Development and appraisal of a hand hygiene teaching approach for medical students: a qualitative study

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Abstract

Background: Poor hand hygiene (HH) practices among medical students have previously been attributed to students not being exposed to sufficient teaching materials during their training.

Aim: To develop and evaluate a teaching module directed at improving the knowledge and attitudes of undergraduate medical students towards HH.

Methods: The HH teaching module was designed based on educational materials used by the World Health Organization and other patient safety organisations. The development was also informed by the findings from two previous studies including qualitative interviews with staff and students and a survey of Australian medical schools. In-depth group interviews were undertaken with 24 undergraduate medical students.

Results: Favourable feedback was received from the interviewed medical students towards the developed scenario-based learning activity; however, the group interview activity was not received well by students. They suggested that the HH teaching activities should be compulsory and not optional for medical students. In order to reinforce good HH practices and to improve knowledge around HH and healthcare-associated infections, they felt that the activities should be repeated during each phase of their degree.

Conclusions: There is a need to change the approach to training in education, particularly to engage students in topics such as HH which are often seen as unimportant.

Keywords

Hand hygiene, healthcare-associated infections, qualitative research, infection control

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Introduction

Despite the well-recognised importance of education and training in improving hand hygiene (HH) of medical students (Feather et al., 2000; Stone et al., 2012; van de Mortel et al., 2010, 2012) it is an increasingly neglected part of medical education. Medical students receive very little formal training around HH while at medical school, due to the pressure placed on curriculum developers to dedicate time to the teaching of core clinical concepts about treatment and diagnosis (Kaur et al., 2014).

Past studies have recommended increasing the emphasis on HH in the undergraduate curriculum via lectures, clinical teaching sessions and assessment (Hunt et al., 2005; van de Mortel et al., 2010, 2012). Education and training is an essential component of the World Health Organization's (WHO)

multimodal HH improvement strategy. However, it can result in actual behaviour change only if practised with other HH improvement measures such as system change and evaluation of HH adherence (World Health Organization, 2009). The WHO has taken an initiative for education and training of HH and developed the patient safety multi-professional curriculum targeted at healthcare students (World Health Organization, 2011). Testing the efficacy of educational programmes to

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improve hand hygiene has also been suggested by other researchers (Feather et al., 2000; Stone et al., 2012). Previously in-depth interviews were undertaken with medical students and medical school academics to explore their perspectives on issues associated with the current teaching approaches around HH and to explore their suggestions on best learning/teaching approaches to teach HH to medical students (Kaur et al., 2014). Scenario-based learning (SBL) activity was unanimously suggested as the most suitable learning and teaching approach by these participants. SBL was also recommended as the best approach to teach HH to medical students by the Deans of 17 Australian medical schools during a survey undertaken in 2012–13 (Kaur et al., 2015).

There is a range of innovative educational tools such as scenarios, videos and power points slides available to teach healthcare workers (HCWs) about HH such as those that have been developed by the WHO (http://www.who.int/gpsc/5may/tools/training_education/en/) and other patient safety agencies such as Hand Hygiene Australia (HHA) (<http://www.hha.org.au/ForHealthcareWorkers/education.aspx>). However, these tools use case scenarios involving trained nurses and doctors and involve clinical aspects which medical students do not get involved with during their course. Given that students often relate better to material that is targeted at them (Richardson, 2005), the teaching/learning activities should have more relevance to their own context. Hence it is important to teach HH to medical students through activities adapted for them, which are more meaningful for their present academic context and which hopefully would have greater long-term influence on their professional practice. Also, clinically contextualised learning materials are more likely to encourage students to adopt a deep learning approach (Reid et al., 2012).

To address the lack of adequately targeted learning and teaching activities addressing HH for medical students, new teaching module was developed. This module was adapted specifically to improve the HH knowledge of medical students. The study involved: (1) conducting a literature review around HH educational approaches used for medical students; (2) evaluating and adapting pre-existing tools such as those from the WHO and online learning package of HHA; (3) developing learning/teaching activities that would incorporate the developed tools; and (4) undertaking in-depth interviews to evaluate the attitudes and acceptability of a range of undergraduate students towards the activities.

Materials and methods

Development of learning and teaching approach

The learning and teaching approach used in this study was developed based on a review of the literature and on the findings from two of the previous studies conducted by the authors of the present study. First, a comprehensive literature

review was undertaken to examine previous approaches used to teach concepts of HH to medical students, as well as qualified doctors and nurses. A keyword search of the following databases was undertaken: Medline, Cochrane, Embase and Cinhal. The search terms ‘medical students’, ‘higher education’, ‘teaching and learning approaches’, ‘hand hygiene’ and ‘infection control’ were used to locate the relevant studies. Further, the reference lists of obtained articles were checked to identify additional relevant studies. Studies published from the time period of January 1990 to December 2014 were included. There were no restrictions on the language, study design or date of publication.

Grey literature review was undertaken to appraise conference papers, WHO’s fact sheets, dissertations on HH. WHO’s multi professional curriculum (WHO, 2011) was examined to inform the development of teaching activities. Four past studies were identified which have examined the impact and short term intervention of educational interventions on medical students’ HH (Calabro et al., 1998, Fisher et al., 2010, Hunt et al., 2005, Phillips and Ker, 2006) and one study tested the long-term retention of the education (O’Brien et al., 2009). In summary, these studies recommended that medical schools need to commit resources to develop and appraise HH training (Calabro et al., 1998). From these studies we also identified that a new teaching resource should not be overly long, should not be repetitive, should be tailored for medical students (Phillips and Ker, 2006) and should include evidence of the effectiveness of HH (Hunt et al., 2005).

In addition, the publically available HH education material developed by the WHO and HHA around the ‘My five moments of HH’ (Hand Hygiene Australia, 2015) were reviewed. The ‘My five moments for HH’ (Sax et al., 2007) provides a solid basis to understand, teach, monitor and report hand hygiene practices (Stone et al., 2012). This user-centred educational approach is the basis of the framework of WHO Global Patient Safety Challenge ‘Clean Care is Safer Care’. It was designed for HCWs to explain why, when and how to apply HH during routine care activities. The five moments of HH includes: (1) the moment before touching a patient; (2) before performing aseptic and clean procedures; (3) after being at risk of exposure to body fluids; (4) after touching a patient; and (5) after touching patient surroundings (Sax et al., 2007). While these materials have been previously validated with qualified HCWs (Chen et al., 2011), to the best of our knowledge they have not previously been adapted to suit undergraduate medical students. The materials consist of SBL activities around the five moments of HH. SBL is an effective way to get students closer to the realities of their intended professions through the construction and deconstruction of authentic learning experiences (Errington, 2005). Moreover, these activities also allow learners to work in context and take ownership of their own learning experiences in order to solve-real world problems (Duch et al., 2001).

Based on the findings from the previous two studies and literature review, authors designed a SBL activity around the 'My five moments of HH' that focuses on a medical student who is undertaking a patient examination, and who fails to correctly observe the five moments of HH. The small group discussion involves correctly identifying the moments missed by the student in correct sequence. A second small group activity was designed in which students were asked to do group interviews based on questions around the perceived attitudes and perceptions of medical students towards HH. This second activity was previously suggested by the university's academics to be an effective approach during in-depth interviews (Kaur et al., 2014). These activities were accompanied with a brief power point presentation on indications of HH and a practical demonstration of accurate technique of HH. Total time taken to deliver this teaching approach was 25 min.

The three researchers (RK, HR and HS), who are all involved in medical education, agreed upon the developed teaching approaches. Expert opinion around this tool was also sought from a separate medical education expert.

Assessment of the learning and teaching approach

In-depth group interviews were undertaken with undergraduate medical students from one university in Sydney, Australia. Participants included 24 medical students from year 1 to year 5. Purposeful and snowball sampling was used, as it was felt that the potential for learning is superior to representativeness, especially given that the aim of the study was to obtain a diversity of views and gain a richer understanding (Stake, 2000). Hence those who could potentially provide rich information were purposefully selected (Blignault and Ritchie, 2009). Medical students were recruited via flyers advertising the study. All participants provided written informed consent prior to participating. This study did not collect any identifiable personal information from the participants. Medical students were offered a chance to win a \$50 gift card for their participation in the study.

Prior to commencing the interview, the recruited students were provided information about the 'My five moments of HH' and were asked to review the new teaching activities.

Data collection

An interview guide was jointly developed and reviewed by the researchers to identify key areas of interest for the study. Questions were shaped to cover the key areas, which included: (1) acceptability of HH teaching practices; (2) perceived effectiveness of teaching practices; and (3) mode and method of delivering the teaching activities. The format of the interviews was semi-structured to allow the respondents to express their perceptions from their own

frame of meaning (Liamputtong and Ezzy, 2005). The interview guide was pilot tested with a group of four students and expert opinion from the infection control experts were sought during its development. During the interviews, member checking (Mays and Pope, 2000) was conducted to ensure the rigour in the research and that participants views were accurately reported. This involved summarising and feeding back participants' views at the end of the interview to compare the investigator's account with participants' views. Recruitment was continued until data saturation was reached, where no new ideas or issues were raised in subsequent sessions (Mason, 2002).

Analysis

Group interviews were analysed thematically. All interviews were audio recorded, transcribed verbatim and reviewed as a whole along with field notes. To find repeated patterns of meaning across all of the interview datasets, data immersion, coding and thematic analysis was undertaken (Liamputtong, 2009, Mays et al., 2000). Two investigators jointly developed a list of themes after one-quarter of the transcripts had been analysed. An agreed framework was then applied to another subsample of transcripts and modified further. Using this final framework, all of the transcripts were analysed and coded. Text was organised within the identified themes of the developed framework using NVIVO Version 10 (NVIVO, 2012).

Ethics approval

Ethics approval was obtained from the University of New South Wales Human Research Ethics medical panel.

Results

Eight group interviews were undertaken with 24 students to explore their views about the learning and teaching approach developed. Most of the senior students interviewed were familiar with HH, although they conceded that their knowledge was 'very vague'. A couple of the junior students interviewed were able to recall that they had attended an infection control lecture but they did not think the lecture was very effective in delivering the message around HH. One student had got all the knowledge around HH from undertaking a research project (as part of their degree) and another claimed that he heard about the importance of HH at a conference he attended overseas. All students thought that HH teaching in the medical school was inadequate.

Appropriateness of the activities

Students considered the newly developed activities as good resources and were satisfied with the content. They noted

that the activities would impart theoretical as well as practical knowledge around HH and were more informative and interesting than their current lecture materials. The short oral presentation and accompanying power point slides were satisfactory to the students and considered to potentially strengthen their theoretical knowledge around HH. SBL was considered to be the most valuable activity in improving HH practices of medical students as well as encouraged student engagement. The students' comments expressed that students appreciated opportunities for active engagement and peer learning (Table 1).

Some of the students felt that while the activities may not be effective in changing behaviours, they would possibly make students stop and think about the concepts of HH and reflect on their own practices. Students suggested that this might ultimately lead to behaviour change as reflected in the comments by a junior student: The use of the words 'simulates their day-to-day practices' may suggest an appreciation for clinically contextualised learning.

Students were less enthusiastic about the second group activity that involved medical students interviewing each other. Some students considered the absence of a moderator or facilitator as a problem as it would not be as engaging and effective as SBL.

It is likely that in the absence of a moderator or facilitator, students may focus on doing other things. Despite the lack of enthusiasm for activities involving interviewing each other, overall the activities tested out in this study were considered better than a lecture. Lectures were considered ineffective in increasing HH knowledge and awareness amongst medical students because they considered these to be 'extremely boring'. Students were in favour of more engaging educational activities which were of shorter duration as well such as SBL.

Sustainability of good HH practices. Students suggested these sessions should be repeated at the start of every phase (student's transition through phases every 2 years) as a refresher to reinforce good HH practices. In their opinion, past attempts to teach HH were ineffective due to the fact that they were not repeated during the medical course (Table 1).

Learning about HH activities needs to be compulsory. Students were asked whether the activities developed for this study should be introduced to medical students as an option or should these be made compulsory. Most indicated that it 'shouldn't be optional' but should be compulsory with a dedicated session on the topic (Table 1).

When to introduce these activities. A couple of medical students said that it was useless to teach/learn about HH on the university campus as these are better suited for teaching in the actual clinical environment by senior consultants. However, other students stated that SBL and small group sessions on the university campus are more suitable as teaching

of HH in hospital setting is very subjective and varies according to disciplines. For example, consultants in busy departments will not have time to dedicate towards teaching of HH so it is better taught in classroom setting. Most students thought that in the university these activities are best suited for facilitator and clinical skills sessions where students are already engaged.

Most of the students interviewed believed that the HH teaching activities need to be introduced early in the medical education (Table 1).

Discussion

Views of medical students towards HH teaching/ learning approach were explored through qualitative group interviews. To date, there have been very few studies that have evaluated teaching/learning approaches around HH. In 2000, Calabro et al. undertook a pre- and post-interventional study aimed at increasing the medical students' knowledge around infection control practices including HH. The educational intervention included a lecture, a demonstration of standard precautions and infection control procedures with two clinical scenarios and an exercise on proper hand-washing. They reported an increase in the knowledge of medical students (Calabro et al., 1998) but long-term retention of this knowledge was reported as poor (Calabro et al., 2000). A few other studies which utilised the WHO's HH scenarios and posters to prompt students to HH also reported an increase in short-term knowledge around HH of medical students following HH educational interventions (Feather et al., 2000; Fisher et al., 2010; Hunt et al., 2005).

To the best of our knowledge, this study is the first to explore the impact of a specifically targeted SBL aimed at teaching concepts around HH to medical students. It should be acknowledged that it is a difficult task to change the HH behaviour of medical students given that there are multiple factors such as lack of time due to high workload, inconvenience, skin irritation and dryness caused by HH agents, inadequate knowledge of guidelines and technique of HH, lack of positive role models and forgetfulness (Erasmus et al., 2009; Kaur et al., 2014; Whitby et al., 2006) that influence their and other HCWs' behaviours. The findings of the researchers from a previous study indicated that medical students do not consider HH to be an important teaching/learning topic (Kaur et al., 2014).

Given this attitude we envisaged that it would be particularly difficult to introduce new learning/teaching approaches around this topic. However, our study results showed that the HH teaching/learning approach we developed received favourable student feedback and students were satisfied with the teaching activities provided a moderator or a facilitator oversees them.

The students participating in this study were very receptive towards the SBL activity and thought it would make

Table 1. List of identified themes/subthemes with selected quotes from medical students.

Themes/Sub themes	Participant details	Selected quotations
Appropriateness of the activities		
SBL is a valuable activity	Year 3 medical student	<i>'The SBL activity makes us think and reflect on our HH practices rather than talking about facts and figures. We relate better to it. The whole group is involved. It stimulates the whole conversation.'</i>
Effective in changing practices	Year 2 medical student	<i>'When actually given an activity which simulates their day-to-day practices, I think it would be effective in changing practices in the long run.'</i>
Importance of facilitator	Year 1 medical student	<i>'If there is no facilitator overseeing the process it always breaks down.'</i>
SBL is more useful than traditional teaching approaches	Year 4 medical student	<i>'It needs to be done in an environment where the students are engaged. It needs to be given by facilitators who can get the students engaged and get them interested in the topic which generally seems to be very uninteresting and boring. We get lectures on stuff which is very important but we never found out.'</i>
	Year 3 medical student	<i>'I don't really remember the lecture. We had tutorials in clinical skills. I think it is easier do as smaller groups, in which you have peers checking each other. I think it is probably more useful than having a lecture.'</i>
Sustainability of good HH practices		
Reinforcing	Year 3 medical student	<i>'We don't ever come back to it. A lot of us forget stuff. I think if you really want to get people to practise these, these activities need to be taught at the beginning of every teaching period. It will increase awareness and over time I think it sticks.'</i>
	Year 5 medical student	<i>'Stage it according to phases; introduce it in phase 1, then a refresher in phase 2 and 3 and assessed as well.'</i>
Compulsory activities		
	Year 5 medical student	<i>'Definitely shouldn't be optional, HH is easily overlooked upon and medical students do have a tendency to avoid things which they think aren't important. It should be a compulsory activity.'</i>
When and how to introduce these activities		
	Year 4 medical student	<i>'To introduce it in first and second year because it is the most important time to establish a good and fundamental understanding about HH. When they have reached years 5 and 6 they have an in-built mentality that HH is not important.'</i>

them reflect on their own HH practices and would lead to long-term knowledge retention. This long-term retention of the learned material occurs due to deep learning based on genuine understanding of these materials. SBL is considered as an effective way to get students closer to the realities of their intended professions through the construction and deconstruction of authentic learning experiences (Errington, 2005). SBL fits well with what John Biggs described as a deep learning approach in his Deep and Surface Approaches Model (Biggs and Tang, 2007). A deep approach is of practical value and is expected to ensure that a student has a more comprehensive grasp of the subject being studied whereas in a surface approach to learning students learn only to pass assessment and fulfil the minimum requirements of the study subjects undertaken (Biggs and Tang, 2007).

SBL engages students to a high level of cognitive activities and encourages deep learning as opposed to surface

learning through passive methods such as lectures (Biggs and Tang, 2007). It involves student–teacher as well as student–student interactions which are the main characteristics of deep learning (McKay and Kember, 1997). In the learning activities used in the current study, students had the opportunities for peer learning and they were provided with a clinically contextualised scenario involving medical students. Thus as the study participants noted, this approach allowed students to work in context, discuss with peers and learn through active engagement with the material. By doing so it created an environment for students to take ownership of their own learning experiences to solve real world problems (Duch et al., 2001).

It is also worthy to note that our participants felt that these should be taught in the university and in the actual clinical settings too. Previously Feather et al. recommended that HH should be learnt throughout the undergraduate course, both theoretically and practically (Feather et al.,

2000). The participants recommended repeating these activities once every year to sustain the impact of the HH teaching for a longer duration. More importantly medical students considered these activities should be compulsory part of their education as opposed to being optional.

Previous studies have recommended that more attention to HH as well as innovation in teaching the concepts around HH is required (Fisher et al., 2010; Scheithauer et al., 2012). Innovative concepts such as blended learning is currently being trialled as a teaching and learning approach in some medical schools across Australia (Ilic et al., 2013). This approach involves teaching some aspects of the course as campus based face-to-face activities that are supported by online activities as well to improve the flexibility of access and provide a broader range of learning opportunities for students (Lehmann et al., 2010; Pereira et al., 2007). This approach may be particularly useful for teaching concepts around HH, as it is unlikely that additional face-to-face time is given to teaching these concepts.

The main limitation of the study is that it explored the views of medical students from a single medical school. However, the interviews generated rich feedback on the teaching and learning approaches used to teach HH to medical students. The study did not set out to check medical students' HH knowledge and compliance in an attempt to reduce HCAs. HH is used as an example of how challenging it can be to engage medical students in such training and to test the impact of the teaching activities on student learning outcomes or attitudes. It was important to be systematic in the approach used by researchers and to seek feedback on the resources/activities prior to implementing them in a teaching trial.

Conclusion

The findings from this study suggest that the activities used have the potential to increase HH knowledge of medical students. Further research is needed to see whether these activities result in long-term knowledge retention. Research is also needed to determine the impact of these activities on behaviour change and reduction of rates of healthcare-associated infections. This will need a larger and more diverse sample of medical students. Based on the current findings the authors intend to undertake a before and after study to determine the effectiveness of this teaching tool on a larger cohort of students. The findings of this work alongside other published work suggest that there is a need to change the approach to training in education, particularly to engage students in topics such as HH which are often seen as unimportant.

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