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'And you'll suddenly realise 'I've not washed my hands': medical students', junior doctors' and medical educators' narratives of hygiene behaviours

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ABSTRACT

Objective Compliance to hygiene behaviours has long been recognised as important in the prevention and control of healthcare associated infections, but medical doctors still display some of the lowest rates of compliance of all healthcare workers. We aim to understand compliance to hygiene behaviours by analysing medical students', junior doctors' and medical educators' narratives of these behaviours to identify their respective attitudes and beliefs around compliance and how these are learnt during training. Such an understanding can inform future interventions to improve compliance targeted to areas of greatest need.

Design A qualitative study, using narrative interviews (nine focus groups and one individual interview). Data were analysed thematically using inductive framework analysis.

Setting Teaching hospitals in the UK.

Participants Convenience sample of 25 participants: third-year medical students in their first clinical year (n=13), junior doctors (n=6) and medical educators (n=6).

Results We identified four main themes: (1) knowledge, (2) constraints, (3) role models/culture and (4) hygiene as an added extra. Knowledge varied across participant groups and appeared to influence behaviours; medical students relied on what they have been told by seniors, while medical educators relied on their own knowledge and experience. There was a strong belief that evidence for the effectiveness of good hygiene behaviours is lacking. Furthermore, medical educators' behaviour appears to strongly influence others. Finally, hygiene was predominately viewed as an added extra rather than an integral part of the process.

Conclusions Awareness of the evidence around good hygiene needs to be improved at all levels. Medical students and junior doctors should be encouraged to consider *why* they are asked to perform certain hygiene behaviours in order to improve ownership of those behaviours. Medical educators need to recognise their responsibilities as role models for their junior counterparts, thereby understanding their role in developing the culture of hygiene practices within their clinical domains.

Strengths and limitations of this study

- ► This is the first study we are aware of that compares medical students and doctors at different stages of training through qualitative interviews.
- ► Qualitative narrative interviewing allowed participants to share their stories so the data are grounded in behaviours as well as attitudes and beliefs.
- ► Opportunistic sampling could lead to population bias and reduced generalisability.
- ► Data collected from participants in two health boards in a single UK country.

INTRODUCTION

Issues of best practice in prevention and control of healthcare-associated infections (HCAIs) are a priority in healthcare.[1] It is estimated that HCAIs cost the UK National Health Service (NHS) in excess of £1 billion every year, posing a significant economic burden.[2] In terms of human cost, it is thought that over 5000 deaths occur as a direct consequence of HCAIs each year.[2] This is particularly significant as, in many circumstances, HCAIs have been shown to be preventable through good hygiene behaviours. An intervention leading to improvements in hygiene practices resulted in a decrease of 31% and 38% of *Clostridium difficile* and methicillin-resistant *Staphylococcus aureus* (MRSA) deaths, respectively.[3 4] Nevertheless, compliance with hygiene behaviours remains suboptimal, the prevalence of antimicrobial resistance is increasing and preventable deaths are still occurring.[5]

'Hygiene' is defined by WHO as 'conditions and practices that help to maintain health and prevent the spread of diseases'.[6] In healthcare, hygiene behaviours include (but are not limited to) hand-washing, use of personal protective equipment and safe sharps disposal. Compliance rates to hygiene behaviours are consistently reported as being poor for medical doctors.[7 8] A recent systematic review found that out of 96 studies, the mean compliance to hygiene behaviours

for all healthcare workers was just 40%. Looking at doctors specifically, their recorded compliance was just under one-third of the potential (32%), the lowest rate of all healthcare workers studied.[7] Compliance is a multidimensional process. Several theoretical models have been associated with the behaviour of compliance including the theory of planned behaviour, which has been recognised and evaluated as a model for exploring hygiene behaviours.[9–14] However, more complex models such as the mechanisms of compliance and a 12-domain framework to explain behavioural change also contribute to our understanding.[15 16] These models illustrate that compliance is multifactorial and that there are many influences towards whether or not a behaviour is performed.

The notion that doctors have a professional responsibility to comply to hygiene behaviours draws on the concept proposed by Mortell *et al*[17] concerning the 'theory–practice–ethics' gap. They suggest that the gap between theory and practice is influenced by an individuals' own 'ethics' as to whether they feel that the behaviour is appropriate to their role and whether they recognise a moral duty or obligation to practice such a behaviour. They observed that doctors portrayed an indifference to evidence-based practice for hygiene behaviours.

Evidence for the effectiveness of hygiene behaviours is arguably not as robust as other evidence-based practices, in part due to measurement difficulties. Nevertheless, over recent years, there have been multiple strategies to quantify and demonstrate the effectiveness of hygiene behaviours. In particular, Stone *et al*[18] evaluated the national 'Clean Your Hands' campaign, launched in England and Wales across 187 acute trusts between 2004 and 2008. Their findings showed that regular hygiene audits, prompts and the introduction of bedside hand gel (alcohol-based handrub) led to decreased rates of both *C. difficile* (from 16.75 to 9.49 cases/10 000 bed days) and MRSA (from 1.88 to 0.91 cases/10 000 bed days). Consequently, hygiene behaviours have been shown to make a significant difference to the rates of HCAIs. Despite this, the problem with compliance persists.

Previous studies have attempted to evaluate the reasons for low compliance; however, the majority of studies employed observational or questionnaire-based designs and tend to focus on attitudes and behaviours of nurses.[19–25] Some qualitative interview and focus group studies have been conducted to examine reasons for hygiene behaviours. Again, the majority focused on the nursing profession,[26–29] though some have looked at doctors' attitudes and beliefs.[30 31] These studies tend to focus on doctors at one stage in their training, rather than considering a cross-sectional group of doctors to gain a broader understanding of the issues.

Due to the paucity of research examining doctors' behaviours, we conducted a qualitative study to examine in-depth doctors' reasoning towards hygiene behaviours in order to understand *why* compliance does not equate to that achievable by other healthcare workers. In order to understand how doctors develop their hygiene behaviours, we considered multiple levels of training including undergraduate, postgraduate and professional stages. By doing this, we hoped to identify a specific time in training where hygiene behaviours might be optimally targeted.

Aim and research questions

The aim of the study is to explore the attitudes and beliefs of medical students', junior doctors' and medical educators' (clinicians who are involved in medical education) towards hygiene behaviours to identify the reasons why hygiene compliance is suboptimal. In doing this, we aim to answer the following research questions: (1) Why do medical students, junior doctors and medical educators comply and not comply with good hygiene regulations? and (2) What are the differences (if any) in hand hygiene compliance between participant groups?

METHODS

Study design

A qualitative study design was employed using narrative interviewing techniques. Narrative interviews were used so that the researchers could ground participants' talk in real-life experiences—thus, personal incident narratives of hygiene incidents in the workplace were elicited: including where the events happened, what the specific event consisted of and participants' reasons why (and why not) they complied with hygiene regulations. Participants were interviewed with peers in uniprofessional groups (to facilitate the exploration of shared experiences) and individually if they were unable to attend a group session. When groups were interviewed, the narratives were shared with the group and similarities and differences in experiences were explored.

Participants

Following ethical approval, we recruited a convenience sample of undergraduate medical students (first year of clinical placement), junior doctors (doctors in their first 3 years of clinical practice) and medical educators (general practitioners and consultants who are involved in clinical practice and the training of junior doctors and medical students). We chose a multistrategy approach to recruitment: email, snowballing (where study participants inform others in their social network about the study) and notices on online social network sites (eg, Facebook), alongside face-to-face recruitment. Nine group and one individual interview was conducted with 25 participants in total; five year 3 medical student groups (n=13: 9 females, 4 males), two junior doctor groups (n=6: 4 females, 2 males) and three medical educator interviews—two group and one individual (n=6: 2 females, 4 males). Interviewer PC was in the same academic year as the medical student participants at the time of the study. All participants were provided with an information sheet (which was also verbally conveyed) and signed a consent form prior to participation.

Data collection

The interviews were semistructured and held on the hospital site at the convenience of the participant. The researcher began by providing participants with a paper copy of the content form and information sheet. She then talked through the information sheet, ensuring that everyone understood the study, what was required of them and what would happen to their data prior to them providing their written consent. Following the signing of consent forms, the audio recorders were turned on. Participants were encouraged to tell us of events they had encountered to enable us to understand what happened and why, in real life experiences, rather than offering general attitudes towards compliance and non-compliance. A semistructured guide was used. The range of behaviours under consideration included hand hygiene, personal protective equipment, sharps disposal, waste disposal, cleaning equipment, personal hygiene, clothing and jewellery. The same researcher (PC) conducted all interviews at mutually agreeable non-clinical locations during the summer of 2012. An emphasis was placed on confidentiality and anonymity before data collection began.

Participants were initially asked about their awareness of current hygiene guidelines before being asked the following questions: (1) tell me about a situation where you fully complied with hygiene practices; (2) tell me about a situation where *you* didn't comply with hygiene practices and (3) tell me about a situation where you observed somebody else not complying with hygiene practices. At all stages participants were encouraged to explain *why* they thought they, or others, followed that particular behaviour. The definitions of 'hygiene' and 'hygiene behaviours' were intentionally not defined to participants at the outset to allow open discussion. For the purpose of this study, hygiene behaviours include all behaviours that can impact on hygiene as per the WHO definition: 'conditions and practices that help to maintain health and prevent the spread of diseases'.[6]

The average length of a session was 23.74 min. The shortest group interview sessions were with junior doctor participants (07.13 and 15.53 min). The longest session was with medical students (36.50 min). The group sessions with medical educators were both around 27 min duration, and the individual interview was 13.02 min. The duration of each session was determined by the natural course of the responses with participants given opportunity to contribute further input at any stage in the session.

Analysis

All interviews were audio-recorded, transcribed and anonymised. All transcripts were linked to their audio-files within Atlas.ti, which was used to manage data coding. The researchers (PC and LVM) simultaneously listened to the audio recordings while reading the transcripts, and the coding framework was developed using the five-step thematic framework analysis.[32] This began with both researchers independently reading a subset of transcripts to identify attitudes and beliefs within the narratives. These were then discussed and negotiated with one another, and a set of codes was developed to reflect the themes/subthemes within the data. Narratives were coded according to whether they were compliance or non-compliance stories and coded for setting, type of behaviour and how the individual performing the behaviour was related to the participant. The data were managed in Atlas.Ti and coded by one researcher (PC) who further developed the coding framework as she worked. Three transcripts were double-coded by a second researcher (LVM), and any disagreements were discussed and negotiated.

RESULTS

Four main themes were identified within the data: (1) knowledge (imposition and evidence awareness); (2) constraints (physical, social and time); (3) cultural reinforcement and role models and (4) hygiene as an 'added extra'.

Theme 1: Knowledge

This theme comprises two aspects of knowledge: (1) the imposition of knowledge and (2) the origins of knowledge.

Imposition of knowledge

Participants used dramatic metaphoric language in reference to how hygiene behaviours are taught,[33 34] with words such as 'driven' and 'hammer' being used:

> it's (hygiene behaviour) really being *driven* into us at the moment. (Male junior doctor 1)

> I must admit when I do the clinical skills teaching I *hammer* it home to the students the whole time that they're—that you're responsible… (Male medical educator 1)

While all groups of participants alluded to knowledge imposition, it was most prominent in the medical student groups. On the whole, medical student participants appeared to be dictated hygiene behaviours that they take to be the correct procedure but did not appear to consider *why* certain behaviours are done. Indeed, student participants made frequent references to medical students being 'told' what to do:

> I haven't read the guidelines personally, but I've been told what to do. (Male medical student 4)

> We've just been told that we have to alcohol gel after every time we see a patient or before we see a patient or whenever we do a procedure or something. And wash our hands. That's all I've been told. (Female medical student 7)

Junior doctors demonstrated an intermediate behaviour, beginning to question *why* certain behaviours are necessary, but still on the whole relying on what they are told. Conversely, medical educators appeared to hold some

ownership over their hygiene behaviours—depending on what they are *told* they should be doing and what they *feel* they should be doing: good (or not so good) hygiene practice is part of their professional identity. Indeed, from our data, it appears that participants' hygiene behaviours mainly focused on the *'what'* and '*how to*' rather than the '*why'*, with the latter developing through experience and the embodiment of a professional identity.

Origins of knowledge

Overall, we have identified that medical educators feel that their hygiene behaviours are influenced by evidence. However, it appears that junior doctors are not aware of the evidence available and in some cases do not believe that there is evidence behind hygiene behaviours. Medical students seemed less aware of evidence and how it can affect their practice, tending to rely on knowledge that is imposed on them from their seniors during clinical skills teaching at medical school and during clinical placement. Thus, while hygiene practices are high on the agenda, the understanding of why, as well as the evidence behind this, was lacking across the medical student and junior doctor groups. This poor understanding appeared to be a detrimental factor to adherence levels, leading to a lack of belief in undertaking that behaviour or a belief that such behaviours are of no benefit from an infection control perspective:

> I like to see evidence before I make my own decisions. (Male medical student 3)

> Interviewer: … is there anything that would make you comply more to hygiene?
>
> Male junior doctor 2: I think the evidence base—
>
> Female junior doctor 4: Yeah.
>
> Male junior doctor 2: —would be good, if there was more standard practice, from the leaders of the team in particular, that would be helpful.
>
> Male junior doctor 1: I think evidence base and uniformity.
>
> I think—because the rest of medicine is so evidence-based driven where every treatment we give there has to be an evidence base I think it is a little bit bizarre that we still follow infection control policies that don't have an evidence base… [using alcohol wipes before taking blood is] just something we do because it makes us feel better, makes us think we're doing something but it doesn't really give any difference. (Male junior doctor 1)

Medical educators on the other hand appeared to have a better awareness of the evidence, acknowledging that such awareness directly affects their behaviour and can be a strong motivator for behavioural change.

> we've got a lot of insight and a lot of information and we're expected to use our common sense. And as more information has come available that would have been included in our knowledge base and affected our behaviour… [evidence] changes behaviour far more than just telling people that these are the behaviours that they must adopt. (Male medical educator 2)

Thus, despite medical educators knowing the evidence for hygiene behaviours, such behaviours appear to be imposed onto medical students and junior doctors by them without reference to that evidence. This is problematic as individuals' personal understanding regarding 'why' a behaviour is important appears to increase the likelihood of compliance.

Theme 2: Constraints

Constraints are defined as factors individuals cite as being beyond their control, which affect their ability to perform hygiene behaviours regardless of their asserted intention. In particular, participants in our study cited three types of constraints that they narrated as inhibiting good hygiene practices: physical factors, social factors and time.

Physical factors

Participants talked about feeling physically constrained by equipment. Medical students and junior doctors in particular described the difficulty of taking blood while wearing gloves due to the lack of sensitivity they afford the wearer:

> it's more difficult to feel the veins and everything with gloves on. (Female medical student 3)

> if you wear gloves they take away the sensation in your hands. (Female junior doctor 1)

However, others recognised that although physical constraints can be a barrier towards hygiene behaviours, these issues can be overcome. For example, in terms of taking blood while wearing gloves, habituation might enable the wearer to perform equally as well with them on:

> I've got taught to take blood by the phlebotomists in the outpatients department and they always use gloves, and they take blood all the time. So I kind of thought if they can take blood all the time wearing gloves, why can't I? And the more I use gloves, the better I'll get taking blood with gloves on. (Male medical student 4)

> if you've always worn gloves when you're putting the drips in or taking blood then you wouldn't notice the difference. (Male medical educator 4)

Other physical factors of note included skin complaints following hand-washing and lack of equipment (eg, lack of sharps boxes for bedside use and empty hand gel dispensers).

Social and time pressures

Pressure from senior doctors (including medical educators) was a recurring theme in regards to lower compliance, with both medical students and junior doctors giving examples of feeling unable to comply. Medical students and junior doctors demonstrated awareness of interrupting

social interactions by performing hygiene behaviours and of their seniors' time constraints. These groups narrated how their feelings of being under pressure to not delay their seniors would sometimes lead to them not fully complying to hygiene behaviours. However, these pressures tended to be self-imposed indirect pressures, rather than direct verbal requests from others:

> if you're going into a room to see a patient that's barriered and your consultant is expecting you to write in the notes … and you're busy putting your gown on and it's like 'no, gotta go, gotta go!' (Female junior doctor 4)

> … didn't feel like there was a chance—it felt rude to escape to go and wash our hands and come back … we felt that was wasting time as well. (Female medical student 1)

> … a junior doctor was like 'go take some blood!' … and I'd be like 'Ok, I'll go do it' and then I'd just go do it quickly and then I'd give him the blood … 'cause I don't wanna waste his time or her time and then I'd go and find it [sharps box] afterwards. (Female medical student 4)

Nevertheless, the junior doctors reported that non-compliance is not necessarily as conscious a decision in relation to time constraints:

> Male junior doctor 1: You're just so so busy. You'll examine the patient, scrub the notes and you'll be sat down later—
>
> Male junior doctor 2: Yeah.
>
> Male junior doctor 1: —and you'll suddenly realise 'I've not washed my hands!'

Medical educators made little reference to time constraints. They did not mention feeling under time pressures themselves or acknowledge that their trainees felt under time pressure because of them.

Theme 3: Role models and cultural reinforcement

From our data, we found that medical educators can have a major influence on the hygiene behaviours of their trainees, mainly because of the pressure felt by trainees and as a direct result of the behaviours the medical educators perform themselves. Thus, medical students and junior doctors admitted to being influenced by their seniors. In particular, there was a large emphasis on how seniors have the power to affect many others' behaviours:

> So it's kind of like—the consultant—I don't know if they really realise but they can almost lead it … everyone just copies exactly what the consultants doing because we're all basically sheep—going around on the ward round. (Male medical student 4)

Furthermore, junior doctors and medical students both expressed a feeling that there is a lack of continuity between ideal behaviour and what they witnessed others doing, which can lead to confusion as to the appropriate behaviour:

> … if you see your consultant not doing it, you're just like 'Erm, ok, I need to wash my hands, but I can't see anyone else doing it. Should I do that? Should I not?' (Female medical student 5)

Medical educators on the whole appeared uncertain towards their influence on medical students and junior doctors. Nevertheless, one clinical teacher hoped that their own behaviour would shape others':

> I just hope that when they're watching me then there's—as a role model—then they'll think 'Actually I do quite like the way he does that' or say 'Oh I can see why he does that but actually I prefer to do other things'. (Male medical educator 4)

It is also important to note that medical students have seen a role for themselves as role models. They demonstrated knowledge that, when with peers on placement, if one person washed their hands then others copied this, showing that at any level you can be a role model.

> if *you* wash your hands, everyone around you will go 'Oh yes' I need to wash my hands. (Female medical student 2)

However, it is not only at an individual level where behaviours are developed. The overall culture surrounding hygiene behaviours was apparent in our data. Hygiene behaviours are recognised as a prominent feature of healthcare today, and this environmental ethos was particularly mentioned by the medical educators:

> … I think you look at things like hand hygiene and it's only been probably about—well less than ten years ago when I was a registrar and people were quite poor about using alcohol gels for cleaning their hands and I think really that's come on, you know, extremely—it's very rare now to not see somebody use alcohol gels. (Male medical educator 4)

Environmental ethos and others' behaviours were recognised as influencing compliance throughout participant groups, both positively and negatively:

> If everyone's complying it's a lot easier. (Female medical student 4)

Challenging the environmental ethos and others' behaviours was recognised by all participant groups as difficult. In particular, medical educators acknowledged the difficulty for a medical student to challenge a senior clinician, despite themselves admitting they would not mind being challenged themselves. Hierarchy was identified as a major barrier to challenging:

> You can't—you don't feel able to stand in front of the doctor and be like 'You should wash your hands!' It's—we're just not in that position. (Male medical student 1)

If you're above someone you can tell them what to do. If you're at the same level as someone you can remind them what to do. If you're below someone … it's a lot more difficult to. (Female medical student 2)

A powerful motivator for change, as identified by a clinical teacher, is the idea of patients challenging doctors' hygiene behaviours:

When my grandfather was in hospital we—encouraged him to demand that the doctors washed their hands before touching him and it became a bit of a joke with him on his ward round—you know when people weren't. So I think you've also got to empower the patients too and feel that they can demand—rather than being passive. That would be another way of going about it. (Male medical educator 4)

Nevertheless, our data showed that overall the culture and actions of other people can have a strong effect on compliance to hygiene behaviours.

Our final theme highlights how, despite hygiene behaviours being involved in all clinical encounters and procedures, they are viewed as an additional behaviour instead of being incorporated as a matter of course.

Theme 4: hygiene as an *added extra*

Evidence that hygiene is not seen as an integral part of behaviour was seen throughout the participant groups. Indeed, because hygiene behaviours were presented as a separate behaviour, they were sometimes described as being omitted from practice. In particular, for junior doctors and medical educators, prioritising other care (such as empathy and emergency treatment) at the expense of hygiene practices was noted:

[With very sick patients] infection control isn't your priority at that moment. (Male junior doctor 1)

Female medical educator 2: … a lady of Somali origin was brought in having had no ante-natal care. She'd been taken unwell at the airport and she had a—a placental abruption whilst standing actually in the corridor. And we carried her to theatre and she had a section and neither I nor the registrar had scrubbed. We both had gloves on, we had no masks on and we hadn't scrubbed. But the baby survived.

Male medical educator 3: And the mum?

Female medical educator 2: And the mum.

Male medical educator 3: Wow.

Female medical educator 2: But that—she didn't even have an anaesthetic when we started—they were doing her up an induction when we er—but that was a pretty horrific situation. And I do remember going to the sink to scrub and the registrar saying 'Just put on your gloves, we haven't got time'. And I don't—you know—it's very difficult for me to say that that was the wrong thing to do, because she was going to die, and her baby was going to die. And it was one of those situations that once she was—you know—once we got the baby out, and she had been knocked out, we could drape and you know do things properly.

On the other hand, medical students were more likely to prioritise completing a procedure, or their impression they made on their clinical teacher, over hygiene behaviours. Many participants referred to how hygiene behaviours increase the workload and take an increased amount of effort—both in remembering to perform the behaviour and in physically doing it. Overall, there were multiple references to how hygiene behaviours can be 'forgotten' and how if they did perform the behaviours it takes 'effort', which in many situations meant that behaviours were not completed:

you can forget easily if you've like examined—just touched the patient—examined them in any way, sometimes it's just brief and you just forget. (Female medical student 1)

Just like after—after—just the example, medical students after seeing patients, they just forget to wash their hands after they've seen patients. And I think a lot of it's because the patient's been examined by three people—four people and then obviously you—everybody appreciates the patient wants to be left alone and so like the—the quickest thing to do is to just pull the curtain back around and just leave rather than everybody having a hand wash, and I think that sort of mentality makes people forget to wash their hands. (Male medical student 2)

I hardly ever wash my hands in hospitals even though I know if I was—if I was a patient and somebody wasn't washing their hands I would be like 'Oh my gosh you need to' but I just don't. And it's not that the alcohol gels aren't there. It's just—I don't know, maybe because it's the effort or just doing it. I don't know I just don't do it. (Female medical student 4)

On the other hand, where a direct benefit from performing the hygiene behaviour in addition to the procedure was identified, there was higher reported compliance. For example, we identified that students were more motivated to wash their hands when being assessed—implying a 'tick-box' culture.

Erm the only time I have fully complied was the OSCE [Objective Structured Clinical Examination][i]. That's the first time—*I have never washed my hands so much in all my life!* When I came out of it they were so dry I was like 'I'm never doing this again!' But yeah before patient and after patient I cleaned my hands with alcohol gel. That was the first time ever and that was because I was being watched. (Female medical student 4)

[i]OSCE is Objective Structured Clinical Examination that is conducted as part of medical student assessments in simulated clinical environments with actors.

Interviewer: … are there any situations you can think of when you fully complied to hygiene?

Female medical student 5: OSCEs!

Female medical student 6: Yes!

Female medical student 7: Yep!

DISCUSSION

We interviewed a range of medical students, junior doctors and medical educators about their hygiene behaviours. The majority of participants reported that their intentions to comply with hygiene behaviours were affected by multiple factors. For the purpose of this paper, we will focus on the decision-making process and the culture/influence of others rather than the subsequent barriers. While we recognise the significance of external factors such as constraints,[35] in order for compliance to improve, the intention to perform a behaviour first needs to be in place.

On the whole, perceived awareness of the evidence behind hygiene behaviours appeared to increase with doctors' experience. Those in the earlier stages of training reported acquiring knowledge of hygiene behaviours via imposition, relying on what they were told and observed, rather than seeking out evidence to inform their behaviours. Medical educators, however, used their perceived knowledge to form their own decisions of which hygiene behaviours they will perform and which they will not. In other words, as doctors progress in their training, hygiene behaviours appear to become more dependent on the individuals' decision-making process and knowledge of the evidence.

Previous research supports this notion and has found that, in order to maintain their professional autonomy, doctors tend to use their own judgement as guidance to what hygiene behaviours they perform and can therefore be selective in how they comply to recommended hygiene behaviours.[31 36] Drawing on the behavioural theories, if there is little perceived benefit towards performing the behaviour, individuals are less likely to conform to the regulations.[9 15] This is supported by our research, where the medical educators reported conscious decision-making for hygiene behaviours. However, as doctors have been identified to overestimate their knowledge[31] or be indifferent to evidence-based practice to hygiene behaviours,[17] this could be a key factor as to why compliance in this group appears to be quite low. This is despite the fact hygiene behaviours have been shown to make a significant difference to the rates of HCAIs,[18] and evidence-based guidelines are available locally, nationally and internationally.[37 38]

Our research suggests that knowledge of evidence-based hygiene practice increases with seniority, and as other studies undertaken in different cultural settings have suggested, medical students and junior doctors have a lesser awareness of this.[39] Therefore, their hygiene behaviours are less likely to be influenced by the evidence and more so by the culture and influence from their seniors. With lack of knowledge leading to juniors' relying on the behaviours they observe, we can infer that an educated decision to not perform a hygiene behaviour in a particular situation by a senior may wrongly be replicated by a junior in an alternative situation. Indeed, our finding resonates with Monrouxe *et al*'s[40] large-scale study of UK medical students' professional dilemmas in which medical students' witnessing of clinicians compromising patient safety through poor hygiene practices was one of the top 10 most common professionalism dilemmas reported, with students' own hygiene breaches being less commonly reported than their seniors (although males admitted breaching hygiene more frequently than females). However, although many junior participants in our study adopted the hygiene behaviours of their seniors, some reported a desire to challenge them. Hierarchy was cited as a major barrier to speaking up. This difficulty in communicating hygiene concerns has also been noted in a study of oncology staff in Switzerland in which speaking-up behaviour occurred mainly around medication safety issues with the majority of 'silence' behaviours being connected to, among other things, hygiene.[41]

This highlights the importance of encouraging senior doctors to role model good hygiene practice. Indeed, over two decades ago, Seto *et al*[42] suggested that it would only be once medical educators were accepting and adhering to hygiene behaviours that the culture as a whole would adopt these behaviours.[42] Our identification of the need for cultural reinforcement is an important aspect of behaviours in healthcare. In fact, in the recent report by Berwick *et al* into improving patient safety, it is claimed that: 'Culture will trump rules, standards and control strategies every single time, and achieving a vastly safer NHS will depend far more on major cultural change than on a new regulatory regime'.[43] This emphasises the need for not just individuals but everybody to make these changes. Indeed, our data supported the notion of cultural influence and the effect of role models on compliance. The potential for senior staff as role models has been frequently identified in the literature.[19 23 26 30 31 40 44–47] Behavioural models consider role models as a significant part of the decision-making process.[9 15] Furthermore, those who perceive themselves to be role models have been found to display higher compliance themselves.[48]

In terms of the decision-making process, we have identified how hygiene behaviours tend to be seen as isolated behaviours, rather than being integrated to practice. Thus, hygiene is not seen as integral to care, through participants describing hygiene behaviours as a burden, sometimes unnecessary and easily forgotten. Although emerging evidence that techniques such as 'priming' (providing visual or olfactory cues) could play a role in prompting hygiene behaviours where the participant may have deemed them unnecessary or otherwise forgotten to perform them,[49] the underlying principle that hygiene is not perceived as integral to practice is an important finding. It implies that such behaviours can be seen as

optional. Back in 1999, Boyce[50] recommended that efforts should be made to develop an atmosphere where hand hygiene is integral to all care. Despite this, our data suggest that hygiene behaviours are still considered as an additional process, running counter to the prevailing NHS recommendations: 'Hand hygiene is considered to be the single most important practice in reducing transmission of infectious agents, including healthcare associated infections, when providing care'.[51]

Strengths and limitations

As with all research, our work has some limitations. The study was conducted across just two health boards in one UK country, and the demographics of our convenience sample are not representative of the population studied. This might be due to our reliance on recruitment via face-to-face contacts and social media. This is not uncommon in qualitative research that does not seek to generalise; rather, it seeks to identify the issues around particular problems, sometimes through narratives of personal experiences, and illuminate them. Despite our cautiousness around the generalisability of our findings, following our research questions, we have succeeded in identifying multiple reasons why hygiene regulations are not adhered to alongside group differences. Further, the main themes identified were consistent throughout our data and are both supported by previous studies' findings as well as moving on our knowledge in this area. As such, we believe that the data we collected are informative about the hygiene behaviours of medical students, junior doctors and medical educators in one UK country, which is important due to the international significance of hygiene behaviours in healthcare today.

Our work also has strengths. For example, it is the first study of which we are aware that obtained the attitudes, beliefs and behaviours of doctors at different stages of their training, to allow cross-comparison between medical students, junior doctors and medical educators. Although past studies have compared medical students at different stages of their training and medical students against nursing students,[46 52] our study enabled us to have an understanding of how self-reported hygiene behaviours differ depending on level of seniority.

Other strengths include the steps we took to ensure research rigour to develop the plausibility, credibility and trustworthiness of our work. We do not comment on issues such as thematic emergence, triangulation, saturation and member checking—typically associated with issues of qualitative research rigour—as these belong within a grounded theoretical approach.[53] However, we built in rigour to the study by ensuring continuity whereby a single researcher conducted all interviews, by using open (rather than closed) questions to facilitate participants' flexibility in their responses, by providing participants with the space to narrate their in-depth and detailed stories and by using an iterative approach to data analysis with two researchers critically developing a detailed coding framework from the data (working with the data to resolve any ambiguities and difference of interpretation).

Finally, the interviewer (PC) was a medical student at the time of this study. This brings forth both strengths and limitations and relates to the trustworthiness of our research. In terms of strengths, students-as-researchers sits within a 'standpoint research' perspective,[54] which addresses issues of concern to a certain population (in this case, medical students): thus PCs' interest in studying this arose from her own observations of hygiene practices during workplace learning experiences, her desire to understand why hygiene regulations are not adhered to and to ultimately change practice. PC received narrative interview and thematic analysis training prior to conducting the research and was supervised and supported by LVM throughout the study. However, as a peer of the medical student participant group and as a subordinate of the junior doctor and medical educator participant groups, she was also in a variety of situations that called forth different power relations: student-to-student interviewing can facilitate the potential for participants to become more candid than they might otherwise be, potentially revealing identities and 'oversharing', and student-to-senior interviewing might be seen as interrupting the usual power relations that often exists between the two. To mitigate this, PC was mindful to adopt a strong *researcher persona*, keeping the relationships between herself and participants highly professional.[54]

Recommendations for future education and practice

From our results, we can make some key recommendations for future education and practice. First, regarding evidence and knowledge, medical students and junior doctors should be encouraged to consider the evidence around hygiene practices and about *why* certain hygiene behaviours are recommended. We suggest this is fostered through reflecting on their own hygiene lapses as well as those witnessed in others.[54] In doing so, good hygiene behaviours can be reinforced as an intrinsic commitment (rather than as an external expectation). Furthermore, physicians should be reminded of their role model status and have their responsibility to comply with hygiene regulations emphasised. They should also be encouraged to review the evidence and remain up-to-date, as with other evidence-based practice disciplines. With this in mind, Monrouxe and Rees (p120)[55] suggest a '4-Rs' approach to participating in a safety culture: resisting, role modelling, reviewing and reporting. Thus, *resisting* and *reviewing* relate to the issue of 'speaking up', which is advocated as a strong and assertive way to address breaches that require immediate attention.[55] Consistently performing good hygiene practices and even talking about them when doing so ("*Oh I'd better wash my hands*":)[55] is one way in which junior members of staff can become *role models* for their senior staff ("They [senior staff] started going '*My God they wash their hands between every single person,*

this is terrible that we don't": p119).[55] Finally, *reporting*, also known as *raising concerns* or *whistleblowing*, should be done in accordance to the practice of incident reporting at the institution in question. This is obviously the most difficult action. Whistleblowers often find themselves becoming the victim of discrimination. However, recently, UK junior doctors' employment contract has been changed to include a whistleblowing protection clause.[56] Essentially, hygiene behaviours should be promoted as being an integral part of clinical practice with healthcare professionals at all levels being encouraged to actively engage in decision-making with regards to their hygiene behaviours through an evidence-based practice approach and to be prepared to challenge poor hygiene adherence in others.[57]

Unanswered questions and future research

Our research also touched on challenging behaviours, including identifying medical hierarchy as a barrier to safe practice. The 'Silence Kills' study in 2005 identified that few behaviours are openly challenged.[58] However, non-verbal cues can be used to prompt hygiene behaviours.[42] Future qualitative research could look at the role of challenging hygiene behaviours in more detail. The role of constraints and barriers to performing behaviours is also an area that can be explored further, which were beyond the scope of this discussion. Finally, future research could explore the efficacy of cultural change indicatives (eg, the introduction of hygiene 'prompts' or the 4-Rs approach to safety culture)[55] in an attempt to understand which strategies work, for whom and in what way.

Contributors PC conceived the idea for the study. LVM designed the study. PC collected the data under the supervision of LVM. Both authors developed the thematic analysis. PC coded the data and developed the framework, and LVM double-checked the coding. PC wrote the first draft of the paper. Both authors edited it for critical content.

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