



Major Article

Predicting and explaining behavioral intention and hand sanitizer use among US Army soldiers



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Key Words:

Infection prevention
Hand hygiene
Behavioral beliefs
Absolute intention

Background: Using hand sanitizers can reduce bacterial contamination and is an efficient and inexpensive method of preventing infections. The purpose of this study was to explore the behavioral intention (low and absolute), attitudes, subjective norms, and perceived behavioral control of hand sanitizer use among US Army soldiers.

Methods: A questionnaire was developed following an expert panel (N = 5) review and 2 pilot studies (N = 35) to ensure questionnaire validity and clarity. Surveys were distributed among nontrainee soldiers during lunch periods. A total of 201 surveys were collected.

Results: Results indicated that attitudes, subjective norms, and perceived behavioral controls explained 64% of the variance in behavioral intention. Attitude remained the strongest predictor of behavior ($\beta = 0.70$, $P < .01$), followed by subjective norms ($\beta = 0.18$; $P < .01$), with significant differences between low and absolute intenders.

Conclusions: Soldiers with absolute intention to use hand sanitizers hold significantly different behavioral and normative beliefs than low intenders. Other soldiers create negative social pressure about using hand sanitizers, indicating that if other soldiers use hand sanitizers, they will refuse to do so. Intervention to ensure use of hand sanitizer should focus on strengthening behavioral and normative beliefs among low intenders. This should increase the overall well being of the military.

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According to the Centers for Disease Control and Prevention and the World Health Organization, simple handwashing is among the most effective methods to prevent the spread of infectious diseases.^{1–3} The literature shows a strong and consistent association between personal hand hygiene and reduced gastrointestinal disease, respiratory illness, and absenteeism in the work force.^{1,4,5} Hands are the primary mode of transmission for many infectious diseases, particularly among military personnel.⁶ Hand hygiene is a proven measure of controlling infection in military settings.⁷

Lack of hand hygiene and resulting illness has economic consequences for the military because of increased sick leave among soldiers and the resulting loss of training time.⁸ The military has acknowledged a critical need for identifying cost-effective ways of preventing communicable diseases within the military ranks.^{7–9}

Ideally, a proactive approach to preventing communicable diseases would allow the military to reduce outpatient physician visits and medical costs.^{7,8,10} One effective approach to preventing communicable diseases in congregate settings is to implement hand sanitation programs.¹⁰

Implementing hand sanitation programs has significantly reduced communicable diseases in many congregate settings, including schools,^{11,12} university campuses,¹³ health care facilities,^{9,14–16} and military bases.^{7,17} Hand sanitizers have proved useful in decreasing transmission of some resistant microorganisms and preventing cross-transmission of bacteria from person to person.¹⁸ Even with alcohol-based hand sanitizers, compliance with hand hygiene remains problematic.^{2,19}

Barriers often hinder hand hygiene compliance within the military environment.^{7,20} Conflicting hand hygiene recommendations often cause confusion among military personnel about what products should be used or how to best wash hands.¹⁹ Little research has been conducted to identify the cognitive stimulants and barriers of using hand sanitizers among military personnel in dining facilities, where the possibility of hand-to-mouth transmission of infection is high.

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The theory of planned behavior

The Theory of Planned Behavior (TPB) proposes that human action is guided. It predicts explicit behavior, provided the behavior is intentional.²¹ The TPB has 3 direct variables: attitudes toward the behavior, perceptions of approval by important others regarding performing the behavior (subjective norms), and perceived behavioral control over performing the behavior. In general, the more positive the attitude and subjective norm toward a behavior, the stronger the perceived behavioral control, and the more an individual will want to perform the behavior.²¹

The TPB assumes that human social behavior is reasoned or planned in the sense that people take into account the likely consequences (behavioral beliefs), normative expectations of important referents (normative beliefs), and whatever facilitates or impedes performance of the behavior (control beliefs).²¹ Behavioral beliefs are considered the prevailing determinants of a person's intentions and actions, influencing attitudes toward the behavior. Normative beliefs, which establish the underlying determinants of subjective norms, explain why individuals from different cultures and social categories have different social expectations. Lastly, control beliefs, on which perceptions of behavioral control are based, help in estimating facilitating or impeding factors of behavior.²¹ Attitudes, subjective norms, and perceptions of behavioral control are thought of as automatic, reasonably forming beliefs and producing a corresponding behavioral intention that enables or inhibits the performance of the behavior.²¹

Furthermore, soldiers who absolutely intend to perform a behavior (ie, those who score a maximum intention score) differ from those who are not firmly committed (ie, those with less than a maximum intention score).²² According to the transtheoretical model of behavior change, we must differentiate between soldiers with absolute intention of performing behaviors and those with less intention to do so across qualitatively distinct motivational stages, then researchers can begin to explain how soldiers differ in their beliefs about using hand sanitizer.²²

As TPB suggests, the purpose of this study was to explore the cognitive stimulants and barriers to using hand sanitizer among soldiers in the dining facility. Specifically, this study explores the behavioral intention (low and absolute), attitude with behavioral beliefs, subjective norm with normative beliefs, and perceived behavioral control with control beliefs toward hand sanitizer use among US Army soldiers.²¹

Hypotheses

The hypotheses to test specific objectives are listed below:

Hypothesis 1: Behavioral beliefs about hand sanitizer are significantly associated with attitudes about hand sanitizer.

Hypothesis 2: Normative beliefs about hand sanitizer are significantly associated with subjective norms about hand sanitizer.

Hypothesis 3: Control beliefs are positively associated with perceived behavioral control in using hand sanitizer.

Hypothesis 4: A soldier's attitude about hand sanitizers is significantly and positively related to his or her behavioral intention.

Hypothesis 5: A soldier's subjective norm about hand sanitizer is significantly and positively related to his or her behavioral intention.

Hypothesis 6: A soldier's perceived behavioral control about hand sanitizer is significantly and positively related to his or her behavioral intention.

METHODOLOGY

Participants, setting, and measures

The population of interest in this study was nontrainee soldiers stationed at a large US Army base in the Midwest. The participating Army facility and the university institutional review board approved the study protocol. The initial questionnaire was created using a literature review and previous health research guidelines to define the target behavior using action, target, context, and time.²³ The questionnaire included both direct belief measures and indirect belief measures, both assessed using a survey of 41 scaled questions and demographic characteristic items.

Direct belief measures are attitude, subjective norms, perceived behavioral control, behavioral intention, and self-reported behavior. Three items of attitude were measured based on endorsement, likeliness, and provability. "Using hand sanitizer is a good idea" is an example attitude that was measured. Three items of subjective norms were drawn from important people, social pressure, and general expectations. One example of an item used to measure subjective norms is: "It is expected that I will use hand sanitizer before each meal." Perceived behavioral control was measured using 3 items on confidence, self-efficacy, and ease of use. For example, "I am confident that I can use hand sanitizers whenever I want to." Behavioral intention was measured using 4 items similar to "I want to use hand sanitizer every day." Finally, self-reported behavior was measured using 2 items. An example is: "I use a hand sanitizer every day before meals."

Indirect belief measures included constructs from behavioral beliefs, normative beliefs, and control beliefs with related outcome evaluations. A total of 6 questions of behavioral belief strength with related outcome evaluations of strength was measured. Example questions are: "If I use hand sanitizer every day, I will be less likely to become ill," and, "It is very important for me to avoid illness." Normative beliefs were measured using 8 questions. Example questions are: "Other soldiers think that I should use hand sanitizer," and, "Doing what other soldiers do is important to me." Lastly, 6 items measured control belief, specifically control belief strength and control belief power. A set of example questions include "The hand sanitizer dispenser is difficult to find," and, "I am more likely to use hand sanitizer if it is easily available." All direct and indirect variables were measured with a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Procedure (pilot phase and final phase)

Two pilot studies were conducted before the main study. Before the pilot study 1, a panel of 5 experts and veterans checked the face validity of the questionnaire. The group made recommendations for questionnaire wording and layout.

The first pilot study was conducted with soldiers at a dining facility on the military base. A total of 40 copies of the survey were distributed, 18 copies with valid answers were returned, for a response rate of 45%. Based on feedback from participants in the first pilot study, the cover page was revised to ensure instructions on how to complete the survey were clear and to highlight that all collected data remained anonymous. The second pilot study was conducted at a second dining facility during lunch hour. A total of 50 copies of the survey were distributed, and 17 copies with valid answers were returned, for a response rate of 30%. After the second pilot study, the survey was modified into booklet form for easy accessibility with a quick response code and Web address linked to online duplicates of the paper survey to encourage participation.

The final paper survey introduced participants to the purpose of the study with instructions on how to complete the survey. A cover

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