

Student and infection prevention and control nurses' hand hygiene decision making in simulated clinical scenarios: a qualitative research study of hand washing, gel and glove use choices

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Abstract

Final year nursing students and infection prevention and control nurses were recorded verbalising their hand hygiene decision-making while working through clinical scenarios on a computer, to understand what factors they were taking into account in choosing a decontamination method (hand washing or alcohol based hand rub/gel) or to wear gloves. Results demonstrated an overuse of gloves, and underuse of gel. Three main themes emerged: 'Experience or expectation'; this was what they had seen on placement, or it was what 'we' do. 'Just in case,' was characterised by an awareness that what they would do wasn't actually necessary but they tended to do it anyway. Thirdly, 'gel doesn't feel clean,' was characterised by a feeling that using gel didn't make the nurses feel clean after 'dirty' tasks, even though gel is actually more effective. There was little evidence that participants were making risk assessments based on the individual patient characteristics given, or the tasks, as they had been taught to do. Choice of hand decontamination agent and whether to use gloves appeared to be based on an habitual characterisation of whether the task was 'clean' or 'dirty,' with a very low threshold for 'dirty' based on an excessive perception of risk to the student.

Introduction

Good hand hygiene practice (hand decontamination and glove use) has been highlighted as the single most important measure for the prevention of cross-infection (Gould et al, 2007; Pratt et al, 2007). However, despite continued efforts, healthcare professionals' compliance with hand hygiene guidance remains sub-optimal (WHO, 2009; Dyson et al, 2011). Although the number of published studies

concerning hand hygiene has increased considerably in recent years, many questions about improved adherence to recommended policies remain unanswered (CDC, 2002; Gould et al, 2010). Many cognitive, attitudinal and social/organisational factors have been identified as influencing the decision to decontaminate hands or wear gloves but the relative contribution of each is unknown (Michie et al, 2005; Dyson et al, 2011).

It has been asserted that the decision to decontaminate hands occurs in two major stages; first, the decision-making process is used to assess risk to self and others (which may or may not be accurate). Secondly, the decision as to if, when, where and how to decontaminate hands occurs, at which point the additional factors known to influence action are operational (Myers et al, 2001). Specific factors identified to be influential include knowledge, workload, type, tolerance and accessibility of hand hygiene agents, awareness of personal and group performance (Pittet, 2004), gender, professional activity and perceived social pressure (Kretzer and Larson, 1998).

One reason for the lack of compliance with hand decontamination is proposed to be the complexity of the decision-making process required (Whitby et al, 2007). Similarly, following a questionnaire study of cognitive factors predicting glove use it was reported that perceptions of risk and decision making need to be explored if compliance is to improve (Watson and Myers, 2001).

Current guidelines state that an alcohol-based hand rub/gel (ABHR) should be used for hand hygiene unless hands are visibly soiled, or in the presence of patients with diarrhoea that may be due to *Clostridium difficile* or Norovirus (WHO 2009; HPS, 2013). Hand hygiene should be performed according to the World Health Organization's '5 moments for Hand Hygiene': before touching a patient; before clean/aseptic procedures; after body fluid exposure risk; after touching a patient; after touching a patient's immediate surroundings (Sax et al, 2007).

Gloves are required to be worn when exposure to blood and/or other body fluids is anticipated or likely (HPS, 2013), and when transmission-based precautions are in operation (HPS, 2009). Research suggests that gloves are overused and misused (Girou et al, 2004).

These guidelines need to be taught to student nurses in their first semester, before their first clinical placement at a time when they may have no healthcare experience. Their ability to apply these guidelines to practice has not been determined.

Limitations of current research methods

Using survey, interview, and observational methods in hand hygiene research can result in biased outcomes (Pittet, 2004). Hand hygiene research has found that intention to wash hands did not predict observed handwashing behaviour, and that the relationship between intention and self-reported estimates of compliance is weak (Whitby et al, 2007). In addition, retrospective self-reports are recognised to be affected by mood, the time elapsed since the event, the format in which the responses are given, and other processes known to affect autobiographical memory (Johnston et al, 2006). Moreover, Jenner et al (2006) found that self-reports of behaviour were unrelated to observed practice. A recent observation study by the author of this paper in a teaching hospital observed significant problems with compliance, as defined by deviation from actions required by local policy and as judged by the infection control nurse observer (Lee et al, 2008) but it was not possible to ask staff why this was. To address these problems, it was decided to use a computer simulation.

Aim of the study

The aim of this study was to record participants verbalising their hand hygiene decision-making while working through clinical scenarios on a computer, to understand what factors they were taking into account in choosing a hand decontamination method and/or to wear gloves.

Research question

How do student nurses and infection prevention and control nurses (IPCNs) make hand hygiene decisions (hand decontamination and glove use) in a clinical scenario?

Study design

The design of the study was to produce virtual clinical scenarios in which the complex variables facing staff in the clinical setting could be presented. Participants – students and IPCNs – were asked to verbalise their hand hygiene decisions in the presence of the researcher. It is intended that the scenarios will be developed into a self-directed learning package with feedback tailored to the students' decisions. IPCNs were chosen to enable comparison of student decision making with that of an expert, to inform the feedback. The choices made by participants in each task were quantified, and explanation was sought by a qualitative interpretive analysis of the accompanying transcript.

Ethical considerations

University Research Ethics Committee approval (UREC) was obtained for the study, along with School of Nursing and Midwifery approval for research on students. For the IPCNs, the local NHS Medical Research Ethics Committee was contacted and gave approval. Participants were given an information sheet approved by UREC, and signed informed consent was obtained. Participants were assured of confidentiality and anonymity by being interviewed individually and assigned a study number.

Sample

A volunteer sample of participants was obtained. Third year pre-registration nursing students in their final theory block before qualification were targeted. These students had received both a lecture and a three-

hour clinical skills session on 'Standard Infection Control Precautions' in Year 1, including hand decontamination and personal protective equipment (PPE) use, according to the National Infection Prevention and Control Manual (HPS, 2013). In addition, all had completed the online 'Cleanliness Champion Programme' (NHS Education Scotland, 2002). All third year students on a campus different from the author were given details of the study by their personal tutor. Those interested in taking part were given a participant information sheet and asked to contact the author by email. Available interview slots were then emailed to those students and appointments made. Twenty three students volunteered, which represents approximately one in four students. Data collection was ceased after the fourth day of interviews – 11 students – as no new themes were emerging. Five students were aged under 25, three were aged 26–35 years and three were aged 36–45 years. Following the student interviews, two IPCNs from the neighbouring acute hospital were recruited by email. Both had post-graduate level infection prevention and control qualifications.

Data collection

An online representation of a patient bay was developed using the principles of psychological fidelity and authenticity (Ker and Bradley, 2010), to present scenario-based tasks or problems, within an appropriate context, using the framework of Hung and Chen (2003). Participants were presented with the simulated bay of three patients on a laptop computer (Figure 1) and were required to undertake 10 tasks that were broken down into component steps (Figure 2). The scenarios were purposefully constructed to allow manipulation of variables to represent different policy criteria, and those variables shown to be influential by the literature. Participants were asked to talk through their decision making relating to hand decontamination and PPE choice in the presence of the researcher and recorded on a digital audio recorder. At the end, verbal feedback was given detailing the appropriate hand hygiene strategies suggested by local infection prevention and control guidelines.

Findings and discussion

Data analysis

The approach used was thematic analysis. Recordings were transcribed verbatim. A constant comparative analysis was then used (Barbour, 2008). Data was colour coded into categories and interrogated to identify similarities, differences and patterns. Three overarching themes were identified, as follows: 'experience or expectation,' 'just in case,' and 'gel doesn't feel clean.' Each was used by the majority of students. The organisation of statements into themes was checked by an independent researcher, and all student statements relating to hand decontamination and/or glove use are presented in Boxes 1–5 for reliability. Student identification numbers are given in parentheses and author's contributions in italics. Themes were then related back to theory, as shown below. A summary of the choices made by students is shown in Table 1. There was a marked overuse of gloves and underuse of gel (ABHR).

Theme 1: Past student experience, or expectation of ward staff. This theme was around the importance of what happened in practice (Box 1).

Students gave the explanation that this was what they had seen or been taught on placement, or what 'we' do. It appeared to have become routine practice or a 'habit' rather than being a conscious decision based on a risk assessment. In one case this seemed to have occurred in the very first placement. Wards where there had been a lot of wounds or 'infected' patients appear to have been influential. One student suggested they would be 'in trouble' if they didn't conform.

These observations are backed up by the nurse education literature. That clinical staff act as role models and their practices become ward norms has been long established (Melia, 1984). More recently, in the



Figure 1. Screenshot of simulated bay (using "Articulate Presenter 09")

similar area of moving and handling. Kane and Parahoo (1994) found compliance was not generally due to lack of knowledge but rather to a multiplicity of clinically based influences, the primary influence being that of ward staff. Snow et al (2006) observed 60 students on placement and found mentor's practice of hand hygiene was the strongest predictor of student's hand hygiene rate. More recently, Barrett and Randle (2008) found that nursing students perceived ward staff as being the influencing factor for hand hygiene compliance because of a need to 'fit in.'

Theme 2: just in case. This theme involved a realisation that it wasn't necessary to use PPE, but they tended to anyway (Box 2).

Theme 2 also did not appear to be due to lack of knowledge, as evidenced by the frequent laughter that accompanied the responses. It was characterised by an awareness that it wasn't actually necessary but they tended to anyway! Again this didn't appear to be based on an individual risk assessment, but rather on personal preference. Experience was again important but more in terms of an adverse event

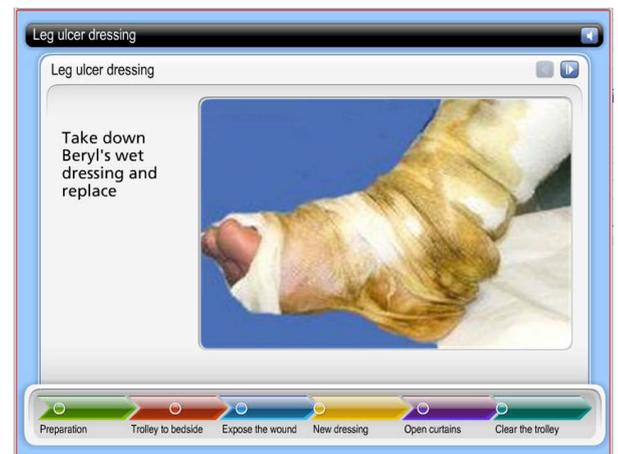


Figure 2. One of the 10 tasks

Table 1. Number of students choosing each option for the 10 tasks

BEFORE	Empty and clean commode	Empty catheter bag	Strip soiled bed	Strip non-soiled bed	Assisted hands + face wash	Help up to sit	Remove dirty dressing	Before sterile dressing	After sterile dressing	Mouthcare using sponges
Apron+gloves	11	11	11	7	8	1	11	11		7
Apron	0	0	0	0	2	2	0	0		0
Gloves	0	0	0	3	0	0	0	0		1
None	0	0	0	1	1	8	0	0		3
AFTER										
Soap and water	9	11	10	5	10	4	9	5	10	9
Gel (alcohol-based handrub)	1	0	1	4	1	6	2	4	0	0
Soap or gel	0	0	0	1	0	1	2	2	1	2
None	1	0	0	1	0	0	0	0	0	0

Box 1. Theme 1: Past student experience, or expectation of ward staff

'I know there's a lot of talk about whether you should wear gloves when cleaning someone's face, but my first placement you just had gloves on for everything so it's, it's in me.' (4)

'Probably hand gel before I went into the patients' bay, if it was on the end o' the beds. Even though you've just washed your hands. Yeah, I've just got into the habit ... I do it a'the time.' [laughs] (2)

'Not in any of the areas that I've been in because we've not, cause even for like catheterisation and things we've not used 'Hibiscrub', it's been basically ordinary soap and water.' (5)

'I would wear apron and gloves, I've just always been taught that way, to wear apron and gloves while making a bed. I think it's just been routine where I've been ... everybody ... wearing gloves while putting clean linen on a bed, yeah. I think you'd get in trouble if you're not.' [laughs] (1)

'There has been a lot of infected patients and stuff so I'm sort of used to it, like I've been where there's a lot o' open wounds, I've been in orthopaedics twice and I think I've just got used to it. They tend to wear gloves a lot.' (1)

'It's just because I've been on a surgical ward so that's what we do.' (3)

'Definitely, I've just been on the ward and that's, you know ... you know I've, that's what you would do.' (10)

'I'd remove my PPE and possibly just gel after, 'cause there's probably about 6 all waiting to get up at the same time ... I'd get murdered if I was always at the sink. Gel is definitely a speed thing.' (4)

Box 2. Theme 2: Just in case

'Would you always wear gloves?' 'Em, I suppose you probably don't necessarily need to if you're just washing someone's hands and face if there's nothing there, but I think I generally do, when I'm washing a patient I do, just because you are doing things around their bedside and if they've got wounds and stuff ... I tend to. I know you maybe shouldn't but I think I do.' (7)

'You get less static off the sheets if you wear gloves. But if it's non-soiled there isn't really any need for you to wear gloves, but you, you can never tell when there's going to be wee bits of blood from a cannula or anything like that ... so I tend to wear gloves anyway 'cause I've been caught out.' (3)

'If you're apron and gloved-up you're prepared for anything, rather than going near someone and then thinking oh God and having to then ... [go out].' (4)

'I'd probably pop gloves on as well just in case.' 'In case?' 'In case maybe you know anything happens.' (2)

'Right, so even if they don't have an infection you still probably wear gloves routinely?' 'Yeah. Just in case they've soiled.' (1)

'Then if you're putting on slippers, it's, I've just got a, I've just, I kind of, I don't know, feet are funny because you can tell by the smell there's bound to be something nasty there so, I tend to like to have gloves and things like that on.' (4)

'OK, so you're just stripping a clean bed this time, so used sheets but they're not soiled.' 'OK gloves and apron, I'd use the full, just because it doesn't look dirty, it doesn't mean it's not.' (4)

'Right, clean bed, so these are used sheets but they're not soiled.' 'Ok, you don't know what's on them so basically it would be gloves on, apron on, to strip the bed.' (5)

'Eh hands and face wash, basically yeah, em personally I use gloves all the time, but I don't think there's actually a necessity to use gloves for washing, but I personally feel, I feel easier doing it.' (5)

'Yeah I do wear apron and gloves, I know some people don't when washing patients 'cause it can make them feel quite dirty and stuff, but I tend to.' (1)

that had happened to an individual student. Nichol et al (2009) suggest that this individual 'vivid' experience may be more important than formal education in explaining hand hygiene behaviour. There was a clear student aversion to direct contact with patients, which is of concern. The overuse of gloves because of this appears to share influencing factors with the underuse of gel, as discussed below.

Theme 3: Gel doesn't feel clean. Statements within this theme demonstrated a preference for soap and water rather than gel, even though gloves had been worn (Box 3).

This theme was characterised by a feeling that using gel didn't make the participants feel clean after 'dirty' tasks, even though, as one participant rightly stated, gel is actually more effective.

As shown by a systematic evaluation of 96 studies, the introduction of an ABHR is most often associated with increased compliance (Erasmus et al, 2010). However, in support of this study, a large survey by Forrester et al (2010) of over 5,000 healthcare workers across 36 facilities recently found that 89.5% preferred soap and water to alcohol hand gel despite it being quicker to use and less irritating to the skin. Although students are taught that

Box 3. Theme 3: Gel doesn't feel clean

'Would you use gel if it was available?' 'No I would use soap and water and give it a good like wash, 'cause that's got body fluids and things like that on it, so I prefer to give them a good wash than just alcohol gel.' (3)[wore gloves]

'The gel, if I don't have any sore bits I would use it yeah. I just prefer washing my hands, it's just personal preference.' (1)

'OK, would you wash your hands rather than use gel?' 'I'd wash them, because gel doesn't get rid o' the bacteria, the micro-organisms as good as soap does. Gel to me is just ... you're not completely taking off everything, it's just a quick cleanse between minor jobs.' (8)

'But soap and water definitely feels cleaner, I would never, after I'd been to clean a soiled patient, I would never use gel after, I want my hands clean, I want them to feel clean, whereas gel I feel covers but it doesn't clean. After going from patient to patient just doing normal tasks like doing their SEWS or things like that I would use gel, but for dirty things, even if I've worn gloves, I prefer to wash my hands.' (4)

'It's just something I've always done, I always just use the gel for ... more so for like in-between. If I've went to someone, picked up their clipboard in their bed space I would gel my hands ... but if I'm doing like a dirty task, because you don't know what's been on that, I would always wash my hands.' (9)

'Do you prefer that on the whole to gel?' 'No, eh, not particularly, but if I'd been touching somebody I like the soap and water, like washing. And taking off gloves, I'd rather have soap and water.' (6)

'I would wash with soap and water.' 'Would you wash rather than use gel?' 'I would wash my hands if I'd been doing something with body fluids.' (7)

'If it was something just wi' sheets or something that's not dirt, I don't know, I would just use the gel, or if I was touching a patient's surroundings I would just use the gel, or something like that, but um if it's something with body fluids or anything, I use, wash my hands. OK, even though you've had gloves on? Yeah, I do.' [laughs] (7)

'So you would give out the tablets for bed 1, once you were finished with that, that's the only time really that I would use hand gel as opposed to soap and water 'cause it's not always, well it would take you 6 times as long I think to do it if you were washing your hands in-between.' (5)

'But I don't, again I don't think you have to unless you're soiled, but I would, yeah ... I would wash.' (10)

gel is more effective and is the method of choice, in line with current Health Protection Scotland (2013) and NICE (2012a) guidelines, it may be that ward staff still think that gel is something that should only be used when access to water is unavailable. Resistance to the implementation of gel rather than a chlorhexidine hand wash has also been observed in intensive care units (Camargo et al, 2009).

The link between hand hygiene and dirty tasks, mediated by disgust, has become more apparent in recent studies. This builds on the work of Valerie Curtis (as reviewed in Curtis et al, 2011), who argues that disgust is an evolved psychological system for protecting us from infection through pathogen avoidant behaviour. They note that bodily wastes, bodily contents, sick, deformed, dead or unhygienic people and dirty environments are universal disgust cues. Using experiments and field tests, Porzig-Drummond et al (2009) propose that at least two factors contribute to hand hygiene behaviour mediated by disgust; visible dirt and ideational contamination. They further suggest that this emotional link – inherent hand hygiene – is more important than a cognitive link through education. Similarly, in a survey of 754 nurses, Whitby et al (2006) found that nurses judged the level of 'dirtiness' of a task, always felt compelled to wash hands after a task they considered dirty, and this always required water.

Information is lacking on how this relates to glove use. An observational study of more than 3,000 opportunities concluded that hand decontamination and glove use follow different behavioural patterns (Pan et al, 2007), although in a more recent study of 56 wards in 15 hospitals, it was proposed that glove use follows the same inherent pattern mediated by disgust (Fuller et al, 2011). These conclusions arose from the finding that hand decontamination decreased when gloves were worn, suggesting gloves were perceived as an adequate substitute for hand washing

in 'dirty' tasks. The present study differs in that students and IPCNs seemed compelled to use both gloves and subsequent hand washing rather than gel. Gloves should be an adjunct to hand decontamination. Their purpose is to reduce contamination of hands by transient organisms to reduce transmission in high risk situations, and to protect healthcare workers from blood-borne viruses (CDC, 2002). As a protection for staff, they should be used when direct contact with blood or body fluids is anticipated (HPS, 2013).

The overuse of PPE, in particular gloves, is supported by several large observational studies (Girou et al, 2004; Fuller et al, 2011). It was reported anecdotally by Hampton (2003), that some nurses appeared to be wearing gloves for all procedures, even those that do not require gloves for protection. More recently, in a focus group study of healthcare workers in an acute care tertiary hospital in Toronto, many participants admitted to prolonged glove use because it gave them a sense of protection (Ji-Hyun et al, 2010).

The results of this study suggest that gloves were worn to protect staff whenever there was the slightest possibility of exposure to blood/body fluids, based on previous experience, now resulting in routine behaviour. In some instances gloves were worn for contact with a patient's skin, and even for skin scales in bedding. This suggests a perception of risk to the student from any contact with any type of micro-organism. The need to wash hands rather than use gel after an aseptic technique, and the use of non-sterile gloves in addition to forceps also indicates an excessive level of precaution. There also did not appear to be an appreciation that hand washing was an adequate protection after inadvertent contact with body fluids.

Infection prevention and control nurses. Rather than research, the purpose of this phase of the study was to look at how an expert makes

Box 4. IPCNs: Just in case

'I personally would wear, definitely wear an apron, and I would wear gloves, just because you're assisting to wash, so that would be my choice.' *'Just for face and hands?'* 'Not for a hands wash but if I was a nurse and in theory from infection control you wouldn't need gloves to wash, to wash a patient but ... for anticipation of, is that the lady with the chest infection? [Yes] Well you could have phlegm [laughs], I'd just, yeah.' (1)

'Gloves and apron. There may be, although, you've still got your patient's skin scales and there may be, there may be the chance that there's a body fluid with it so I would recommend gloves and aprons for stripping.' (1)

'Strip a clean bed. The guidelines say you don't need any PPE on whatsoever however I'd probably would put an apron on because patients are unpredictable and you don't know what is on the bedframe so there is potential contamination from the bed frame and you don't know what's underneath those sheets.' *'You wouldn't wear gloves for the same reason?'* 'I probably would. But I know the guidelines say that you don't need to have gloves and apron on to strip a clean bed.' (2)

Box 5. IPCNs: Gel doesn't feel clean

'Gloves and apron.' *'Would you wash your hands before?'* 'Yes I would gel my hands first.'

'Gel rather than wash?' 'Yes, unless they're visibly dirty.' *'Because?'* 'Well, it doesn't matter before the task but it would be after the task I would use soap and water because you're exposed to body fluids.' (1)

'Take gloves and apron off and decontaminate my hands. Gel or soap would probably be fine but I would prefer to wash my hands.' *'Why would that be?'* 'Just because I've come into contact with bodily fluids. Research would say gel would be adequate but I think it's just the perception of having contact with bodily fluids. You feel cleaner actually physically washing your hands but gel would be alright.' (2)

'Soap and water would be sufficient and then a gel and then back in and sterile gloves this time and an apron and do the dressing.' *'And then when you've finished at the end?'* 'I would have taken off my gloves and apron in the bay area putting it into the waste bag.' *'Hand decontamination?'* 'Soap and water.' *'Because?'* 'Because you've got wounds.' *'Even though you've just done a clean dressing?'* 'Yes.' (1)

'Once I'd disposed of everything, removed gloves and apron I'd decontaminate hands and again gel or soap and water would probably suffice, but I know in reality that I would wash my hands although from a research perspective I know that the gel is probably more effective, but the physical washing feels cleaner.' (2)

decisions in comparison with a student, with the aim of informing feedback to students. It was anticipated that the IPCNs would model evidence-based decision making based on risk assessment. In practice, the responses given by the IPCNs were similar to the students' so are included here. Responses fell under the 'just in case' (Box 4) and 'gel doesn't feel clean' (Box 5) themes:

Summary and limitations

This research study was very successful in using computer-based tasks to provide insights behind student behaviour in choice of PPE and hand decontamination agents, in particular, the overuse of PPE and underuse of gel.

A limitation of a study of this type, particularly where advance notice is given, is that participants may give what they believe to be the correct answer i.e. that which the researcher taught them in class (social desirability bias). This did not appear to be a factor in this study, and no student had been taught infection prevention by the author. A further limitation is that practice in the computer simulation may differ from what is actually done in real life. Hand hygiene in practice is influenced by interpersonal and 'community' level factors (Whitby et al, 2007) in addition to the intrapersonal factors examined in this study, and it is not known how factors such as workload or peer pressure, for example, may impact on the students' decisions. The deconstructing of actions into tasks and steps may or not be realistic. However, in a grounded theory study of final year nursing students Pearcey (2007) found that tasks and routines were still what seemed to structure the work of nurses, with little evidence of holistic, patient-centred care. Finally, student

attitudes may change after qualification in either direction: Lymer et al (2003) proposed that with 'routinization' staff may develop the conception that things are really not so dangerous after all, although conversely negative patient judgements or stereotypes may increase. All these limitations are balanced by the strength of the students' responses, which appear to function as underlying beliefs.

Applying reflexivity, it is very likely that the fact the author began nursing before the use of gloves outside of aseptic procedures has had an impact on the interpretations given.

The age of students in the study represented the high proportion of mature students on that particular campus (>60% over 26 years of age), which may have affected the results, and it is necessary to repeat the study with students coming straight from school, and with larger numbers. However, although the numbers were small and not designed to be generalisable, they indicate serious problems in our students' perceptions and risk assessments that need to be addressed in our teaching, and raise concern for practice in the placement areas.

In summary, in answer to the research question, 'How do health-care workers make hand hygiene decisions (hand decontamination and glove use) in a clinical scenario?' there was little evidence that participants were making risk assessments based on the individual patient characteristics given or the tasks, which they had been taught to do. Choice of hand decontamination agent and whether to use gloves appeared to be based on an habitual characterisation of whether the task was 'clean' or 'dirty,' with a very low threshold for 'dirty' based on an excessive perception of risk to the healthcare

worker. Further research is necessary to explore how students develop these perceptions and how they can be addressed in our teaching.

Implications for wider practice

Hand hygiene is a key component of patient safety (WHO, 2009). The UK National Patient Safety Agency guidance 'Seven Steps to Patient Safety' focuses on enabling healthcare professionals to analyse their own healthcare environment in order for them to make evidence-based, informed decisions (NPSA, 2004). The lack of risk assessment in student nurses entering practice as trained staff is thus concerning. The lack of individualised care and unnecessary use of gloves when touching patients is also at odds with the current drive to improve compassion and dignity (NICE, 2012b).

Following a Health Technology Assessment, NHS Quality Improvement Scotland (2005) issued guidance on promotion of alcohol-based products for improving compliance with hand hygiene. As well as increased efficacy over soap and water, benefits to compliance included visibility, proximity to point of care, being less time consuming and less damaging to hands. The results of this study suggest that a perception of not feeling as clean as soap and water may be a barrier to promotion and would benefit from further research.

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Conflict of interest

None declared.

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