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# Factors that influence hand hygiene practice amongst occupational therapy students

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## Abstract

**Purpose** – Hand hygiene is the single most important intervention to reduce the risk of acquiring infection. All healthcare workers and healthcare students have a responsibility to prevent transmission of infection. The purpose of this study is to investigate students' attitudes to hand hygiene following university-based education and practice placement. Students attended a lecture, completed an e-learning module, participated in a practical session using a ultra-violet light hand inspection cabinet and engaged in clinical placement.

**Design/methodology/approach** – In all, 64 students participated in a multimodal hand hygiene education programme before clinical placement, with each student completing an in-class questionnaire after placement. Data were analysed using descriptive and comparative statistics. Students rated educational methods that had most influence on them. Their preference was for a practical hand hygiene education session. Students were also influenced by the therapist they were on placement with. They were least influenced by the didactic college presentation.

**Findings** – This study highlights that students may be influenced by different methods of education at different stages in their course and that placement may be an important influencing factor in the earlier years of occupational therapy education.

**Research limitations/implications** – This study highlights the importance of the availability of a multimodal educational approach and clinical placement to promote increased compliance with hand hygiene amongst students.

**Practical implications** – University healthcare course curricula should include multimodal approaches to the education of hand hygiene. While hand hygiene e-learning modules are beneficial, they should be used in conjunction with a multimodal educational strategy that incorporates practical elements. The influence of the therapist on a students' behaviour should be utilised to improve both student and professionals hand hygiene adherence.

**Originality/value** – Original piece of work that is not widely discussed in Occupational Therapy literature.

**Keywords** Education, University, Behaviour, Students, Hand hygiene

**Paper type** Research paper

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## Introduction

Hand hygiene is recognised as the single most effective action to reduce and control the spread of infection (Pittet *et al.*, 2000; Whitby *et al.*, 2007). However, compliance is not always optimal. The challenge of affecting change in the behaviours of healthcare workers and healthcare students towards maintaining compliance with hand hygiene guidelines is well-documented (Whitby *et al.*, 2006).

Although hand hygiene prevents cross-infection, successful adherence is unacceptably low (Institute for Healthcare Improvement, 2006). Knowledge needs to be enhanced and changed to improve compliance (Kim *et al.*, 2013). Education is an integral part of hand hygiene improvement strategies (Mathai *et al.*, 2010). Kaur *et al.* (2014) suggest that poor hand hygiene compliance by medical students is because of a lack of knowledge, misconceptions and poor hand hygiene practices by role models. Negative influences of poor role models further emphasises the significance of good clinical practice by those who teach students (Hunt *et al.*, 2005). The influence of others and the need for positive role modelling is vital for successful hand hygiene compliance (Polacco *et al.*, 2015). In occupational therapy practice, practicing occupational therapists are the main role models for students in the traditional one-to-one placement model.

To plan interventions that are most likely to succeed, it is vital to understand both the barriers and motivators for that behaviour (Collins McLaughlin and Walsh, 2012). Compliance with hand hygiene remains a challenge (Smiddy *et al.*, 2015). Education is a key component of hand hygiene training for all team members. Hand hygiene education for healthcare workers and students can be delivered using a number of pedagogical approaches including traditional didactic lecture, e-learning, demonstration, interaction and discussion (World Health Organization 2009). In the last published research related to hand hygiene education for occupational therapy students, it was reported that occupational therapy educational programmes did not provide sufficient information on hand-washing techniques to students (Marcil, 1993).

This study was undertaken to explore the educational methods that were most effective in terms of delivering hand hygiene information. The aim of the study was to inform improvement of teaching practices and, thus, positively influence students hand hygiene knowledge and skills.

The study provides an insight into the impact of different educational methods and an exploration of perceived factors influencing hand hygiene compliance amongst undergraduate occupational therapy students.

## Methods

### *Research design*

This is a descriptive cross-sectional study of undergraduate occupational therapy students who attended a four-year degree programme in an Irish university.

### *Participant selection*

The study population were a convenience sample of undergraduate students studying occupational therapy. Students from Years 2 to 4 ($n$ = 78) were asked to partake. All students had completed clinical placements. Students in Year 1 were excluded because of a lack of clinical experience.

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*Procedures*

In the 2014-2015 academic year, students received four different methods of hand hygiene education before going on placement:

(1) All students completed the Irish Health Service Executive Learning and Development Hand Hygiene for Clinical Staff e-learning module. This module included an online assessment which students had to pass to generate a certificate of completion.

(2) All students received a practical session in college before commencing their clinical placement. This session in college involved students engaging in hand hygiene and then using an ultra violet (UV) light hand hygiene inspection cabinet to check technique.

(3) All students attended a didactic lecture in college and were prompted to discuss hand hygiene.

(4) All students were asked to peer check their fellow student to check for hand hygiene readiness (to check for any barriers to engaging in successful hand hygiene).

Students checked and commented to each other regarding barriers to hand hygiene compliance, for example: hand/wrist jewellery, sleeve length, nail polish, nail condition and skin condition.

Once this multimodal hand hygiene education was complete, the students engaged in their placements. When students returned to college post-placement, they completed a paper-based questionnaire (Appendix). The same procedure was followed for all academic years that were involved in the study.

*Data collection*

The paper-based questionnaire was developed by the author to capture factors influencing students' hand hygiene practices. Sections of the questionnaire (Questions 2 and 3) were developed, with permission, based on a previously published study (Collins McLaughlin and Walsh, 2012).

Questionnaires were provided to students on return to college after the completion of clinical placement. All participants were provided with a research participant information sheet. Participation was voluntary and consent obtained. Completion of surveys was facilitated immediately at the end of teaching sessions to maximise response rate and to reduce the possibility for students to check information or communicate with each other. Completion of the questionnaire took approximately five minutes. Participant's anonymity was assured throughout the survey distribution, collection and analysis. Data were categorised according to the specific academic year.

*Statistical analysis*

Descriptive and comparative statistics were performed using Stata IC, version 13.

*Ethical approval*

Ethical approval was obtained from the university Clinical Research Ethics Committee before the commencement of the study.

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## Results

### *Demographics*

There were 78 students eligible to engage in the research. All students were invited to participate. In all, 64 students were recruited, from second year ($n$ = 23), third year ($n$ = 21) and fourth year ($n$ = 20). This equated to an 82 per cent response rate.

### *Reasons for hand hygiene compliance and non-compliance*

Students were asked to rank a list of statements about the influences on their hand hygiene on clinical placements (Appendix). The highest ranked factor for engaging in hand hygiene practices was that students believed that engaging in hand hygiene practices prevents the spread of diseases (39 per cent [95 per cent CI 0.27-0.52]). Second to this, students identified that they engaged in hand hygiene, as it was what they were taught to do (19 per cent [95 per cent CI 0.11-0.32]). Other reasons the students ranked included, soap dispenser was located conveniently and planning on touching someone. In some instances, students suggested that they used alcohol-based hand-rub on placement rather than hand washing. Additional reasons for non-compliance with hand hygiene practices were that it was not important on placement, they forgot, the therapist they were working with did not wash their hands and they did not deem patients to be a risk to them.

### *Educational methods*

Students rated multimodal influencing factors, as detailed in Table I. The majority of students (72 per cent [95 per cent CI 0.60-0.80]) rated the practical session in college using the ultra-violet light hand hygiene inspection cabinet as having most influence on their practice. Over 90 per cent (95 per cent CI 0.68-0.93) of third-year students and 80 per cent (95 per cent CI 0.56-0.93) of fourth-year students rated this as having the most influence on their hand hygiene behaviour.

Association between the year the student was in and the reported influence the practical session in college had on their hand hygiene behaviour was tested using a chi-squared test. A significant association was identified, $\chi^2$ (1, $N$ = 64) = 18.33, $p$ = 0.02.

The comparison between second years and fourth years with regards to the influence of the therapist on their hand hygiene behaviour was studied. The level of influence was

**Table 1.** Reported influence of educational methods on student hand hygiene practice

| Year | Practical (with UV light) %/95% C.I. | Therapist (O.T.) | Other healthcare workers | Online learning (e-learning) | Peer checking | Didactic presentation |
|---|---|---|---|---|---|---|
| Second years (%) | 48 | 61 | 30 | 22 | 18 | 0 |
| ($n$ = 23) | 0.27-0.70 | 0.39-0.80 | 0.14-0.53 | 0.08-0.44 | 0.06-0.40 | |
| Third years (%) | 90 | 29 | 19 | 29 | 14 | 0 |
| ($n$ = 21) | 0.68-0.93 | 0.12-0.52 | 0.06-0.43 | 0.12-0.52 | 0.04-0.37 | |
| Fourth years (%) | 80 | 25 | 30 | 25 | 20 | 0 |
| ($n$ = 20) | 0.56-0.93 | 0.10-0.49 | 0.13-0.54 | 0.10-0.49 | 0.07-0.44 | |
| All students (%) | 72 | 39 | 27 | 25 | 17 | 0 |
| ($n$ = 64) | 0.60-0.82 | 0.27-0.52 | 0.17-0.39 | 0.15-0.38 | 0.09-0.30 | |
| $\chi^2$ value | 18.34 | 12.32 | 7.27 | 10.70 | 5.86 | 0 |
| $P$ value | 0.02 | 0.14 | 0.52 | 0.22 | 0.66 | 0 |

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divided into most influence and not most influence. Because of a small sample ($n$ = 64), a Fisher's Exact test was used to establish the level of influence of the therapist on student hand hygiene. In all, 14 second-year students rated the level of influence of the therapist as "most", whereas only five fourth-year students rated the level of influence of the therapist as "most", indicating a significant difference regarding the influence of the therapist on these groups, $p = 0.03$.

## Discussion

This study adds to the existing literature regarding hand hygiene educational strategies. The concept of practical sessions was also explored in a study by Porzig-Drummond *et al.* (2009), where their findings suggested that even brief disgust-based interventions may have a successful place in promoting hand hygiene compliance. Their findings suggest that an emotional link to disease may be more important to prompt hand hygiene than a cognitive link. Similarly, Vanyolos *et al.* (2015) advocate that introducing a ultra-violet test into graduate medical education may help to improve hand hygiene compliance, as it gives immediate visual feedback to medical students.

The majority of third- and fourth-year students in this study strongly favoured the influence of practical education (using a ultra-violet light hand hygiene inspection cabinet) on their hand hygiene behaviour, whereas the majority of second-year students rated the therapist they were on placement with as most influential to their practice. There could be many influencing factors for this difference. One could be that second years had just completed their first block placement of eight weeks, so they rated the therapist as more influential. This may be that more junior students (second years) are influenced more by those working in clinical practice, whereas more senior students (third and fourth years) have established their own hand hygiene habits by this stage. Tompson and Ryan (1996) discuss the professional socialisation of students and state that there is a shifting focus in placements. By the time students reach fourth year, the supervision model is one of consolidation, whereas in the second year, the model is one of students becoming familiar with their role and more reliant on the therapist for direct teaching. This would suggest that education before students going on placements would provide more junior students with increased capability and motivation to enable them to practice appropriate hand hygiene behaviour while on placement (Michie *et al.*, 2014). Future research in this area would be beneficial to explore the therapists influence on students and the need for ongoing education of therapists to make them explicitly aware of their influence.

Online approaches are advocated for inclusion when teaching hand hygiene to medical students (Kaur *et al.*, 2015). This study adds another dimension to those findings, as only 25 per cent (95 per cent CI 0.15-0.38) of students in this study found the e-learning hand hygiene module to have most influence on their practice. In Ireland, at present, the recommendation is made that an e-learning programme may be used in isolation to educate regarding hand hygiene (The Royal College of Physicians of Ireland, 2015). This study would caution the use of solely using online learning and suggest that wholly online approaches would miss vital opportunities to teach face-to-face and that because of the different learning styles of students various educational methods need to be used to target different learners. For example, over 90 per cent (95 per cent CI 0.68-0.93) of third-year students rated the practical session in college using the ultra-violet light hand inspection cabinet as having the most influence on their practice.

Students also stated that one of the influencing factors for not engaging in hand hygiene practices was that it was not perceived as important on clinical placement. This links with other studies regarding role models and the importance of having good role models for hand hygiene on sites to champion hand hygiene for others (Jang *et al.*, 2010, Dixit *et al.*, 2012). Feather *et al.* (2000) found that medical students were modelling the poor hand hygiene practices of medical personnel. Likewise, this study found that occupational therapy students were influenced by their educator/therapist and others on the site. Role modelling on site has been rated as important, and for future clinical placements, this knowledge could be harnessed to improve hand hygiene practices.

Forgetting to engage in hand hygiene, while on practice was a common reason cited for non-compliance. Efficacy of visual cues effecting improved hand hygiene practice is debatable (Wearn *et al.*, 2015, Nevo *et al.*, 2010). Use of visual reminders is a component of the Five Moments for Hand Hygiene multimodal hand hygiene improvement strategy (World Health Organization, 2009) and is promoted as the cue for healthcare workers to engage in hand hygiene (Luangasanatip *et al.*, 2015). As practice sites vary considerably, the issue of reminders and prompts needs to be discussed at local level in conjunction with a hand hygiene behavioural strategy to see what would impact most with regards to increasing student compliance. A national focus via inter-professional regulatory bodies to obtain consensus on an educational approach needs to be considered. Comprehensive collaborative approaches in universities are required to increase the profile of hand hygiene education within undergraduate healthcare student programmes.

Using a hand sanitizer instead of washing hands was chosen as a reason in Collins, McLaughlin and Walsh's (2012) study for why people did not *wash* their hands. They identified that a hand sanitizer was a method of hand hygiene. In this study, students stated that the most frequent reason for *not* engaging in hand hygiene was that they used an alcohol-based hand rub (ABHR) instead. As they were engaging in hand hygiene by using the ABHR, it is unknown whether the students understood this. Further research would need to be conducted to check did the students understand that hand hygiene included using ABHR as well as hand washing.

Future research needs to consider the influence the students on the hand hygiene practices of the therapists/educators who facilitate the clinical placements. From another perspective, Almaguer-Leyva *et al.* (2014) suggest that medical students can successfully be used as covert observers in the evaluation of hand hygiene compliance. Their incorporation of medical students into their hand hygiene programme revealed a discrepancy between covert observers and infection control observers. They suggest that using medical students in this role leads to no Hawthorne effect. However, there are ethical issues with this approach. Irish occupational therapy students have not been used in this role previously, and it could be a novel suggestion for increasing hand hygiene audit in primary care settings and on home visits, where traditionally an audit of hand hygiene compliance has been impossible.

This study provides important information regarding hand hygiene behavioural perceptions of a group of healthcare students who previously were not highlighted in Irish or international student-related hand hygiene research and literature.

- University healthcare course curricula should include multimodal approaches to the education of hand hygiene.
- While hand hygiene e-learning modules are beneficial, they should be used in conjunction with a multimodal educational strategy that incorporates practical elements

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- The influence of the therapist on a students' behaviour should be utilised to improve both student and professionals hand hygiene adherence.

*Limitations*

This small-scale study was carried out with a limited sample size ($n = 64$), yet response rates were high. The fact this was a one-site study may reduce generalisability to the wider occupational therapy student population; however, the findings are important, as they impact on the teaching in the undergraduate occupational therapy course and highlight areas for future research. The entire sample that was available was sampled; therefore, there was no selection bias. This study looked at students' perceptions of what influenced their behaviour rather than observation of their actual hand hygiene practices. Future direction for this research would be to replicate this intervention in other healthcare-related courses and also take into account the views of teaching staff regarding hand hygiene education in various healthcare-related undergraduate courses.

## Conclusion

The findings indicate that the introduction of hand hygiene educational methods into the curriculum enhanced students' knowledge and also impacted on their perceived hand hygiene behaviour and practices. Practical education (using ultra-violet light hand hygiene inspection cabinet) and role modelling (from the therapist and others on site) influenced student behaviour more than other educational approaches. This study highlights that students may be influenced by different methods of hand hygiene education at different stages in their course and that while on placement the therapist may be an important influencing factor in the earlier years of occupational therapy education.

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## Appendix. Research questionnaire

**Hand hygiene questionnaire**

**Preliminary piece to read and if agreeable please tick the box**

| | |
|---|---|
| If you consent to completing this questionnaire on hand hygiene and if you are aware that the results may be published but there will be no identifying features to identify you personally please tick this box →→→→→→→→→→→→→→→→→→→→→ | |

**Question 1**

Please circle what year of your programme are you currently in:

| | | | |
|---|---|---|---|
| Year 1 | Year 2 | Year 3 | Year 4 |

**Question 2**

Please pick three items from this list below and rate the following from 1 to 3:
**1** = the most frequent reason I carried out hand hygiene practices
**2** = the second most frequent reason for carrying out hand hygiene practices
**3** = the third most frequent reason for carrying out hand hygiene practices

**Reasons for carrying out hand hygiene on practice experience:**

| | |
|---|---|
| Had plenty of time | |
| Soap/dispenser was located conveniently | |
| My hands were visibly dirty | |
| The client had an infection | |
| I washed my hands when I did not have an alcohol based hand rub instead | |
| I believe hand washing prevents the spread of diseases | |
| The team member I was with washed his/her hands | |
| Because that is what I was taught to do | |
| I never wash my hands before an activity | |
| Dispenser full or product was available | |
| I washed my hands when I remembered to do it | |
| I washed my hands when I believed my hands were dirty | |
| Returning to an activity where hands would stay clean | |
| Planning on touching someone | |
| I washed my hands when my educator washed his/her hands | |
| I care if my hands are dirty | |
| Other (please specify) | |

**Question 3**

Please pick three items from this list below and rate the following from 1 to 3:
**1** = the most frequent reason I did not carry out hand hygiene practices
**2** = the second most frequent reason I did not carry out hand hygiene practices
**3** = the third most frequent reason I did not carry out hand hygiene practices

**Reasons for not carrying out hand hygiene on practice experience:**

| | |
|---|---|
| Too busy | |
| Soap dispenser empty | |
| I did not believe my hands were dirty | |
| I was not dealing with patients that were a risk to me | |
| I was not planning on touching anyone | |
| I used an alcohol based hand rub instead | |
| The team member I was with did not wash his/her hands | |
| If I washed my hands it would have interfered with patient care | |
| It did not seem like it was important on my placement | |
| I always wash my hands before an activity | |
| It never crossed my mind to wash them | |
| I did not wash my hands because I had nothing to dry my hands afterwards | |
| Touching anything in (location) seemed dirtier than not washing my hands | |
| Hands were not visibly dirty | |
| I have a skin sensitivity so I did not wash my hands | |
| I don't believe hand washing prevents the spread of diseases | |
| Soap/dispenser was too far away | |
| My educator did not wash his/her hands | |
| The client did not have an infection | |
| I simply forgot | |
| I used gloves instead | |
| Other (please specify) | |

(continued)

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**Question 4**

Can you please rate the influence each of the following three methods of hand hygiene education had on your hand hygiene practices by ticking one box per method?

| Method | | 1= **Most** influence on my practice | 2 = **Some** influence on my practice | 3 = **Neither** agree or disagree | 4 = **Little** influence on my practice | 5 = **Least** influence on my practice |
|---|---|---|---|---|---|---|
| 1 | HSELanD online hand hygiene for clinical staff course | | | | | |
| 2 | Practical session in pre linking learning using the "glow box"/ hand hygiene inspection cabinet | | | | | |
| 3 | PowerPoint session in pre linking learning | | | | | |
| 4 | Peer checking fellow students to check if hand hygiene ready | | | | | |

**Question 5**

Can you please rate the influence each of the following had on your hand hygiene practices by ticking one box per item?

| Statement | 1 = **Most** influence on my practice | 2 = **Some** influence on my practice | 3 = **Neither** agree or disagree | 4 = **Little** influence on my practice | 5 = **Least** influence on my practice |
|---|---|---|---|---|---|
| The hand hygiene practices of others on site | | | | | |
| The hand hygiene practices of my therapist/educator | | | | | |

**Question 6**

Any further comments?

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