

Position on Healthcare Client Hand Hygiene

Author:

Katie Morales, PhD, RN, CNE (Chair)^a, Kathleen Puri, MSN, RN^b, Shanina Knighton, PhD RN^c, Christine Greene, MPH, PhD^d, on behalf of the Healthcare Infection Transmission Systems (HITS) Hand Hygiene Workgroup

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Abstract

Recent public health concerns call for innovative strategies to better protect healthcare clients. Pathogens which can lead to healthcare-associated infections (HAIs) are found on the hands of healthcare workers and clients. Hand hygiene is the most effective and economical behavior to reduce pathogen transmission. Although hand hygiene is frequently mentioned to the public to address community-associated infections, the context rarely addresses the client's role in HAI prevention.

A literature review addressed the following evidence-based practice question: Does the implementation of healthcare client hand hygiene decrease pathogen transmission? Fifty-four studies spanning 17 years (2002-2019) were appraised using Dang and Dearholt's (2018) five levels of evidence with Level 1 being the most stringent to develop and support our position on client hand hygiene.

Several research studies found clients' hands become a reservoir and means of transmission if not adequately cleansed. Effective education increased the frequency of client hand hygiene, decreased pathogens found on their hands, and subsequently, decreased HAI rates across healthcare settings. Effective education led to greater client and worker engagement, increased worker hand hygiene adherence, and increased frequency of visitor/family hand hygiene.

We present an evidence-based multimodal strategy that is affordable, practical, effective, acceptable, safe, and equitable.

Definitions

Hand hygiene: An inclusive term for the practice of cleansing hands, which includes hand washing, use of alcohol-based handrubs, or disposable wipes. Hand hygiene does not refer to surgical hand antisepsis performed in surgical settings (World Health Organization, WHO, 2009).

Hand hygiene supplies: Includes sinks, alcohol-based handrubs, and disposable wipes.

Healthcare-associated infections (HAIs): Infections acquired while receiving treatment for other conditions within a healthcare setting (Centers for Disease Control, CDC, 2002).

Healthcare client: Recipients of care in any healthcare setting, including inpatient, outpatient, and/or long-term care settings. Referred to as *client* in this paper. The role of visitor hand hygiene will be addressed in a separate paper.

Healthcare worker: Licensed and unlicensed employees in the healthcare setting, including inpatient, outpatient, and/or long-term care settings. Referred to as *worker* in this paper.

Introduction

Recent public health concerns such as the coronavirus pandemic and the global threat of pathogens such as Ebola call for innovative strategies to better protect healthcare clients. Harmful bacterial, viral, and fungal pathogens, including multidrug-resistant organisms (MDROs), are found on the hands of healthcare workers and clients. Most of these pathogens can lead to HAIs (Cao et al., 2016; Mody et al., 2019). Hand hygiene is the most effective and economical behavior to reduce transmission of potentially harmful organisms and subsequent HAIs (Barnett et al., 2014; Tejada & Bearman, 2015). These infections are associated with long-term disability, increased length of stay, and higher risk of death (WHO, 2009). Healthcare-associated pathogens include many which can be MDROs (Centers for Disease Control, CDC, 2019; Istenes, 2011). There is limited information available to the public as states have different reporting criteria and not all states require HAI reporting (Cohen et al., 2014, National Council of State Legislatures, 2020).

Although hand hygiene is frequently mentioned to the public to address community-associated infections, the

context rarely addresses the client's role in HAI prevention (Healthy People 2020, 2014; Wallace, Cropp, & Coles, 2016). Thus, it is imperative all people in all healthcare settings are vigilant regarding hand hygiene (CDC, 2016). Inadequate hand hygiene affects everyone including, but not limited to, clients, workers, visitors, family, leadership, manufacturers, and the public (Seale, et al., 2016).

The transmission of pathogens via hand contamination between healthcare workers and clients is dynamic and reciprocal, asserting the role of the client in the chain of infection and contradicting the common assumption workers are mainly responsible for transmission (Banfield & Kerr, 2005; Vaidotas et al., 2015). There are direct consequences for the population vulnerable to HAIs (Busby et al., 2015). Several studies found clients' hands become a reservoir and means of transmission if not adequately cleansed (Srigley et al., 2014). Healthcare reception areas have low hand hygiene adherence rates and clients' hands may be colonized shortly after entering a healthcare setting (Vaidotas et al., 2015; Sunkesula et al., 2017).

While client hand hygiene is an obvious but frequently overlooked safety concern across healthcare settings, it is not routinely measured (Cheng et al., 2016). However, workers' adherence to hand hygiene has recently been deemed a quality indicator with mandated public disclosure. Any publicly reported hand hygiene metric will suffer because the credibility of various methods has yet to be established, leading to distrust of the data due to misaligned incentives (Ellingson et al., 2014). For example, there is no national standard for the optimal number of hand hygiene observations or which indications should be monitored (Chassin, Mayer, & Nether, 2015a; Chassin, Nether, Mayer, & Dickerson, 2015b).

This paper presents a formal, intentional, systematic appraisal of the evidence for client hand hygiene. Evidence-based practices (EBPs) are delineated to enable facilities to discover their key causes of client hand hygiene failure and to deploy a set of customized practices to target their key causes. Interventions should be customized to specific locations and circumstances as the facility's key causes may be the most important determinant of the intervention's success or failure (Chassin et al., 2015a; Chassin et al., 2015b). The role and

responsibilities of all within the healthcare community are addressed. Finally, we promote a multimodal strategy to address the facility's most significant issues.

Materials/Methods of the Interventions

Hygiene and infection prevention and control strategies have traditionally been nursing responsibilities. Nurses possess the capacity to educate healthcare workers and clients about the importance of hand hygiene (Larson, 2016). Accordingly, we structured our findings to the nursing process developed in 1958 by Ida Jean Orlando to guide patient care. The five sequential steps are assessment, diagnosis, planning, implementation, and evaluation (Toney-Butler, 2019).

A literature review was conducted to assess evidence from qualitative, quantitative, and mixed methods studies. We screened for relevance by reviewing the titles and abstracts of identified papers and identified key studies pertaining to client hand hygiene. From there, we pursued references of references. We also consulted national and international infection control guidelines. We appraised the scientific literature using Dang

and Dearholt's (2018) five levels of evidence with Level 1 being the most stringent to develop and support our position on client hand hygiene (Dang & Dearholt, 2018). We included 54 studies spanning 17 years (2002-2019). We also included 31 studies published during the last 5 years in professional peer reviewed journals and 23 seminal studies more than 5 years old (Appendix A). The studies included several different countries, healthcare systems, and settings (hospitals, long-term care facilities, and the community), with hospitals being the most frequent setting. Studies differed in focus, design, and methods. Because of ethical considerations in randomizing control groups, hand hygiene research in general has lagged compared to other healthcare research topics, with few randomized trials or epidemiologically rigorous observational studies. Research around client hand hygiene is scarce and little is known about research on client hand hygiene.

Results/Data/Outcomes

Studies showed effective education increased the frequency of client hand hygiene, decreasing the pathogens found on their hands, and, subsequently, decreasing HAI rates across the healthcare settings

(Cure & Van, 2015; Kundrapu et al, 2014; Pokrywka et al. , 2017). Studies have shown a correlation between the lack of worker accountability and decreased hand hygiene adherence. Therefore, it is important to provide education and training for all who work or enter the healthcare setting regardless of role (Chassin et al., 2015a). Effective education led to client and worker engagement and increased worker hand hygiene adherence (Fox et al., 2015) and increased the frequency of visitor/family hand hygiene (Sunkesula et al., 2015). Effective education of parents regarding the importance of hand hygiene increased child welfare (Bowen et al., 2012).

Home hand hygiene habits are often not applied in a healthcare setting (Barker et al., 2014). Client hand hygiene practice is affected by time of day and availability and placement of hand hygiene supplies (Ellingson et al., 2014; Hobbs et al., 2016). Issues regarding client hand hygiene adherence may include inaccessible supplies, irritating agents, lack of knowledge, forgetfulness, or lack of administrative leadership/support (O'Donnell et al., 2015). Barriers to implementing client hand hygiene programs include lack of administrative support, workload, and negative attitudes.

Ineffective education may also contribute to decreased hand hygiene (Knighton et al., 2018). Factors affecting the success of the education intervention depend on clearly stated instructions and the client willingness and ability to adhere to the intervention (Chassin et al., 2015a; Chassin et al., 2015b). For example, decreased cognitive ability or motor function, and presence of orthopedic devices or bandages may interfere with their ability to perform hand hygiene (Hill et al., 2015; Burnett, Lee, & Kydd, 2008).

Recommendations

We recommend a multimodal strategy for the development of a client hand hygiene education program. First, assess the current adherence to client hand hygiene and specific potential root causes for non-adherence (Chassin et al., 2015a). Once the root causes are understood, it is important to define the barriers specific to the facility or unit (Chassin et al., 2015a; Chassin et al., 2015b). This includes identifying themes which impact hand hygiene adherence and causes of non-adherence to precisely define the problem (Chassin et al., 2015a; Chassin et al., 2015b, Morales, 2017).

Next, plan interventions directed at the facility's unique causes of hand hygiene failure since different causes require different remedial measures. This will help invest resources where needed and avoid wasting resources on problems the facility does not have. A "one size fits all" approach does not allow for customized improvement. Attempting to address hand hygiene globally with the same plan is not likely to address problems which differ among facilities (Chassin et al., 2015a; Chassin et al., 2015b).

Important to the success of the plan is leadership engagement, which critical to facilitating a culture change (McInnes et al., 2014). Ensure facility leadership is aware and supportive of hand hygiene improvement strategies and supports these efforts with adequate resources (Chassin et al., 2015a; Chassin et al., 2015b). Use a behavioral framework and recognized behavioral techniques to plan and execute interventions (Tuong, Larson, Armstrong, 2014). This should be a bundled plan which includes education, reminders, and feedback (Schweizer et al., 2014). We recommend the facility adopt an individualized plan, with videos, audio, and print materials to promote and sustain hand hygiene adherence

(Morales, 2017, Tuong et al., 2014; Randle et al., 2014; McGuckin & Govednik, 2013). A digital support system may also promote and sustain hand hygiene adherence.

Finally, hold everyone accountable and responsible. Include hand hygiene in the clients rights and responsibilities (American Hospital Association Patient Care Partnership and on the Rights and Responsibilities of Residents of Long-Term Care Facilities) to promote high quality care, a clean and safe environment, and client involvement (Chassin et al., 2015a; Chassin et al., 2015b; Morales, 2017). Available resources and resources which can be modified to target the client are listed in Appendix B.

Once the plan is implemented, it must be sustained for long-term benefits. We recommend incorporating and maintaining the following key points for successful implementation:

- Encourage healthcare client engagement and emphasize personal responsibility and altruism (Busby et al., 2015; Cheng et al., 2016; Morales, 2017; McInnes et al., 2014).

However, healthcare workers will need assist clients with hand hygiene as needed (Cheng et al., 2016; Sunkesula et al., 2015).

- Empower clients and stakeholders to have a role in HAI prevention (Seale et al., 2016; Cheng et al., 2016; McInnes et al., 2014).
- Implement plans to target specific causes and to sustain improved performance, changing reminders periodically for effectiveness (Chassin et al., 2015a; Chassin et al., 2015b).
- When designing the education plan, build on the home behaviors of the client by exploring their pre-existing attitudes and values regarding hand hygiene (Barker et al., 2014).
- Address cultural beliefs surrounding hand hygiene as it has both hygienic and ritualistic meanings. Assess and leverage the intrinsic value clients associate with hand hygiene to improve overall hospital hygiene and decrease HAIs. (Barker et al., 2014, Morales, 2017). Two

available resources developed by Morales (2018) are listed in Appendix C.

Simplify education by breaking the information into components (Randle et al., 2014). Focus the education on the importance of hand hygiene and describe the available options (soap and water, alcohol-based handrubs, disposable wipes; Chassin et al., 2015a; Chassin et al., 2015b). Include the basics of infection prevention and the need for hand hygiene even if gloves or other personal protective equipment are used (Chassin et al., 2015a; Chassin et al., 2015b; Association for Professionals in Infection Control and Epidemiology [APIC], 2014). Additionally, explain the importance of avoiding touching the eyes, nose, or mouth (T-zone) to avoid self-contamination (Morales, 2017). Given the high frequency of mucosal contact, hand hygiene is essential to prevent pathogen transmission and self-inoculation (Kwok, Gralton, & McLaws, 2015).

Educational content must instruct clients on when to perform hand hygiene. There are five specific moments for client hand hygiene adapted from the World Health Organization *5 Moments of Patient Hand Hygiene* (WHO, 2009; Rai et al., 2017).

These are: 1) Before and after touching their wounds, devices and anything within reach, including the call button/remote, phone, service animals, etc.; 2) Before eating; 3) After using the toilet; 4) When entering or leaving the care area; and 5) In view of workers when they enter the care area which provides an unspoken reminder to workers to clean their hands before providing care. An example educational script is included in Appendix D.

Education should be provided in various forms to address limitations in literacy, physical function, or sensory perception. Education may be provided individually and/or in groups (Knighton et al., 2018; Morales, 2017; Kwok et al., 2015). Since people may often forget to perform hand hygiene, verbal and visual cues may reinforce and remind everyone thereby improving adherence (Chassin et al., 2015a; Morales, 2017). Verbal reminders can include automated audio prompts, hand hygiene champions, or reminders from workers (Morales, 2017; Rai et al., 2017; Knighton et al., 2017). Automated systems may provide real-time reminders and generate feedback for quality improvement (Chassin et al., 2015a; Chassin et al., 2015b). Champions can provide just in time

coaching to encourage accountability and improve adherence. Champions can determine the cause of non-adherence and engage appropriate interventions based on the root cause (Chassin et al., 2015a). Visual reminders include stickers, posters or pamphlets focused on targeted behavior change rather than simply conveying information (Chassin et al., 2015a; Chassin et al., 2015b; Morales, 2017). Assess learning comprehension by having the learner repeat the key concepts either verbally or by demonstration.

Select appropriate hand hygiene supplies as client preference plays a role in adherence. Include several options such as soap (non-antimicrobial or antimicrobial) and water, disposable wipes, and alcohol-based handrubs when possible. Some clients find disposable wipes difficult or unpleasant to use. Others prefer push down pumps for alcohol-based handrubs (Chassin et al., 2015a; Morales, 2017; Rai et al., 2017; Knighton et al., 2017; Senol et al., 2014). Although handrubs with an alcohol concentration of 60% may decrease methicillin resistant *Staphylococcus aureus* colonization, incomplete removal is common (Sunkesula et al., 2015). There is a lack of evidence to support the use of

triclosan containing soap compared with alcohol-based handrubs, benzalkonium chloride, or chlorhexidine gluconate (CHG: Chassin et al., 2015a; Chassin et al., 2015b; Therattil et al., 2015). While the judicious use of 2% CHG may help to prevent HAIs, chlorhexidine-free supplies may prevent allergic reactions in sensitive people (Chassin et al., 2015a; Chassin et al., 2015b).

Hand hygiene supplies must be accessible and easy to use as ineffective placement of supplies decreases hand hygiene (Ellingson et al., 2014; Hobbs et al., 2016; O'Donnell et al., 2015). Visibility and accessibility of the supplies (upon entry to the care area, on meal trays, etc.) influences adherence, therefore accommodate clients who cannot easily get to the sinks or wall-mounted dispensers (Ellingson et al., 2014; Cure et al., 2015; O'Donnell et al., 2015). Full hands also decrease adherence; ensure there is a convenient spot to place items and develop a maintenance plan to ensure supplies are always fully stocked (Chassin et al., 2015a).

Evaluate the intervention on a regularly scheduled basis (McInnes et al., 2014). Collect hand hygiene adherence data and report results accurately and frequently.

Meaningful data includes a target and an action plan in place for improving adherence, such as unit or role-based adherence (Chassin et al., 2015a; Chassin et al., 2015b). Evaluate performance by incorporating a measurement system to audit adherence (McInnes et al., 2014). Commit to collecting and analyzing data using the same methods so the data can be compiled across sites. Avoid the use of self-report as the primary method of hand hygiene adherence. Direct observations can measure adherence as well as identify barriers to hand hygiene. Inter-rater reliability must be assured. A combination of measurement approaches is appropriate and may be adjusted for facility specific needs (Chassin et al., 2015a; Chassin et al., 2015b; Cheng et al., 2016). Most measurements of hand hygiene are for healthcare workers and usually only include entry and exit of care areas (“in and out”; Dawson & Mackrill, 2014). One easy measurement may be client hand hygiene pre-meal or upon entry and exit from the care area (Chassin et al., 2015a; Chassin et al., 2015b). An ultrasound-based location system may measure client hand hygiene in real-time during visits to the toilet, mealtimes, and on entering and leaving the care areas (Srigley et al., 2014).

Reconceptualize non-adherence and develop progressive remediation for all (Chassin et al., 2015a; McInnes et al., 2014). A robust process improvement examines the complicated problem of non-adherence and discovers highly effective, targeted interventions focused on the causes prevalent at each facility. When there is a decline in client hand hygiene, the Targeted Solution Tool provides specific recommendations to identify causes and increase adherence. Real-time displays of hand hygiene adherence may provide incentive for improvement (Chassin et al., 2015a; Chassin et al., 2015b). Consider recognition or rewards for those who model hand hygiene behaviors or improvements.

Client hand hygiene is an evidence-based strategy to reduce HAIs which are “never events” – preventable and egregious events which should never happen (Centers for Medicare and Medicaid Services, 2008). Facilities are not reimbursed for costs associated with “never events.” An increase in the perception of healthcare workers’ caring may improve client satisfaction which will also greatly impact reimbursement. Despite universal acknowledgment hand hygiene is the single most effective way to prevent the spread of pathogens, client hand

hygiene is seldom addressed. We have presented several strategies to develop interventions to address these barriers which do not hinder the workflow of the worker. The evidence-based multimodal strategy presented here is affordable, practical, effective, acceptable, safe, and equitable. Additionally, policy makers should create legislation mandating facilities provide education to clients about cleaning their hands.

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Appendix A: Levels of Evidence Based on Dang and Dearholt (2018)

Dang and Dearholt (2018)	Level 1	Level 2	Level 3	Level 4	Level 5
	Includes experimental studies or randomized control trials (RCTs) using the traditional scientific method. Must include a control group. Also includes a systematic review of RCTs, with or without meta-analysis.	Includes quasi-experimental studies, which have an experimental design, without a control group. These designs are used when it is not practical, ethical, or possible to randomly assign participants to the experimental or control groups. Includes a systematic review of a combination of existing RCTs AND quasi-experimental studies OR quasi-experimental studies only, with or without meta-analysis.	Includes non-experimental studies of naturally occurring phenomena. Studies may focus on purpose (descriptive, predictive, or explanatory) or time (prospective, longitudinal, or retrospective). Also includes a systematic review of a combination of RCTs, quasi-experimental, AND non-experimental studies OR non-experimental studies only, with or without meta-analysis.	Includes clinical practice guidelines and consensus/position statements based on scientific evidence.	Includes integrative review, quality improvements, financial evaluation, opinion of nationally recognized experts, or case reports.
Number of research studies	3	26	9	15	1

Appendix B: Available Resources

Available resources for client hand hygiene include:

Clean Hand Count for Patients* <https://www.cdc.gov/handhygiene/patients/index.html>

Available resources which could be modified for client hand hygiene include:

The Joint Commission Center for Transforming Healthcare

<https://www.centerfortransforminghealthcare.org/en/>

Robust Process Improvement <https://www.centerfortransforminghealthcare.org/what-we-offer/high-reliability-training/>

Targeted Solution Tool <https://www.centerfortransforminghealthcare.org/en/what-we-offer/targeted-solutions-tool/hand-hygiene-tst/>

Healthcare Improvement's How to Guide

<http://www.ihl.org/resources/pages/tools/howtoguideimprovinghandhygiene.aspx>

Patient Advocacy Materials <https://www.cdc.gov/handhygiene/patients/index.html>

WHO Observation Forms https://www.who.int/gpsc/5may/Observation_Form.doc

WHO Self-Assessment

Framework https://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf

iScrub Application <https://apps.apple.com/us/app/isclub-lite/id329764570>

* Centers for Disease Control. (2015). Hand hygiene in healthcare settings. Retrieved from <https://www.cdc.gov/handhygiene/patients/index.html>.

Appendix C: Tools to Assess Clients Hand Hygiene Values and Beliefs

Health Beliefs Related to Hand Hygiene Tool*

Participant's Reaction to Hand Hygiene Intervention Questionnaire **

* Morales, K. (2018). Tools for monitoring hand hygiene in a long-term care facility.

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Appendix D: Sample Educational Content

What can you do to prevent healthcare-associated infections? The good news is there are simple steps you can take to prevent infections. Clean your hands regularly, especially at these important times:

- Whenever you enter or leave the care area
- Whenever hands look or feel unclean
- Whenever there is a concern if hands are clean
- Before you eat or drink
- Before touching any broken skin or before any medical procedure
- Before contact with indwelling medical devices, such as tubes to drain your bladder or administer intravenous fluids
- Before and after touching others
- After using the toilet
- After coughing or sneezing

To help prevent infecting yourself, avoid touching your eyes, nose, or mouth and always cough or sneeze into your elbow.

Ask each day if you still need any indwelling medical devices, such as tubes to drain your bladder or administer intravenous fluids. Also, ask about vaccines you need to stay healthy. While infections can be serious, taking these simple steps to prevent infection can help you take charge of your health.^[1]

[1] Massachusetts Hospital Association, (2016). *Healthcare-associated Infections*. Patient CareLink. Retrieved from <http://patientcarelink.org/improving-patient-care/healthcare-acquired-infections-hais/>