The Lack Of Effective Hand Washing Practice Despite High Level Of Knowledge And Awareness In Medical Students Of Clinical Years

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Background: Nosocomial infection is among the leading problem in many major hospitals resulting in soaring cost expenditure in managing its affect. Hand washing practice is a crucial preventive way to contain such mischief but many ignored its importance. This is perhaps due to lack of appropriate role modeling from senior practitioners.

Subjects and methods: Our study examined the prevalence of hand washing practice among medical students from year 3 to 5 and compared it to their knowledge and level of awareness on its importance in clinical practice. 142 students were randomly observed during their clinical work in the wards on this practice and questionnaires were later distributed to 268 students from all semesters on their knowledge on the technique and awareness on its importance.

Results: Out of 142, almost 80% washed their hands but only 41.6% performed effective hand washing. In contrary, 80 to 90% showed good level of knowledge and awareness as well as perception about its importance in clinical practice.

Conclusions: The contradictory findings between the actual practice of hand washing and knowledge as well as awareness suggest that enforcement on the practice is necessary. This requires motivation and cooperation from all health alliances and higher authority in the health system. Remedial measures are much needed in order to contain high incidence of nosocomial infection in our local practice.

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Key Words: Effective hand washing, Nosocomial infection, Practice of hand washing

Introduction

It has been since the 18th century that high rate of perinatal mortality was recognized to be associated with nosocomial infection.[1] Since, effective hand washing was attributed as one of the most important measures to reduce such risk.[2] Along with the acceptance of the 'germ' theory (which states that germ could be passed between patients and healthcare workers), it has also been established as a standard medical precaution.[3]

Although infectious control training including effective hand washing is included early in the medical school curriculum, studies have found that there was no significant knowledge in infectious control among medical students but the awareness increases after implementation of continuous training on the matter.[5, 6] High level of awareness among medical students is also shown to be associated with the role played by lecturers, health care staffs and compliance of infection control practices in health care institution.[7, 8]

Despite the emphasis on importance of effective hand washing in prevention of nosocomial infection, not all students or health care workers are compliant to it where they either fail to wash their hands or fail to follow the correct steps in effective handwashing.[9] According to a research observing health care workers and medical students during clinical practice, the overall frequency of hand washing before and after contact with patients were 6.7% and 23.7% respectively which are generally very poor.[10] Other study on students during their clinical examination also showed poor results for hand washing practice as only 8.5% performed it and another 18.3% did after reading hand washing signs.[11]

This research is conducted in order to determine the actual practice of effective hand washing among medical students of International Medical University (IMU) Clinical School in conjunction with hypothesis that their awareness and knowledge about its importance are high as formal education is already introduced from early part of their training.

We hope that through this research project, more countermeasures can be identified to improve the awareness and practice of effective hand washing in order to minimize the risks of preventable nosocomial infection in our local practice.

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Methods

We carried out a cross sectional study consisting of: an observation and a survey for a period of a month. To determine the prevalence of effective hand washing practice, students from all years (3-5 years) in IMU Clinical School, Seremban, were randomly selected in the wards of Hospital Tuanku Jaafar (the teaching hospital for IMU in Negeri Sembilan, Malaysia) during their clinical work to be single blindly observed for their practice of hand washing before and after physical examination of in-patients and while performing a medical procedure. The technique of hand washing was evaluated to either simple or effective. Consents were later taken before inclusion of the observed subjects into the study.

In the second part of the study a questionnaire survey was conducted to all medical students to assess their knowledge and awareness about hand washing practice. They have already attended formal sessions during their pre-clinical years and again during their orientation week in their clinical years on hand washing practice. The questionnaire was validated after tested on a small group of students before the actual distribution.

During the observation, researchers collected the necessary information anonymously from selected students. However they were informed of purpose of the study at the end of data collection. The questionnaires were distributed to students after obtaining verbal consents.

All the collected data were analyzed using SPSS version 15.0 and Microsoft Excel 2007. Frequencies and percentages were computed for all the information gathered and tabulated in table 1 & 2. Chi- Square tests were used to look at the relationship between practices of hand washing with the timing of practice.

Definitions

Effective hand washing is defined as washing of hands with soap and water according to the sequence illustrated in page 19 of the WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft): A Summary.[12] For the ease and practicality of the observation, effective hand washing was arbitrarily defined as the washing of the palmar and dorsal surfaces of both hands with soap and water. *Simple hand washing* is defined as washing of one or both hands without the use of soap.

Result

Prevalence of effective hand washing from observation

A total of 142 medical students from year 3 to 5 were randomly selected in the wards to be anonymously observed for the practice of hand washing before and after physical examination and performing medical procedures. 72 students of the total observed were followed during their performance of physical examination. It showed that 49 (68.1%) did not wash their hands before physical examination and only 18 (25%) of them effectively washed their hands whilst and 5 (6.9%) of them performed the simple technique. Nevertheless, majority washed their hands after physical examination. Amongst them, 23 (31.9%) performed simple while 30 (41.7%) performed effective hand washing. There was a statistically significant relationship between the type of hand washing practice and the timing before or after physical examination ($\chi^2 = 31.7$, $p < 0.010$). See **Table 1**.

Another separate group of 70 medical students were also randomly selected for observation while they are performing medical procedures. It showed that 59 (84.3%) students did not wash their hands before performing medical procedures. However, it is reversed when compared to after performing medical procedures as 70 % washed their hands although only 30 medical students (42.9%) performed effective hand washing and 19 (27.1%) did simple washing. There was a statistically significant relationship between the type of hand washing practice and the timing before or after performing medical procedures ($\chi^2 = 43.5$, $p < 0.010$). See **Table 1**.

The students' perception (level of awareness) about its importance in clinical practice and their knowledge in technique of effective hand washing

A total of 268 students in year 3-5 responded to our questionnaire survey. The total score from section A of the hand washing questionnaire was calculated and subsequently categorized into ranges of <14, 14-21 and >21 which correspond to poor, moderate and good awareness respectively. Summary statistics of the students are shown in **Table 2**. Majority of medical students (81%) had good awareness about the importance of hand washing. Only 3 (1.1%) medical students had poor awareness about it.

Knowledge in the technique of effective hand washing

Only 23 (8.6%) of the total of 268 medical students had correct understanding in the sequence of effective hand washing based on the serial pictures shown in the questionnaire. Unfortunately, majority of them (91.4%) did not know the correct sequence.

The other section of the questionnaire also addresses the students' knowledge thus scores of 4 and 5 are considered as correct answers while scores of 1, 2 and 3 are considered as wrong answers. A total of 252 (94%) medical students knew that the usage of soap and water or alcohol sanitizer with the action of rubbing each part of the hands systematically is considered as effective hand washing. In fact, more than 70% of them also knew that use of water only is not effective and scrubbing of hands with soap and rinsing them with water loosens and removes bacteria from the hands. However, only 90 (33.6%) medical students knew that the Central of Disease Control (CDC) recommends use of hand sanitizer with at least 60% alcohol during effective hand washing. The results are summarized as in **Table 3**.

Perception about the practice of effective hand washing

The bar chart in **Figure 1** shows perception about the practice of effective hand washing amongst the medical students. Only a third of the medical students perceived that hand washing is needed after history taking. However, majority (more than 90%) perceived that hand washing is necessary and compulsory whenever physical contact with patients is involved and it is important especially before touching different patients as well as before and after performing medical procedures. In contrary, only 177 (66.0%) students perceived that it is important to perform effective hand washing in between separate medical procedures performed on a similar patient.

Discussion

The prevalence of hand washing among medical students before and after physical examination varies in its type: simple or effective. The results showed that only 31.9% of the students washed their hands before any physical examination and majority of them (73%) did simple hand washing. In contrary, most students washed their hands after a physical examination, which means out of 10 medical students, 7 of them washed their hands after a physical examination in which the majority used effective hand washing. From these statistical values, we can logically deduce that medical students are unaware of the transmission of communicable diseases from themselves to the patients, but most are aware of the transmission of diseases from patients to patients and from patients to themselves.

For the practice of hand washing before and after performing medical procedures, 84.3% did not wash their hands prior to a medical procedure and even if they do, they practiced simple hand washing but the pattern reversed when looked at after performing procedures among them. From these statistical values, we can infer that most medical students think that sterility can be effectively maintained by wearing gloves without prior washing of hands and the knowledge as well as awareness about transmitting infection to patients are still lacking. These findings are consistent with other studies on the attitude and knowledge of medical students in prevention of nosocomial infection.[4, 5]

Majority of our medical students were observed to not practice hand washing during their actual clinical work and it is consistent to most studies conducted elsewhere. A study conducted in Riyadh, Saudi Arabia showed that most health care workers did not take into consideration of hand washing after any form of physical contact with their in-patients.[13] This is contrary with the findings on their level of awareness about its importance and knowledge on the practice itself.

From the results, majority of then (88.1%) showed good understanding about the importance of hand washing and their knowledge of effective hand washing technique is quite satisfactory. Although 91.4% of them could not correctly identify the sequence of effective hand washing, majority of them knew that the usage of soap and water or alcohol sanitizer is essential and that effective hand washing cannot be achieved by using water only. Moreover, more than 70% of medical students knew that the combination of scrubbing and rinsing the hands with water loosens the bacteria from the hands. However, only 66.4% of them are aware of the recommendation by the Central of Disease Control (CDC) to use hand sanitizer with at least 60% of alcohol. We could thus conclude that the general knowledge of effective hand washing among medical students is somewhat satisfactory requiring further measures to improve it somehow.

In the evaluation of the perception of effective hand washing practice, majority of them agree that hand washing is necessary before and after physical examination and during ward rounds. It is also perceived as necessary before and after performing medical procedures. However, there are more than 30% that stood neutral or had a negative perception about hand washing in between two different procedures on the same patient. This may be due to the lack of awareness among some medical students about the possibility of transmission of disease from one part to another part of the body of same patient, especially in skin lesions such as *Molluscum contagiosum*.[14]

From the research, it was observed that despite the satisfactory knowledge and level of awareness about hand washing, there was poor actual practice among the medical students in IMU. This could be explained by the possibility of inadequate reinforcement among them and medical staffs. Students perhaps tend to also imitate what they observed during clinical practice where effective hand washing is not strictly performed. A clinical practitioner has noted his dilemma of sparing too much time on hand washing incongruent with the amount of physical contact with patients in a busy ward daily. The expressed gesture has proven the overwhelming concern on lack of practice among medical practitioners despite the good awareness and knowledge about its importance in preventing nosocomial infection.[15] Good hand washing habit must be imposed not only on medical students and junior doctors, but also on registrar, specialist and consultant as they are role models to their juniors.

There are limitations to the study as the data collected from the observation of a group of students on their actual practice of hand washing was not truly reflected by the survey used on deducing their level of awareness or knowledge. The survey was also conducted on all students with different level of maturity and clinical training opportunities which may have contributed to the study bias.

Conclusion

From our research, it was found that knowledge in the technique of effective hand washing and awareness of its importance among medical students are satisfactory. However, it does not translate into good hand washing practice as the uptake among them is poor.

It is therefore important that recommendations should be made available in order to improve the practice among medical students as well as other health alliances:

1. Medical schools should stress on the importance of hand washing among medical students and may provide each and every student with mini-alcohol

sanitizer. Medical schools should make it compulsory that medical students carry the alcohol sanitizers provided with them all the time.[16]

2. In conjunction with the recent rise of pandemic of H1N1 virus, the hospitals and government should take the opportunity to promote hand washing through the mass media regularly.[16]

3. Further investigation into the factors that might promote hand washing including review of the current teaching program is recommended.

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Table 1

Table 1	Before physical examination		*After physical examination*		Before medical procedure		*After medical procedure*	
Hand washing	No of students n = 72	(%)	No of students n = 72	(%)	No of students n = 70	(%)	No of students n = 70	(%)
No	49	68.0	19	26.4	59	84.3	21	30.0
Simple	18	25.0	21	31.9	7	10.0	19	27.1
Effective	5	6.9	30	41.7	4	5.7	30	42.9

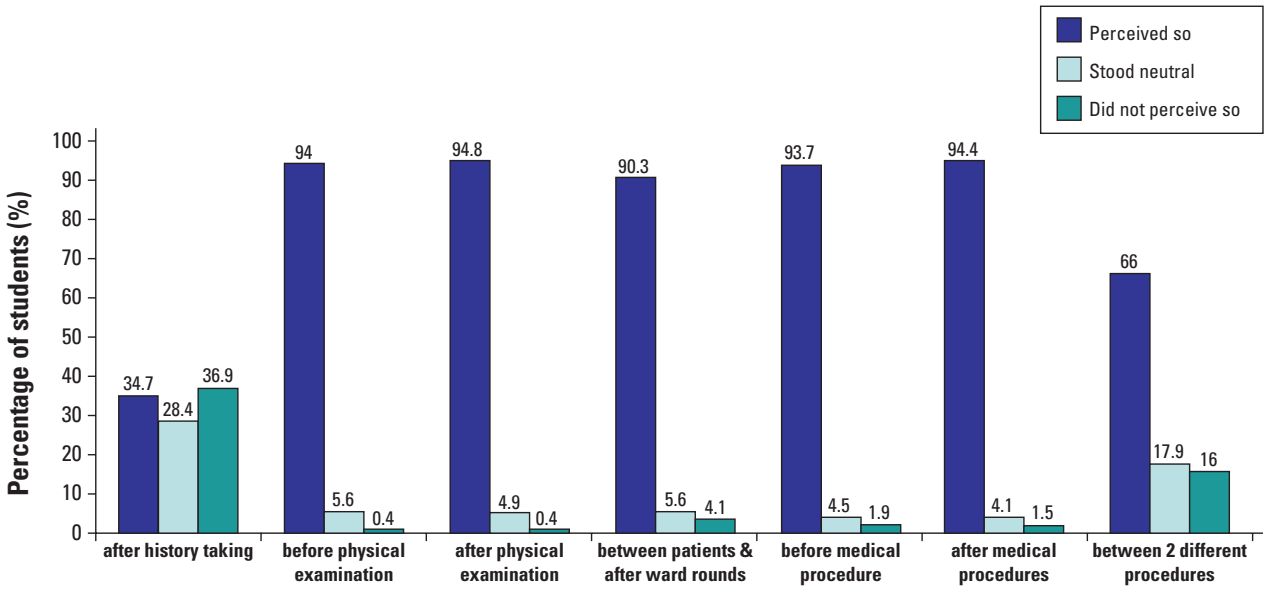
Table 2

		Number of medical students	Percentage (%)
Awareness	Poor (<14)	3	1.1
	Moderate (14-21)	29	10.8
	Good (>21)	236	88.1
Total		**268**	**100**

Table 3

		Yes	No
Knowledge	Effective hand washing is rubbing hands with soap and water or alcohol sanitizer	252 (94.0%)	16 (6.0%)
	Usage of water only is not an effective handwashing	212 (79.1%)	56 (20.9%)
	Scrubbing hands with soap and rinsing them with water eliminates hand bacteria	194 (72.4%)	74 (27.6%)
	At least 60% alcohol for effective hand washing	90 (33.6%)	178 (66.4%)

Figure 1: Perceptions About The Practice of Effective Handwashing



Appendix 1

HANDWASHING QUESTIONNAIRE

Thank you for participating in this survey. Please read each statement carefully, and answer it in the way that best describes you.

Semester :

ID Number :

Gender : ❑ M ❑ F

Please tick (✔) in the boxes according to the number which is equilvalent to your opinion

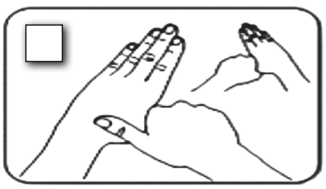
1	2	3	4	5
strongly disagree	somewhat disagree	neutral	somewhat agree	strongly agree

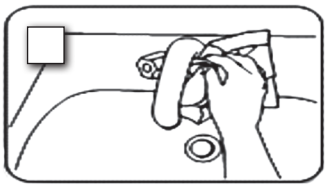
A. *Awareness of The Importance of Effective Handwashing*

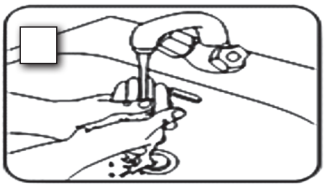
1. To reduce risk of contracting the disease or other infections yourself 1 2 3 4 5
2. To reduce spread of infection among patients 1 2 3 4 5
3. Infections that can be transmitted from hand-to-hand contact is
   a. Flu 1 2 3 4 5
   b. Common cold 1 2 3 4 5
   c. Infectious diarrhoea 1 2 3 4 5
   d. Typhoid fever 1 2 3 4 5

B. ***Knowledge of The Technique of Effective Handwashing***

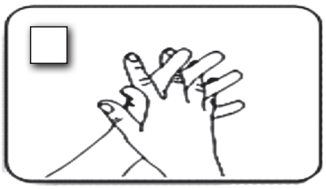
1. Please arrange the following handwashing sequence in proper order (1 – 12):

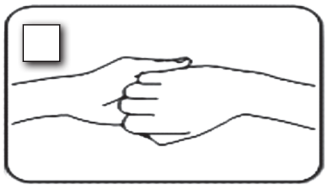

rotational rubbing of left thumb clasped in right palm and vice versa

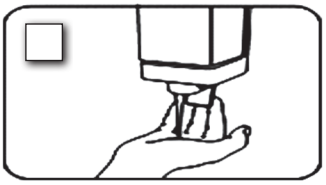

use towel to turn off faucet

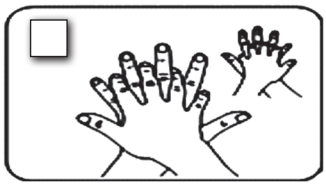

rinse hands with water

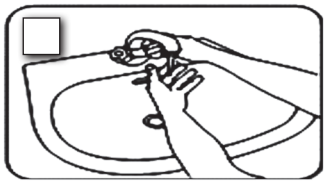

dry thoroughly with a single use towel

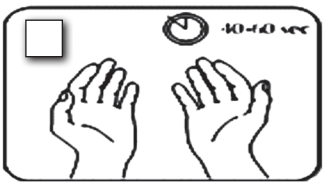

palm to palm with fingers interlaced


backs of fingers to opposing palms with fingers interlocked


apply enough soap to cover all hand surfaces


right palm over left dorsum with interlaced fingers and vice versa


wet hands with water


… and your hands are safe


rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa


rub hands palm to palm

Please tick (✔) in the boxes according to the number which is equilvalent to your opinion

1	2	3	4	5
strongly disagree	somewhat disagree	neutral	somewhat agree	strongly agree

2. Effective handwashing involves the usage of soap and water or alcohol sanitizer with the action of rubbing of each part of the hands systematically. 1 2 3 4 5
3. The usage of water only (without soap) to wash hands is NOT considered as effective handwashing 1 2 3 4 5
4. Central of Disease Control (CDC) recommends hand sanitizer with at least 60% alcohol. 1 2 3 4 5
5. The combination of scrubbing your hands with soap (antibacterial or not) and rinsing them with water loosens and removes bacteria from your hands. 1 2 3 4 5

C. *Perceptions About the Practice of Effective Handwashing*

1. Handwahing is needed even only after history taking 1 2 3 4 5
2. Handwashing is necessary and compulsory BEFORE performing a physical examination 1 2 3 4 5
3. Handwashing is necessary and compulsory AFTER performing a physical examination 1 2 3 4 5
4. It is necessary to do handwashing from patient to patient and effective handwashing after ward rounds 1 2 3 4 5
5. Handwashing is necessary and compulsory BEFORE performing a procedure 1 2 3 4 5
6. Handwashing is necessary and compulsory AFTER performing a procedure 1 2 3 4 5
7. It is necessary to do effective handwashing in between two different procedures on the same patient 1 2 3 4 5

Thank you for participating in this questionaire. All information disclosed in this questionaire is strictly confidential and participants will remain anonymous.