm water to rinse the hands, applying soap and rub each for at least ten seconds until soap lathers, rinse hands and completed drying hands afterwards. The study will identify if students are aware of proper hand-washing technique and if not, what kinds of usual hand-washing behavior do students perform. Interventions such as a reminder sign, automatic faucets and soap dispenser, might prompt patrons to think of the hand-washing behavior, and thus actually performing the action.

Some of the research questions include: How often do college students wash their hands after using a public restroom? When they wash their hands, do they wash it “properly” or is there a type of common hand-washing practice among college students (in terms of the amount of time used and the procedure). What types of intervention would be necessary to increase hand washing behavior? What are the students’ thoughts on the different types of interventions? How does each type of intervention differ in terms of altering hand hygiene behavior? Which type of

intervention is most efficient to apply to have college students increase hand washing behavior? Some of the interventions I plan to explore including: the posting of signs, automatic faucets, automatic soap dispenser, and automatic towel dispenser, location of soap or towel, and having an observer present in the restroom.

The conceptual framework also includes other external compounding factors that are not within my control. For example, a person’s education level, his or her parent’s influences, personal habit, health consciousness, and recent experiences with illness may also contribute to hand-washing behavior in the public restroom. These factors, along with my proposed intervention, may alter hand-hygiene, leading to a bigger impact on public health in general.



IV. Proposed method: Design, Sampling, Data Collection, and Analyses

For this research, I intend to employ quasi-experimental techniques on to a survey to study the effects of various interventions have on hand-washing behavior. Each intervention is being asked in several survey questions to determine its perspective effects on restroom users. A comparison can be drawn on each intervention and how it differs in enhancing hand-washing behavior. The survey will be an internet-based anonymous survey. I plan to use a website similar to surveymonkey.com to create and host the survey. I will then send out an email announcement to all of my contacts that are currently college students and ask them to complete the survey, I will then use snowballing technique and ask my respondents to try to send the survey to their contacts who are also college students. I believe I have over 100 contacts that are currently college students attending different universities in the United States, and my colleagues may be able to send the survey to their contacts. I hope the survey request will reach 300 people, and I aim to get a minimum of 10 % (30) completed surveys.

The survey will collect information regarding both the dependant variable: hand-washing behavior, and the independent variable: interventions including restroom features such as automatic faucet, automatic soap dispenser, location of soap, location of paper towel, reminder signs, etc. The survey collects information on the variables using both ordinal and interval scales, aiming to collect data on the relationship between the incorporation of interventions (independent variable) and how it alters hand-washing behavior (the dependent variable). The survey contains questions that aim to obtain data that is both qualitative and quantitative regarding the variables. It also collects other information such as gender, ethnicity, age, using nominal scale. In this survey study, the target population is also the study population, which is

college students, either undergraduate or graduate students. The unit of analysis is people, which are college students to be specific.

The advantages of an anonymous internet survey include conveniences for both the researcher and the respondents. The respondents can complete the survey at anytime and virtually anywhere with an internet connection, making it a more pleasant experience. This method allows greater flexibility for the respondents since they are not limited by time or location to complete the survey. Since the survey contains questions regarding personal hygienic habits, it is also important to create anonymity so respondents can feel comfortable to answer the questions honestly. The disadvantages of a survey, however, include a lack of personal interaction between the researcher and the respondents. There will not be chances to ask further questions on this subject matter and the data being collected is restricted to the questions covered by the survey.

An optional interview may be conducted with survey respondents who agree to do a follow-up session. The interview contains similar questions on each of the possible interventions and would allow for a more qualitative approach on this issue. The interview may be able to allow for comments and suggestions in interventions that the survey did not include. However, due to the nature of the hygienic questions, interviewees may feel embarrassed or may not be truthful when answer questions in person. Therefore, the interview is entirely optional and may yield very limited data depending on the number of respondents who agree to do the follow-up. Data from the interview will be supplemental and will not be used as primary results in the hypothesis test plan.

V. Data Analyses and Hypothesis Test Plan

Qualitatively, I will be visiting the comments section of the survey and see what types of responds I get from the survey respondents. I anticipate some comments from respondents regarding their thoughts on hand-washing behavior in general, and also on the need to enforce or promote the behavior in a public restroom. Quantitatively, I plan to analyze the collected data using two different methods: regression and multivariable analysis. Using regression and multivariable analysis, I will be able to map the dependent variable (the hand-washing behavior) as a function of the independent variables (the different interventions). Regression also allows for the prediction of the relationships between the variables, hence it will provide data to support hypothesis testing.

VI. Conclusion

Hand washing after using the restroom is a very important step in reducing the spread of bacteria, virus, and other illness causing germs. Due to the density of college classrooms and dormitories, infections diseases are commonly spread through poor hand hygiene. Such infections impact academic performance and burdens college health centers. Many college students also work as restaurant servers, baby sitters, sales, or are in other types of customer-service oriented positions. These students come in to contact with the general public and hence their hand hygiene has a huge impact on the spreading of germs. There is a need to study hand-hygiene behavior modifications to enhance hand-washing behavior in the college population. An anonymous survey is created to minimize the risk of intrusion of respondents' privacy. The survey study will benefit not just the college population, but the general public who comes into contact with students. Results from this study can be used to promote public health and facilitate policy on public restroom design to prompt hand-washing behavior.

Due to the limited time and resources I have, I am trying to make the research as convenient as possible. If I have unlimited resources, I would love to survey students of all college campuses in the United States, but that is not possible in this case. I do not have access to all college population and do not have the funds needed to conduct such a huge study. In this situation, an internet-based survey will be convenient for both the researcher and the respondents. Using snowballing technique is also a convenient factor for the researcher. Since most of my contacts are from the Bay Area, chances are they attend colleges nearby, and the snowballed respondents will likely have similar backgrounds. The results may not be representative of all college students due to a lack of diversity, or a lack of responds.

In addition to the limitation of time and resources, there are other threats to the study that are non-avoidable. Threats to internal validity include factors that are out of the researcher's control. For example, there could be recent changes to a user's life that might have changed his person habits. The history of a user's past experiences, such as recently getting sick and exposing to infectious diseases, might post a threat to the study's internal validity. The selection of survey respondent also posts a threat to the study's internal validity, in addition to posting threats to the external validity. Due to the limited selection of respondents using snowballing technique, the sample is not truly random and the sample does not necessarily represent the study population. Also, respondents might also lie about their personal hygienic habits in order to gain social acceptance since hand-washing is a socially expected behavior.

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Research Schedule:

May 2008:	Complete Research Proposal
June 2008:	Revise Research Proposal if needed
July – August 2008:	Create survey and host on internet
September – November 2008:	Await survey responds
December 2008:	Review and organize collected Data
January 2009:	Begin to take PA 706 and learn data analysis
February – March 2009:	Critically analyze collected data
April – May 2009:	Complete write up of research paper