Check for updates

Original Article

SAGE Open Medicine

Experiences of hand hygiene among acute care nurses: An interpretative phenomenological analysis

SAGE Open Medicine
Volume 4: 1–9
© The Author(s) 2016
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/2050312116675098
smo.sagepub.com

Sheryl L Chatfield, Rachael Nolan, Hannah Crawford and Jeffrey S Hallam

Abstract

Objective: Occurrences of healthcare-associated infections are associated with substantial direct and indirect costs. Improvement in hand hygiene among acute care nurses has potential to reduce incidence of healthcare-associated infections. Findings from reviews of intervention research have not conclusively identified components that are more or less efficient or effective. Much prior qualitative research has focused on descriptive analysis of policies and practices rather than providing interpretive explorations of how individuals' perceptions of hygiene might drive practices.

Methods: We conducted qualitative interview research with eight nurses in the United States who were employed in various patient-care roles. We analyzed the data using an interpretative phenomenological analysis methodology to explore how nurses described their perceptions of, and experiences with, hygiene. We developed themes that explored individual, workplace, and management influences on perception of hygiene.

Results: Developed themes include *practical hygiene*, *risky business*, and *hygiene on trial*; the latter theme described the conflict between how nurses perceived their own hygiene practices and how they felt hospital management perceived these practices. Other findings included that participants distinguished between policy-mandated use of sanitizer and a personal sense of cleanliness; the latter was more likely to be associated with scrubbing or removal of contaminants than with use of protectants.

Conclusion: While participants asserted support for facility hand hygiene policies, their behavior in certain instances might be mediated by broadly defined emergent situations and a belief that it is not currently possible to establish a causal link between an healthcare-associated infections and a specific individual or occurrence. Researchers and infection prevention practitioners might consider soliciting greater input from nurses in planning hand hygiene improvement interventions, to encourage ownership, and emphasizing detailed cases as training content to take advantage of individuals' sensory responses to hygiene.

Keywords

Hand hygiene, healthcare-associated infections, nurses, qualitative, interpretative phenomenological analysis

Date received: 6 June 2016; accepted: 13 September 2016

Introduction

According to a report compiled by the World Health Organization (WHO),[1] healthcare-associated infections (HCAI) account for annual direct costs in excess of 6 billion dollars in the United States and 7 billion Euros in the European Union. Additional direct and indirect costs of HCAI are difficult to estimate with precision but are presumed substantial. Examples of specific consequences for individuals and significant others include longer hospital stays, emotional stress on caregivers or family members, extended illness, disability, or discomfort, loss of working days, diminishment of social contacts, and, in extreme instances, death.[1] It has been suggested that a single modifiable factor, improvement in hand

Department of Social and Behavioral Sciences, College of Public Health, Kent State University, Kent, OH, USA

Corresponding author:
Sheryl L Chatfield, Department of Social and Behavioral Sciences, College of Public Health, Kent State University, Lowry Hall, 750 Hilltop Drive, Kent, OH 44242, USA.
Email: schatfi1@kent.edu

Creative Commons Non Commercial CC-BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 3.0 License (http://www.creativecommons.org/licenses/by-nc/3.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (https://us.sagepub.com/en-us/nam/open-access-at-sage).

hygiene among healthcare workers, has potential to greatly reduce incidence of HCAI[2] although hand hygiene itself is characterized by researchers as a highly complex behavior that is influenced by varying combinations of individual, social, and administrative factors.[3]

Authors of six meta-studies of quantitatively measured intervention research considered and aggregated the findings from more than 100 unique intervention studies.[4–9] Global findings of most intervention studies included directed educational programming or incorporated alternate methods of providing information regarding compliance or infection rates.[4–10] Authors of meta-studies reported that improvements in hand hygiene rates tended to follow behavior change interventions although there were additional aspects of the behavior or facilitators that were not fully explained through analysis of the primary research studies.[4–9] These aspects included lack of understanding of how to encourage and ensure long-term compliance,[4] incomplete identification of specific strategies in multi-component interventions that were both most efficacious and resource effective,[7,9] and lack of knowledge related to potential efficacy of interventions that might simultaneously operate at multiple levels within healthcare organizations.[6]

One additional study[10] compiled data from 96 published observational investigations to identify correlates with compliance and non-compliance and recommended that context-specific adjustments need to be identified and implemented to make existing theoretical frameworks more effective. To lay the groundwork for development and modification of behavior change models, the authors recommended the use of qualitative inquiry to explore behavioral issues in greater depth.[10] Use of this recommended exploratory and qualitative approach has the additional advantage of potentially guiding intervention development to address the outstanding items identified by the authors of the review studies described above. Therefore, the purpose of this article is to describe findings from a qualitative research study implemented to investigate hand hygiene among healthcare workers, specifically nurses, in healthcare facilities.

Many previously published qualitative research studies of hand hygiene among healthcare workers have featured findings from individual or group interviews framed in a descriptive, generic, or unspecified qualitative approach.[11–14] Findings from descriptive or generic studies are often presented in the form of broad practice or contextual categories that falls into the classification "topical survey of findings" in which results are "organized by the research or interview questions asked, by the prevalence of topics raised, or by some other a priori but always surface classification system" (p. 910).[15] Use of this presentation style in itself does not suggest lack of quality in the research design or data processing. We believe, however, that more interpretive findings have greater relevance to our research interest and more potential to help address the knowledge gaps identified above.

We identified a small number of examples of published hand hygiene research in which authors expanded findings beyond common categories and offered interpretive explanations for findings. Only two of these research reports[16,17] included healthcare workers employed in healthcare facilities as participants. Authors of one report interviewed primarily individuals in supervisory roles and considered hygiene in context of Bourdieu's concept of habitus, defined by the authors as "an acquired, collectively held pattern of thinking and acting" (p. 1048).[16] These authors suggested that nursing staff might take advantage of responsibility for cleanliness to acquire an asset the authors described as hygiene capital and considered beneficial to individuals and to nurses as a practice group, as well as a facilitator of quality improvement in healthcare practice overall. Authors of the other report compared inductively derived qualitative findings with constructs comprising the existing theory of planned behavior and recommended modifications to the theory to better explain the disconnect between intention and behavior the authors' data analysis revealed.[17] These authors also emphasized the role of experience and suggested using the emotional power of "vivid episodes" (p. 40)[17] in training materials to facilitate lasting behavior change.

The research described in this article was also planned using an interpretative approach to qualitative inquiry. Where our work differs from the two reports described above is in our priority placed on the described perception and experience of hygiene itself. We aimed to further investigate individuals' perceptions of hygiene, in order to improve our understanding of how individual or subjective interpretations of this concept might influence responses to policies, communication, and education- or information-based interventions since these approaches are prevalent in hand hygiene intervention research.

For this research study, we chose specifically to use an interpretative phenomenological analysis (IPA)[18] approach to explore how acute care nurses described their experiences with hand hygiene. We selected nurses among healthcare workers because the frequency of direct patient contact associated with nursing practice results in frequent opportunities to participate in hand hygiene based on WHO guidelines.[19] We chose to use IPA due to the priority of this qualitative approach on "offering detailed, nuanced analyses of particular instances of lived experience" (p. 37).[18]

What distinguishes IPA from other qualitative phenomenological approaches that are also directed at understanding lived experience is an acknowledgement of researcher interpretation; results reflect the researcher's interpretation of the participant's interpretation and presentation of his or her experience. We believe this characteristic makes this approach particularly well suited toward investigation of subject matter such as hand hygiene in which individual practice is likely at times to differ from institutional quality control standards. To our knowledge, there have been no prior published articles in which researchers described the

use of IPA to investigate hand hygiene although authors of two prior research studies used IPA to investigate quality in healthcare practices among general practitioners[20] and nurses.[21] We identified several findings of interest and potential applicability to this research study from the first of these previous IPA research studies. These include the following: expressed distrust of evidence-based guidelines, fear of loss of autonomy from implementing guidelines, and a pessimistic view of the benefits resulting from evidence-based practice when compared to the effort required to implement guidelines.[20] Authors of the second IPA study identified disconnect between ideals specified by the standard knowledge and skill-based nursing evaluation and how nurses implemented processes in practice.[21] This finding supports prior research findings that speculate that activities comprising professional practice, such as hand hygiene, are influenced by factors both within and beyond the individual.

Methods

Participants

Individual interviews are the customary means of data collection for IPA research.[18] For this study, we conducted in-depth interviews with eight nurses, employed in various hospitals throughout the United States, who were recruited by a research screening organization. Small samples are the norm to facilitate "detailed account of individual experience" (p. 51).[18] Eligible participants were required to speak and understand English sufficiently well to participate in an in-depth interview, to consent to be interviewed, and to be currently employed fulltime in an acute care nursing position in which they spent most of their time in direct patient care. Our aim was to recruit a sample that was homogenous, by comprising nurses who engaged in hand hygiene as part of their regular duties, but that still represented some variation in the range of specific patient-care responsibilities, healthcare system, and region of employment. Our goal in seeking this limited variation was not generalizability, which is beyond the scope of IPA and many qualitative methods, but rather to be better able to distill the essence of the hygiene experience over and above factors related to specific positions, management practices, and elements of organizational cultures that might be present in a single facility. Willing participants were provided with a small financial incentive upon completion of the interview.

A university institutional review board approved the research study prior to recruitment, and all participants were provided with a written information sheet and asked to provide oral consent at interview onset. Nurses represented neonatal intensive care units (two), triage, labor and delivery, intravenous team, and general care hospital nurse (one of each). The sample also included two nurses who additionally had supervisory responsibilities, one from an oncology unit and one from a pediatric unit. All were working fulltime at the time of the interview. Participants' reported years of nursing experience ranged from 6 to 28.

Interviews

One of the authors who had extensive qualitative interviewing experience conducted all interviews over the telephone. Prior to initiating interviews, the author discussed with the participants his role as a university-affiliated behavioral health researcher interested in exploring participants' experiences with hand hygiene and encouraged participants to be open and thorough when describing those experiences. The author informed participants that the results of data analysis would be used to help identify alternatives for future hand hygiene intervention research.

The mean duration of interviews was 56.85 min. We developed the interview guide using an example IPA framework[18] with adaptations made to account for the subject matter of interest. We added one question regarding participants' opinion about classification of hand hygiene as a medical error because it was of particular interest to the research team. All interviews were audio-recorded and professionally transcribed with a content focus. Two of the authors checked the transcripts for accuracy and made appropriate corrections to the typed interview transcripts prior to initiating data analysis. The interview guide is given in Appendix 1.

Data processing

Author information. Authors of qualitative research, due to the nature of the relationship with participants and with data, can be considered as analogous to instruments used for quantitative methods.[22] We are all university-affiliated researchers; only one author has previous healthcare experience, and as of the time of this analysis had research responsibilities that required occasional site visits to an area hospital. Prior to and while conducting this research, we completed a comprehensive review of prior qualitative research on hand hygiene among healthcare workers. We also engaged in regular discussions with a larger group of individuals including other health behavior researchers who were involved in ongoing intervention development to improve hand hygiene in healthcare settings. We believe that our ongoing immersion in both previously published data and general subject matter helped us to better understand and interpret participant experiences although our status as relative outsiders in healthcare settings helped counter potential bias during interviews and analysis.

Analytic processes. We completed descriptive, linguistic, and conceptual commenting stages that characterize IPA analysis[18] using the commenting function in the Microsoft Office® software program, Word. Next, we initiated the development of themes for each participant. Following the completion of commenting and theme development for all participant transcripts, themes were

Table 1. Super-ordinate themes and subthemes by represented participants.

Super-ordinate themes/subthemes	Participants
Practical hygiene	
Soap is for old people	Angela, Barbra, Francis, Jordan, Kim, and Nicole
The rise of sanitizer	All
Alien substances	Barbra, Dana, and Francis
Risky business	
The contaminated environment	Angela, Barbra, Caren, Dana, and Kim
Long-term concerns	Angela, Dana, and Jordan
Hygiene on trial	
Accused	Angela, Barbra, Caren, and Dana
Confession	Angela, Caren, Dana, Francis, Jordan, Kim, and Nicole
Extenuating circumstances	Angela, Caren, Dana, Francis, Jordan, Kim, and Nicole
Beyond a reasonable doubt	Caren, Dana, Francis, and Kim

compared across cases. We used the process of abstraction[18] to identify our broader themes or super-ordinate themes. We consolidated the items in each cluster into the representative variations of the super-ordinate themes or subthemes.[18]

These processes were documented by creating and retaining edited transcripts that represented each stage of coding for each participant and several subsequent iterations of theme development documents, culminating in a master theme table that contained representative excerpts of text from each participant that contributed to each subtheme. The research team discussed various aspects of the analysis process, from initial commenting through creation of the master theme table, during regular meetings. Further analysis information, including the audit trail that represents detailed theme development, is available by contacting the first author (S.L.C.).

Findings

We used quality control recommendations associated with IPA[23] and developed those super-ordinate themes that were supported by minimum 50%, or four of the eight participants. We identified three prevailing super-ordinate themes and the multiple subthemes represented within each. We labeled the super-ordinate themes as follows: *practical hygiene*, *risky business*, and *hygiene on trial.* We have shown super-ordinate themes and associated subthemes and listed the represented participants using pseudonyms in Table 1. Below, we present the themes, supporting, and when available, contradictory excerpts, and our interpretation of the findings.

Themes

Practical hygiene. This theme includes examples in which participants described how to attain hygiene. For participants, personal attainment was achieved either primarily through soap and water or primarily through sanitizer or, in some instances, using a combination of soap followed by sanitizer. Nurses who preferred soap tended to self-associate this with mature age. We clustered those findings in a subtheme titled *soap is for old people*. According to Jordan,

> There's no replacement for soap and water. And a good 20-second scrub … in every patient room, we have hand sanitizer and soap … I think the older nurses will do soap and water. They don't do the hand—the gel-in, gel-out unless there's a trigger or we have a family that's very aware of the nurses coming in.

Kim also described age-related soap preference:

> And I'm old-fashioned; I don't know why, but I do a lot more of the actual soap and water. I don't know why; I guess it's just because of my age … I don't know, sometimes I just feel like my hands are washed better with the soap and water.

We identified a companion subtheme that reflected the increasing prevalence of alcohol-based sanitizers in acute care settings: *the rise of sanitizer*. Angela described her view of the role of sanitizer in hygiene: "The first thing that comes to mind [with hand hygiene]—hand sanitizer really comes to mind." This subtheme included those who felt that sanitizer was necessary to accomplish hygiene, such as Caren:

> I foam just because I think it gives extra protection, because I don't think soap and water, unless you're scrubbing for the good 15 to 30 seconds, which I try to, but I still think there are areas that are missed, so I will use the alcohol-based on top of washing.

Nicole characterized herself as a sanitizer user although she described sanitizer as an occasional source of discomfort:

> I was always taught wash your hands, wash your hands, but now it includes gel … I probably would say my sanitizer [use] is probably higher than soap and water, but sometimes that dries my hands, so I prefer soap and water.

Other nurses described discomfort with alcohol-based sanitizer rubs in tactile terms. We titled this subtheme: *alien*

substances. Barbra was succinct: "Honestly, I don't like the way it feels." Dana provided more detail:

> Okay, the gel, after a while, after you've used it four or five times, you have this icky film on your hands, and you just, for myself I should say, I just want to wash it off. I feel like it's just gummy and gross, so after I've used it several times, I find myself washing with soap and water just to get that film off.

Whether preferring soap, sanitizer, or a combination, individuals' hygiene experience was often described using tactile terms such as scrubbing, rubbing, washing, feeling, and touching; this suggests that hygiene involves a physical feeling as much or more than it does confidence in the efficacy of a product or process. Participants reported finding sanitizer undesirable because it remains on the skin, which again refers the tactile dimension of hygiene but also suggests that mental awareness of product use might be meaningful. Participants used an alternative set of descriptive words for this tactile sensation including build-up, layered, film, gross, and gummy.

Risky business. Despite the frequency of opportunities to engage in hand hygiene (according to Kim, "Almost every conceivable place that you would go, there is a hand sanitizer available"), the nurses described their work environment as generally dangerous; we included these findings in the super-ordinate theme *risky business*. Caren observed, "I work in a hospital that's a very germy, nasty area."

Some participants also characterized the use of sanitizers as one of the hazards of hospital work. Angela wondered,

> How effective are the sanitizers and is there any long-term adverse effect using it that much, to the provider who's using that that often? I've just wondered and I've heard other coworkers say "I wonder what this does to us long term?" Are they going to see that it's causing harm to healthcare workers?

Dana expressed similar concerns:

> I do wonder what it's doing to me. It's antimicrobial agent that I'm rubbing onto my skin 100 times a night. I do wonder about that; how I'm absorbing it, and if there is going to be any long-term effect and that kind of thing just because I'm a little bit leery about that.

We also developed a subtheme titled *the contaminated environment*. Along with the awareness of dangers, described variously as bugs, germs, viruses, or organisms, nurses expressed concern about bringing contaminants home. Barbra stated,

> Especially when I go home, I'll always come home, if I don't take a full shower, I'll wash my face and hands and the uniform, just to [get rid of], whatever germs are outside the facility to bring home.

Barbra's urge to wash her skin and uniform to rid herself of germs she might unknowingly carry home demonstrates that in her view, use of protective measures might not be associated with hygiene. In fact, the use of protective substances or clothing provides not just a barrier but also a place where undesirable elements, visible or not, can remain. Achieving hygiene in this instance might require removal of protective agents in order to purge oneself of the contaminants that are trapped there.

In the initial theme, participants described dislike of alcohol-based sanitizers in tactile and physical terms, while in the second theme, participants asserted they mistrusted alcohol-based rubs due to perceived potential harm from cumulative chemical exposure that was not described as something that could be felt or sensed. What unites these two different negative responses is that both are based on the belief that alcohol-based rubs have an additive impact, whether in the short term, when it results in a build-up that is described as a physical sensation, or in the long term, when frequent use is imagined as being associated with a (non-specific) health threat. Although the alcohol base evaporates quickly after application, participants in both instances appear to be describing a belief that some essence of the substance does not go away.

Hygiene on trial. Throughout the interviews, nurses described their interpretation of the rules in place along with their personal experiences of hand hygiene. The super-ordinate theme, hygiene on trial, and its multiple subthemes were evocative of a narrative device that has been used from ancient times[24] to the present: the courtroom drama.

Questions and allegations about poor hand hygiene made by patients or hospital administration were compiled in the subtheme *accused*. Nurses had differing responses when patients questioned whether or not they had engaged in hand hygiene. When asked how this made her feel, Barbra replied, "Honestly? A little annoyed, like are you kidding me?" On further reflection, however, she added, "I guess if it was me in her chair, it would be the same." Caren was supportive of patients who questioned hand hygiene:

> I was actually kind of glad, because they're paying attention to it; because this is your body, they have every right to ask about that. So I wasn't offended by it at all; actually I was kind of proud of them.

Caren acknowledged that not all of her coworkers felt the same way: "Some people are open to it and some people aren't. Some people just get mad and nasty." Caren herself had a different type of response to an accusation from hospital administration. In this particular instance, administration requested cultures to identify which nurse might be the source of bacteria:

> They put rectal swabs in the bathroom and wanted us all to do rectal swabs so they could figure out where this Serratia was coming from. And there was only one staff member that did it because we're like, they're on a witch hunt.

Dana and Angela had similar responses to specific or general accusations from hospital administration. Dana observed, "Personally, I sometimes feel like they come down on the nursing staff. It's the first thing. Oh, what did you guys not do?" Angela commented, "I feel scrutinized, which feels a little bit demeaning."

All but one nurse described one or more instances of personally failing to engage in hand hygiene or of witnessing others failing to engage in hand hygiene. These comprised the subtheme *confession*. Some of these resulted from a judgment-based decision, as Angela described, "And there are times when I have not touched, and I did not hand hygiene coming out because I did not touch a thing … and I stand by it. I haven't caused harm."

Jordan confessed without offering any excuse: "I would say that over the 24 years there's probably been a few times when I haven't followed that protocol." Francis suggested non-specific but common circumstances: "There's always times when someone has to leave a room real quick and they know they're coming right back and maybe they don't do it when they should." Nicole described how it is possible to briefly forget and then catch oneself: "I know last week I forgot to and then I went back and just squirted my hands real quick." Dana described a similar instance:

> I think that there is periodically a time where I'll walk up to a bed and start doing things … and think, oh gee, I didn't do the soap or I didn't do the gel and stop and do that. Just where you catch yourself … and you know, I would absolutely be lying if I didn't admit that there were times when that happened.

Many nurses expressed that 100% compliance to hand hygiene was not realistic, largely due to emergent situations, with low staff and high workloads offered as secondary explanations. These excerpts comprised the subtheme *extenuating circumstances*. Caren specifically recalled not pausing to sanitize during a neonatal intensive care unit (NICU) emergency, "or else the baby was going to be extubated." According to Nicole, who also worked in NICU, "I know there are some times when I didn't have a chance to [sanitize], but it's life or death, or you touch the baby." Nicole added, "If it's a code … whatever I'm doing is more important, and I don't feel guilty at that point." Francis observed,

> There's definitely emergency situations, I'd say that come up almost every day … sometimes you just get in there to start helping and you may not have time to get your hands sanitized or if you go in to help with whatever the situation is, if it's an emergent need … definitely you can bypass the hand sanitizer when it's an emergency.

Still, Francis described the need to strive for optimal compliance, other than when: "There may be more risk to wasting time than to actually getting in there and helping and doing something. Other than that, in normal situations, I think the goal should definitely be 100%."

Dana offered,

> Our staffing ratio is very high. We have some very, very heavy assignments, and we've had some instances where we're fairly short staffed … part of the issue is that we're spread too thin on the average day.

According to Kim, "We're humans and sometimes when you're working in a fast-paced environment and you're multitasking and you're trying to get patients done and you're interrupted a million times, it would not be hard to forget."

Nurses interviewed for this project were aware of the infection prevention goals underlying hand hygiene policies and generally expressed that failure to engage in hand hygiene was a concern. The degree of concern participants expressed sometimes depended on the potential to link a negative outcome to failure to engage in hand hygiene. We titled the subtheme containing these excerpts as *beyond a reasonable doubt*.

Caren felt that hand hygiene could be classified as a medical error, given a negative outcome, and "if it's the direct cause … and they can prove a causality to it." Dana expressed a similar thought: "If somebody specifically did not use good hand hygiene and some patient had a negative sequelae because of that, I think that's inexcusable, if that could be traced to the exact cause." Kim described potential for concern over serious consequences: "If you actually had a patient death that was related to poor hand hygiene, then, yeah, that's something you have to look at." Francis expressed more skepticism about obtaining actual proof:

> I feel like it might be difficult to identify the particular instance where this patent got this bacteria [sic] from, this one missed opportunity. I think it would be hard to correctly correlate when it happens, or who or how. It could be multiple people; it could be one—or maybe they somehow still got the infection even though people did have good hand hygiene.

Other than in exceptional instances, participants stated that it was generally wrong to violate the rules of hygiene because violations created or contributed to risk of infection. At the same time, participants questioned whether evidence showing a link between negative consequences and failure to engage in hand hygiene could even be produced. In Caren's quote shown above, she considers hand hygiene a medical error only if it can be shown to be the primary cause of negative consequences. This assertion that only tangible proof is acceptable evidence is particularly interesting given the invisible nature of viruses and bacteria, and that participants described protective practices motivated by perceived but not proven risk of contamination or harm.

Discussion

Despite our stated research purpose to focus on individual experience of hygiene, participants' perceptions of other

influences were prevalent enough to influence the development of our themes. In this order, our presented themes refer to the practice and perception of hygiene by individuals (*practical hygiene*), perceptions of the working environment (*risky business*), and how participants viewed management and monitoring of nurses' hand hygiene practices (*hygiene on trial*). We suggest based on this analysis that, among these participants, the experience or attainment of hygiene and the rules of hygiene intersect but are not the same. For participants, feeling clean tended to result from rinsing, purging, or removing clothing. Application of alcohol-based sanitizer, a method for attaining acceptable hygiene advocated not only by healthcare facilities but also by WHO, was viewed by participants as coating rather than cleaning. Additionally, the use of alcohol-based sanitizers was described as a potential source of physical discomfort, due to build-up or irritation, and as a potential source of unspecified future harm resulting from ongoing and continual use.

Participants described the formal rules of hygiene as sometimes as open to interpretation and always open to exception. An example of the former is when a nurse decides that he or she did not touch anything, and, as a result, can disregard a sanitize-in-and-out policy. Based on our immersion in these data, we believe that our participants were universally conscientious, caring, and skilled workers. Despite this, we offer that emergencies, such as hygiene itself, might be subjectively defined and highly context-dependent and so present at minimum potential for inconsistent hygiene practice. Although participants stated that it was generally wrong to violate the rules of hygiene, because violations created or contributed to risk of infection, the link between negative consequences and failure to engage in hand hygiene was not seen as provable. Some nurses' desire for autonomy in clinical decision-making, as reported in prior IPA healthcare research[20] combined with our finding of perceptions that perceived consequences, if any, are remote, might also impact compliance. These factors potentially result in subjective decision-making processes that eventually become guides for daily practices; in other words, the lack of belief that a direct or proximal link between hand hygiene and negative outcomes could be proven facilitates suboptimal compliance. Thus, Bandura[25] described, "most anticipated outcomes are too far off … to shepherd specific actions in immediate situations that present many uncertainties and complexities" (p. 336).

Authors of the systematic reviews described at the beginning of this article recommended improvements in quality and reporting,[5,7] changes in emphasis,[6] and in particular more use of feedback,[4,8,9] goal setting, accountability, and rewards[7] in intervention research. Authors of qualitative studies made similar recommendations regarding provision of education, feedback, and communication,[11–14] along with suggestions for analysis of workflow and workload management.[11] However, these recommendations speak generally to enforcement and communication of the formal rules rather than individual perceptions of hygiene. Our findings suggest that facility protocols are the only one factor that influences hygiene practice. Some authors[26,27] have reported that nurses' subjective assessments of tasks as cleaner or dirtier also influence behavior; we suggest based on our findings that individual behavior is additionally influenced by the tactile sensation of hygiene. For some, this tactile definition of hygiene is confounded by a conflict between the desire to clean through removal by scrubbing and rinsing, and the encouragement and convenience in using alcohol-based sanitizer. A similar concern was reported in research among home-based healthcare workers. One participant in homecare research described the use of sanitizer as follows: "I don't necessarily get that clean feeling. I feel like I've put something onto my hands, but not that I've taken anything off" (p. 435).[28]

Because the use of alcohol-based sanitizers has become a standard component of hospital hand hygiene, especially in developed countries, it is important for researchers and infection control specialists to be aware that even sanitizer users who appreciate the protective nature of these products might not consider application of sanitizer as analogous to hygiene, especially after repeated applications. Therefore, interventions that feature education on use or efficacy of sanitizer might not have the desired impact. It has been reported that nurses use gloves primarily for self-protection,[26] which might contribute to the observed practice of changing gloves less often than is ideal for optimal patient care.[29] If sanitizers are also valued more for self-protection than for prevention of cross infection, and if use is associated with an enduring tactile awareness, it is likewise possible that reapplication occurs less often than is ideal for optimal patient care. One alternative is to encourage nurses to periodically use a soap and water scrub after repeated applications of sanitizer, prior to beginning a new cycle of sanitizer application. Although this can be seen as a time-consuming practice, it potentially addresses both actual and perceived hygiene needs.

Beyond this recommendation, we acknowledge the difficulty in intervening to impact how individuals perceive the tactile dimension of hygiene, so focus the remainder of our recommendations on the segment of our findings in which we explored how nurses perceive that they are presumed "guilty" of violation of hand hygiene policies. First, providing staff nurses with more frequent opportunities to participate in development, implementation, and evaluation of hand hygiene improvement interventions might encourage a greater sense of ownership of, and control over, the process, which could address both identified autonomy concerns[20] and result in development of hygiene capital.[16] Acquisition of hygiene capital might particularly enhance the professional identity of nurses given current concerns with infection control in healthcare settings.[16] In research exploring hygiene capital, nurses described physicians as "curiously liminal beings, inhabiting a realm between the clean and the

filthy, performing medical work yet being agents of disease transmission by breaching boundaries and allegedly flouting rules" (p. 1054).[16] Ideally, a strengthening of the role of nurses as the guardians of hygiene, that is communicated from administration through the healthcare ranks, would strengthen nurses' influence over other medical practitioners, including doctors. We admit that the extent to which this realistically might occur in individual healthcare settings is likely highly context-dependent.

Second, provision of vivid descriptions of harm resulting from HCAI, as recommended in prior research,[17] might serve to make what we identified as perceived distal consequences seem both more possible and more proximal. According to Bandura,[25] when consequences are distal, "people have to create for themselves proximal guides and self-motivators" (p. 336). The use of vivid descriptions might serve as such a self-motivator. The merit of perceived proximal consequences is supported from the experience of Kim, one of the participants in this research. Kim described a close family member's experience with HCAI and expressed particular awareness of the actual and potential costs, both from a financial and quality-of-life standpoint. When asked to define hand hygiene, Kim characterized it as "probably the most important and most effective method of infection prevention in the hospital [and] one of the top priorities … as a nurse when I'm providing care for patients." Case studies, especially those that reflect true and dramatic circumstances, might provide far more engaging and memorable sources of training than statistics or incidence rates, even when the cases are not as personally relevant as in Kim's experience. The efficacy of vivid and detailed descriptions is suggested by inclusion of several explicit case studies in WHO documents,[1] including one reported from the viewpoint of both a child who experienced HCAI and ensuing, lasting injury, and her mother, who described ongoing stress experiences as a result of the incident. Vivid language used by the participants in this research to describe the sensory experience of hand hygiene suggests that training materials that stimulate the sense and emotions might be engaging and appealing; Kim's described experience suggests that if these materials trigger empathetic responses, the impact might be enduring.

Limitations of this research study include that our findings represent experiences described by a small group of nurses. However, our goal was not to generalize to the broader population of nurses but instead to begin to understand and interpret how acute care nurses perceive and describe their hygiene experiences. Additionally, unlike much prior qualitative healthcare hygiene research, our participants were not united by a single hospital or healthcare system culture and instead represented eight different facilities, which we believe is one of the strengths of this study. Interpretative findings are frequently subjected to questions of bias although we believe our systematic and documented process contributes to the quality control standards of credibility and transparency. The data based on self-report are given in interview research; we offer that sometimes unflattering information provided by participants argues for the veracity of the information provided.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Ethical approval for this study was obtained from Kent State University Institutional Review Board, Kent, OH, USA (approval no. 14-345).

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: GOJO Industries Inc. provided financial support for this research, including provision of participant incentives and payment for professional transcription services, but was not involved in research design, data analysis, drafting of the research report, or publication decisions.

Informed consent

Participants were provided with written informed consent and signatures were obtained, prior to the interview. Verbal consent was also obtained at the beginning of the interview.

References

1. World Health Organization (WHO). *Report on the burden of endemic health care-associated infection worldwide*. Geneva: World Health Organization, 2011, http://apps.who.int/iris/bitstream/10665/80135/1/9789241501507_eng.pdf (accessed 15 May 2016).
2. Pittet D, Allegranzi B, Sax H, et al. Evidence-based model for hand transmission during patient care and the role of improved practices. *Lancet Infect Dis* 2006; 6(10): 641–652.
3. Allegranzi B and Pittet D. Role of hand hygiene in healthcare-associated infection prevention. *J Hosp Infect* 2009; 73: 305–315.
4. Cherry G, Brown JM, Bethell GS, et al. Features of educational interventions that lead to compliance with hand hygiene in healthcare professionals within a hospital care setting: a BEME systematic review. *Med Teach* 2012; 34: e406–e420.
5. Gould DJ, Moralejo D, Drey N, et al. Interventions to improve hand hygiene compliance in patient care. *Cochrane Database Syst Rev* 2010; 9: CD005186.
6. Huis A, van Achterberg T, de Bruin M, et al. A systematic review of hand hygiene improvement strategies: a behavioral approach. *Implement Sci* 2012; 7: 92.
7. Luangasanatip N, Hongsuwan M, Limmathurotsakul D, et al. Comparative efficacy of interventions to promote hand hygiene in hospital: systematic review and network meta-analysis. *BMJ* 2015; 351: h3728.
8. Ofek Shlomai N, Raio S and Patole S. Efficacy of interventions to improve hand hygiene compliance in neonatal units: a systematic review and meta-analysis. *Eur J Clin Microbiol Infect Dis* 2015; 34: 887–897.

9. Schweizer ML, Reisinger HS, Ohi M, et al. Searching for an optimal hand hygiene bundle: a meta-analysis. *Clin Infect Dis* 2014; 58: 248–259.
10. Erasmus V, Daha TJ, Brug H, et al. Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Control Hosp Epidemiol* 2010; 31(3): 283–294.
11. Jang JH, Wu S, Kirzner D, et al. Focus group study of hand hygiene practice among healthcare workers in a teaching hospital in Toronto, Canada. *Infect Control Hosp Epidemiol* 2010; 31(2): 144–150.
12. Joshi SC, Diwan V, Tamhankar AJ, et al. Qualitative study on perceptions of hand hygiene among hospital staff in a rural teaching hospital in India. *J Hosp Infect* 2012; 80: 340–344.
13. McLaws ML, Farahangiz S, Palenik CJ, et al. Iranian healthcare workers' perspective on hand hygiene: a qualitative study. *J Infect Public Health* 2014; 8(1): 72–79.
14. Siebert DJ, Speroni KB, Oh KM, et al. Preventing transmission of MRSA: a qualitative study of health care workers' attitudes and suggestions. *Am J Infect Control* 2014; 42: 405–411.
15. Sandelowski M and Barroso J. Classifying the findings in qualitative studies. *Qual Health Res* 2003; 13(7): 905–923.
16. Brown B, Crawford P, Nerlich B, et al. The habitus of hygiene: discourses of cleanliness and infection control in nursing work. *Soc Sci Med* 2008; 67: 1047–1055.
17. Nicol PW, Watkins RE, Donovan RJ, et al. The power of vivid experience in hand hygiene compliance. *J Hosp Infect* 2009; 72(1): 36–42.
18. Smith JA, Flowers P and Larkin M. *Interpretative phenomenological analysis: theory, method and research*. London: SAGE, 2009.
19. World Health Organization (WHO). Your 5 moments for hand hygiene, http://who.int/gpsc/tools/5momentsHandHygiene_A3.pdf?ua=1 (accessed 15 May 2016).
20. Michie S, Hendy J, Smith J, et al. Evidence into practice: a theory based study of achieving national health targets in primary care. *J Eval Clin Pract* 2004; 10(3): 447–456.
21. Stewart L and Rae AM. Critical care nurses' understanding of the NHS knowledge and skills framework. An interpretative phenomenological analysis. *Nurs Crit Care* 2012; 18(1): 23–31.
22. Patton MQ. *Qualitative research and evaluation methods*. 4th ed. Thousand Oaks, CA: SAGE, 2015.
23. Smith JA. Evaluating the contribution of interpretative phenomenological analysis. *Health Psychol Rev* 2011; 5(1): 9–27.
24. Sonmez E. The jury knows how this one ends: popular narrative influence on jury trial bias. *J Law Interdiscip Stud* 2011; 1(1): 62–71.
25. Bandura A. *Social foundations of thought and action: a social cognitive theory*. Upper Saddle Ridge, NJ: Prentice Hall, 1986.
26. Barrett R and Randle J. Hand hygiene practices: nursing students' perceptions. *J Clin Nurs* 2008; 17: 1851–1857.
27. Marjadi B and McLaws ML. Hand hygiene in rural Indonesian healthcare workers: barriers beyond sinks, hand rubs and in-service training. *J Hosp Infect* 2010; 76: 256–260.
28. Pink S, Morgan J and Dainty A. The safe hand: gels, water, gloves and the materiality of tactile knowing. *J Mat Cult* 2014; 19(4): 425–442.
29. Fuller C, Savage J, Besser S, et al. The dirty hand in the latex glove": a study of hand hygiene compliance when gloves are worn. *Infect Control Hosp Epidemiol* 2011; 2(12): 1194–1199.

Appendix 1

Interview guide

Can you tell me what comes to mind when you think of hand hygiene?

Can you describe for me a recent time when you engaged in hand hygiene (probe: How do you feel when you engage in hand hygiene?)

Can you describe your hygiene practices outside of work?

How do you think others (coworkers, patients, and family members) view your hand hygiene?

Can you describe for me your facility's hand hygiene protocol?

How does your coworkers' hand hygiene behavior compare to yours?

Please describe for me a positive consequence that results from your own hand hygiene.

Can you describe for me any time when you failed to engage in hand hygiene but thought you should have?

What circumstances might change your hand hygiene behavior in the future?

Please describe the last healthcare-associated infection that you are aware of that occurred on your unit (probe: Can you describe what was responsible for the HCAI?)

Do you think failure to use hand hygiene should be classified as a medical error? Why or why not?