THE PSYCHOLOGY OF HAND HYGIENE: HOW TO IMPROVE HAND HYGIENE USING BEHAVIOUR CHANGE FRAMEWORKS

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Disclosures

• No conflicts of interest
Objectives

• Describe the psychological frameworks/theories that have been used to predict hand hygiene compliance, including motivators and barriers of hand hygiene
• Review the effectiveness of interventions based on psychological frameworks of behaviour change to improve hand hygiene compliance
• Discuss how to use behaviour change theories to implement hand hygiene interventions
The Psychology of Hand Hygiene
Dr. Jocelyn Srigley, BC Children’s and Women’s Hospitals, Vancouver, BC
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Health Care-Associated Infection Rates

Hand Hygiene Compliance
Multimodal Hand Hygiene Strategies

WHO
- System change
- Training and education
- Evaluation and feedback
- Reminders in the workplace
- Institutional safety climate

Just Clean Your Hands
- Environmental changes and system supports
- Education
- Monitoring and feedback
- Opinion leaders and champions
- Patient engagement
- Senior management support

System Change and Education

Cochrane Database of Systematic Reviews
Interventions to improve hand hygiene compliance in patient care
Dinah Gould, Donna Moralejo, Nicholas Drey, Jane H Chudleigh
First published: 8 September 2010

“Introducing alcohol-based hand rub accompanied by education/training is not enough”
A ubiquitous but ineffective intervention: Signs do not increase hand hygiene compliance

David J. Birnbach, Lisa F. Rosen, Maureen Fitzpatrick, Ruth Everett-Thomas, Kristopher L. Arheart

Systematic Review of Interventions

- Compared 3 types of studies:
  - Single interventions
  - WHO approach
  - WHO approach + goal setting, incentives, or accountability

Luangasanatip, 2015
Changing Behaviour vs. Culture

- Behaviour change
  - Individual level
  - Based on psychological theories
- Culture change
  - “The way we do things around here”
  - Group interactions
  - Based on sociological theories
  - E.g. frontline ownership, positive deviance
Objectives

• Primary
  • To review the effectiveness of interventions based on psychological theories of behaviour change to improve HCW hand hygiene compliance

• Secondary
  • To determine which frameworks have been used to predict HCW hand hygiene compliance
Methods

- Multiple databases and reference lists of included studies were searched
- Eligibility criteria
  - Studies that applied psychological frameworks to improve and/or predict HCW hand hygiene compliance
  - English language, published, peer-reviewed studies with primary data
- All steps in selection, data extraction, and quality assessment performed independently by two reviewers

Search Results
### Summary of Predictive Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Participants (N)</th>
<th>Theoretical Framework</th>
<th>Outcome Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>O'Boyle, Henly, &amp; Larson (2001)</td>
<td>Longitudinal observational</td>
<td>Nurses (120)</td>
<td>Theory of Planned Behaviour</td>
<td>Direct observation</td>
</tr>
<tr>
<td>Eiamsitrakoon et al. (2013)</td>
<td>Observational</td>
<td>All HCW (123)</td>
<td>Transtheoretical Model, Theory of Planned Behaviour</td>
<td>Direct observation, self-report</td>
</tr>
<tr>
<td>Fuller et al. (2014)</td>
<td>Qualitative cross-sectional survey</td>
<td>All HCW (207)</td>
<td>Theoretical Domains Framework</td>
<td>Direct observation (poor hygiene instances only)</td>
</tr>
</tbody>
</table>

### Theory of Planned Behaviour (TPB)

![Diagram of TPB](image)

Ajzen, 1991
O’Boyle et al, 2001

- 120 nurses completed TPB-based questionnaire and then were observed
- Model predicted intention to hand wash, which was related to self-reported compliance
- No constructs associated with observed compliance

Transtheoretical Model (TTM)

Prochaska & DiClemente, 1986
Eiamsitrakoon et al, 2013

- 123 HCWs were observed and then completed a survey based on TPB and TTM
- Total TPB scores correlated weakly with observed compliance and moderately with self-reported compliance
- Both observed and self-reported compliance increased with higher TTM stage

Theoretical Domains Framework (TDF)

- Knowledge
- Skills
- Social/professional role and identity
- Beliefs about capabilities
- Optimism
- Beliefs about consequences
- Reinforcement

- Intentions
- Goals
- Memory, attention, and decision processes
- Environmental context and resources
- Social influences
- Emotion
- Behavioural regulation

Cane et al, 2012
Fuller et al, 2014

- 207 HCWs who missed hand hygiene opportunities were asked to provide an explanation, which were coded based on TDF
- Explanations for non-compliance
  - Memory/attention/decision making (42%)
    - E.g. “forgot,” “preoccupied,” “in a rush”
  - Knowledge (26%)
    - E.g. “thought gloves were adequate,” “unaware hands [needed] to be cleaned after making beds”

Operant Learning Theory

Skinner, 1953

Behaviour

Reinforcement
  - Positive (reward)
  - Negative (escape)

Punishment
  - Positive (aversive stimulus)
  - Negative (removal of stimulus)
EVIDENCE FOR INTERVENTIONS BASED ON BEHAVIOUR CHANGE FRAMEWORKS

Summary of Intervention Studies

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<tr>
<td>Fuller et al. (2012)</td>
<td>Stepped-wedge cluster randomized trial</td>
<td>All HCW (60 wards)</td>
<td>Goal Setting, Control, Operant Learning Theory</td>
<td>Covert direct observation, hand soap &amp; alcohol rub procurement</td>
</tr>
<tr>
<td>Mayer et al. (2011)</td>
<td>Controlled before-after, followed by time series</td>
<td>HCWs (36,123 hand hygiene opportunities)</td>
<td>Theory of Planned Behaviour, Positive Reinforcement</td>
<td>Direct observation, MRSA &amp; VRE infection rates</td>
</tr>
<tr>
<td>Pontivivo, Rivas, Gallard, Yu, &amp; Perry (2012)</td>
<td>Uncontrolled before-after</td>
<td>All HCW (11,247 hand hygiene moments)</td>
<td>Transtheoretical Model</td>
<td>Direct observation, S. aureus bacteremia</td>
</tr>
</tbody>
</table>
Fuller et al, 2012

- 3 year stepped wedge cluster randomized controlled trial involving 60 units
- Intervention
  - HCWs encouraged to set goals and action plans to perform hand hygiene, and feedback was provided on their compliance (based on goal-setting and control theories)
  - Positive reinforcement for following recommended practices (operant learning)

Fuller et al, 2012

- Significant increase in hand hygiene compliance and soap consumption on intensive therapy units but not geriatric units
Harne-Britner et al, 2011

- Controlled before-after study on 3 medical-surgical units
  - All completed self-study module on hand hygiene
  - 1 unit received positive reinforcement (sticker system)
  - 1 unit received information on risks of non-compliance
- Informed by operant learning and change theories
- 15.5% increase in hand hygiene compliance on positive reinforcement unit after 1 month
- After 6 months, no significant differences in compliance or HAI rates between groups

Mayer et al, 2011

- 6 year study on 12 units
  - Phase 1 – stepped wedge study of intervention informed by TPB (education, audit/feedback, access to hand sanitizer)
  - Phase 2 – positive reinforcement strategies implemented hospital-wide
- Significant increase in compliance in experimental groups compared to controls during phase 1
- Increase in compliance from 28.7% to 59.1% during phase 2
- No changes in HAI rates
Pontivivo et al, 2012

- Before-after study of intervention based on TTM and Pathman awareness-to-adherence model
  - Coaching, competitions, group evaluation, and feedback
- After 1 year, significant increase in hand hygiene compliance among nurses and medical staff, but not allied health
- Non-significant reduction in health care-associated S. aureus bacteremia rates

Summary of Systematic Review

- 2 of 3 studies found that behavioural theory could predict hand hygiene behaviour
- 4 theory-informed interventions had mixed results but generally resulted in increases in hand hygiene compliance among HCW
- Unclear how the frameworks are informing interventions
  - Interventions tended to rely largely on standard multimodal programs
- Indicates potential benefit of applying behaviour change theory, although sustainability and generalisability across clinical settings is yet to be demonstrated
USING BEHAVIOUR CHANGE FRAMEWORKS

Types of Behaviour

<table>
<thead>
<tr>
<th>Deliberative</th>
<th>Spontaneous</th>
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<tbody>
<tr>
<td>• Slow, effortful, relies on executive functioning and rules</td>
<td>• Fast, effortless, shaped by context</td>
</tr>
<tr>
<td>• Frameworks include TPB, TTM, operant learning</td>
<td>• May lead to habit formation</td>
</tr>
<tr>
<td>• Hand hygiene studies to date have taken this approach</td>
<td>• Frameworks include MODE model of attitude-behaviour consistency, focus theory of normative conduct, habit theories</td>
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</table>

Cane et al, 2012
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Framework Determines the Intervention

<table>
<thead>
<tr>
<th>Deliberative/Explicit</th>
<th>Spontaneous/Implicit</th>
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<tbody>
<tr>
<td>• E.g. theory of planned behaviour</td>
<td></td>
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<tr>
<td>• Target injunctive norms (i.e. perceptions of what others think we should do)</td>
<td></td>
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<tr>
<td>• E.g. operant learning</td>
<td></td>
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<tr>
<td>• Intervention = positive reinforcement</td>
<td></td>
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<tr>
<td>• Individuals habituate to rewards quickly, causing rewards to lose their reinforcing properties</td>
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<tr>
<td>• E.g. focus theory of normative conduct</td>
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<tr>
<td>• Target descriptive norms (i.e. perceptions of what people are actually doing)</td>
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<tr>
<td>• E.g. habit theory</td>
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<tr>
<td>• Establish strong automatic associations between performance of a behaviour and contextual cues, then ensure those cues are present</td>
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How to Use a Framework

1. Find a psychologist to work with
2. Choose a framework
3. Assess motivators and barriers to hand hygiene using behaviour change constructs from that framework
4. Develop intervention based on the framework and assessment results
5. Evaluate

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Conclusions

- New strategies are needed to improve hand hygiene compliance and reduce HAIs
- Psychological frameworks of behaviour change demonstrate significant potential for predicting hand hygiene behaviour and informing interventions to improve hand hygiene compliance
- More research is needed
- Collaboration with experts in psychology and behaviour change is essential

QUESTIONS?

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<th>Date</th>
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<tr>
<td>July 26, 2017</td>
<td>THE IMPACT OF CATHETER ASSOCIATED URINARY TRACT INFECTION</td>
<td>Prof. Brett Mitchell, Avondale College of Higher Education, Australia</td>
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<tr>
<td>August 10, 2017</td>
<td>LEARNING INFECTION CONTROL VIA GAMES</td>
<td>Prof. Anne-Gaëlle Venier, Centre Hospitalier Universitaire de Bordeaux, France</td>
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<td>August 23, 2017</td>
<td>BIOFILMS IN THE HOSPITAL ENVIRONMENT - INFECTION CONTROL IMPlications</td>
<td>Prof. Karen Vickery, Macquarie University Faculty of Medicine, Australia</td>
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<td>August 24, 2017</td>
<td>SOCIAL MEDIA: USELESS OR USEFUL IN INFECTION PREVENTION?</td>
<td>Barley Chironda, IPAC Canada National Social Media Manager</td>
<td></td>
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<tr>
<td>September 14, 2017</td>
<td>RELATIONSHIP BETWEEN PATIENT SAFETY CLIMATE AND ADHERENCE TO STANDARD PRECAUTIONS</td>
<td>Dr. Amanda Hessels, Ann May Center for Nursing, Columbia University</td>
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<tr>
<td>September 18, 2017</td>
<td>Cottrell Lecture - IGNITING PASSION, SPARKING IMPROVEMENT</td>
<td>Julie Storr, World Health Organization</td>
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