

BRIEF COMMUNICATION

Using Behavior Change Theories to Enhance Hand Hygiene Behavior

ERIC P. TRUNNELL¹ & GEORGE L. WHITE JR²

¹Department of Health Promotion & Education, and ²Department of Family and Preventive Medicine, University of Utah, USA

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It is well-documented that proper hand hygiene reduces nosocomial infections (Centers for Disease Control, 2000), while it is also well-documented that compliance by health care providers to proper hand hygiene remains less than satisfactory (Larson *et al.*, 2001). It is the purpose of this brief communication to propose a theoretically driven approach that can be used by health educators in a variety of settings focusing on different target groups.

While most research and interventions on hand hygiene have focused on the specific needs of health care providers (e.g. physicians and nurses), a theoretically based approach would be equally applicable to a variety of targeted groups, such as lay care providers, professional food handlers, home food prep, crowded conditions of dorms and classrooms and toddlers in day care centers, with some modifications.

Barriers to Change: Are they lying or self-deceived?

When asked to estimate their “hand washing” frequency, health care providers tend to report a much higher compliance rate for themselves than when actually observed (Tibballs, 1996). While it is possible that some providers may be simply lying about their hand hygiene compliance, it seems more likely that a larger proportion of this discrepancy is due to provider self-deception.

Author for correspondence: Eric P. Trunnell, PhD, Department of Health Promotion & Education, University of Utah, 375 Chipeta Way, Suite A, Salt Lake City, Utah 84108, USA.
Tel: +1 (801) 581 4462. Fax: +1 (801) 585 3646. E-mail: eric.trunnell@health.utah.edu

Self-deception, defined as holding an inaccurate belief or idea in spite of the availability of more accurate information, does not carry with it the same moral implications as simply lying. But in the case of health care providers, who believe they are adequately following hand hygiene protocols when they are not doing so, the negative consequences remain the same. Furthermore by definition, self-deception is subconscious and, therefore, much more resistant to behavior change (Goleman, 1985; Mele, 2001).

Stages of Change and Related Behavior Change Theories

Stages of Change theory (SOC) offers a powerful theoretical framework for both educators and the targeted participants to facilitate identification of the stage the participants are in, then to help them to transition through the other stages towards actual behavior change and maintenance (Prochaska *et al.*, 1994). What follows is a brief summary of this theory with explanations related to participants (see Table 1).

The SOC model characterizes particular stages and provides guidance as to how best to help participants become *aware* of the need to change, *contemplate and prepare* for change and *act and maintain* that change. This model helps explain why some education-based programs may not be successful in attempting to encourage hand hygiene compliance, since they have not addressed the issue of the medical staff's psychological preparedness to change,

Table 1. Stages of Change Model applied to Hand Hygiene

Stages	Description/Definition	Explanation
<i>Precontemplation</i>	Recognition of the problem is avoided, and ignorance is maintained.	Participant is <i>unaware</i> of the need to change often through avoidance or rationalization.
<i>Contemplation</i>	Change is recognized but has yet to occur.	Participant is <i>aware</i> of the need to change but is still stuck.
<i>Preparation</i>	Plans, sets time to change and makes it known to others.	Participant <i>plans</i> and makes ready for change to occur in the <i>near</i> future.
<i>Action</i>	Change occurs as action is taken by modifying the environment and instituting rewards and social supports.	Participant <i>begins</i> by taking small steps and progressing towards goal. <i>Cues, reminder, and rewards</i> are in place.
<i>Maintenance</i>	Commitment is stressed, and rewards are internalized while being aware of what tempts us to relapse.	Participant overcomes hassles of hand hygiene by using <i>prompts</i> and <i>rewards</i> .
<i>Termination</i>	Not appropriate since behavior is maintained, not terminated.	Not appropriate

beliefs in their ability to change or the relevance of actually changing their behavior.

Theories to Augment the Stages of Change Theory

Prochaska *et al.* (1994) have addressed how modifying self-efficacy beliefs in the maintenance stage would enhance ability to prevent relapse. We agree with this proposed application but would wish to broaden its application to include the effect of modifying self-efficacy beliefs when the educator instigates those initial steps in their particular program by providing acknowledgment of successful execution of hand washing behavior in the beginning of the earlier SOC stages of preparation and action.

Self-efficacy theory was developed by Bandura (1997), who designated four modalities as influencing behavior change: performance enactment, vicarious learning, verbal persuasion and emotional arousal. The four modalities are described below, and three of the four modalities are addressed in Table 2. *Performance enactment* (PE) refers to the successful execution of all or part of a targeted behavior as modifying beliefs about the person's ability to perform that behavior. *Vicarious learning* (VL), the second modality, modifies self-efficacy by watching others, who are similar to them, successfully execute the desired behavior. *Verbal persuasion* (VP), the third modality, is modified through messages from significant others, who have faith in the ability of the participant to perform the behaviors between when required. *Emotional arousal* (EA), the final modality, is not addressed, although it could be added in highly stressful or arousing situations. Relaxation techniques could be used to modify self-efficacy beliefs, so that more relaxed, less aroused participants would be more likely to be aware of the need to consider doing hand hygiene behaviors.

It is our contention that further mining of aspects of self-efficacy theory and the related expectancy-value theory would improve significantly the participant's hand hygiene compliance and would result in increased maintenance of these behaviors (see Table 2). Self-efficacy and expectancy-value theory have been extensively reviewed and been shown to be two of the most effective ways of initiating and sustaining behaviors (Bandura, 1997). *Expectancy-value theory* predicts increases in a behavior if it is seen as important or *valued* and if there is a strong link established between the performance of the behavior and the *expected* outcome (Rotter, 1982; Weiner, 1992).

These two theories were selected, because they would augment the critical transitional states from *preparation* to *action* and from *action* to *maintenance* mentioned above in the SOC model. Self-efficacy beliefs increase the likelihood that the participants will perform and persist in performing the hand hygiene behaviors, because they are confident that they can do so. Expectancy-value theory would help the participants realize that performing the necessary hand

Table 2. Two additional theories utilized in Stages of Change and Hand Hygiene Behaviors

Theory/Dimensions	Description/Definition	Applications/Messages
<i>Self-efficacy theory</i>	This is the <i>belief</i> in the ability to perform a behavior based on the three of four modalities: stepwise performance (PE), seeing it done by others (VL), and/or feedback from someone able to talk about it (VP).	<i>Messages</i> acknowledging:
<i>Dimensions:</i>		Recognition of performance of a behavior or any part of it (PA).
<i>Performance enactment (PE)</i>		Seeing the behavior performed by someone else (VM).
<i>Vicarious learning (VL)</i>		Hearing from others about ability to perform the behavior (VP).
<i>Verbal persuasion (VP)</i> <i>Expectancy-value theory</i>	Predicts increased expectancy of the behavior based on establishing a strong link between doing the behavior and realizing a desired outcome that is important and valuable.	<i>Messages</i> help participant's recognize: Participant's <i>behavior</i> will result in a desired <i>outcome</i> (e.g. reducing nosocomial infections).
<i>Dimensions:</i>		Participant's performing the desired behavior has <i>value</i> .
<i>Expectancy Value</i>		

hygiene behaviors will likely result in reducing nosocomial infections which are important outcomes of doing these hand hygiene behaviors.

Conclusion

As the science of hand hygiene progresses, new and better ways to avoid the cross-transmission of pathogens and the nosocomial infections are being offered, but innovations in techniques are only part of the answer. Participants need to continually evaluate their own performance. Supervisors could help by

monitoring changes in hand hygiene behaviors, as well as serving as role models. Increasing awareness, and belief in ability to perform the behaviors, actually changing hand hygiene behaviors, as well as maintaining these behaviors over time are integral aspects of successful behavior change programs in a variety of settings and with various individuals involved in caring for the health and welfare of others.

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