

Prevention of Health Care Associated Infection: Time to Prime Students on Hand Hygiene!

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Abstract

Background: In today's era of preventive medicine, infection control practices hold the centre stage for prevention of Health care associated infection. Adequate knowledge and compliance of hand hygiene is undoubtedly the most essential component which needs to be instilled in all health care personals including medical undergraduate students.

Objective: The present study aimed at assessing the knowledge and awareness of hand hygiene in students of a Medical college.

Methodology: A cross sectional questionnaire based study was conducted in a medical college teaching hospital and included students from I MBBS, II MBBS, III MBBS part I and II and also students undergoing internship in the hospital.

Results and discussion: A total of 383 participated in the study and assessment of the students regarding their awareness showed that over all the awareness regarding the relevance of hand hygiene ranged between 39.2% and 89.2%.

The knowledge aspect ranged from 36.6% to 64%. The study showed that overall the students were aware, but lacked knowledge in few important aspects of the laid down protocols of hand hygiene (80.5% vs 56.7%). Comparison of different batches showed a significant difference ($p < 0.05$) in responses of various batches. The study results are in concordance with other studies in literature, where too a gap in knowledge has been realized.

Conclusion: Need for introduction of hand hygiene practices in the early years of Medical graduate curriculum with adequate emphasis on all keys areas and thereafter a continued plan for educational and training program.

Keywords: Hand hygiene, Health care associated infections, medical undergraduate students.

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INTRODUCTION

Health care associated infections (HAI), is recognized as a critical indicator of any health care facility. HAI rates from India remain at a higher bracket in comparison to our western counterparts and the gap is even more glaring in intensive care units [1, 2]. Prevention of HAI remains the key tool to tackle this mammoth of a problem. And only if we take concrete steps today, will we be able to bring about a positive change in the near future. According to World Health Organization (WHO) the practice of hand washing is the single most cost effective tool to not only reduce HAI but also curb the spread of antimicrobial resistance in health care setting [3-6]. However, it has been shown that in spite of introduction of a range of tools that were based on a multi-modal strategy for effective implementation, training, education evaluation and feedback, the compliance of HCWs to the laid down

protocols of hand hygiene is highly variable and has been categorized as poor in many studies [7-10].

Knowledge and awareness regarding Hand hygiene is the first step to compliance and literature regarding this amongst medical students is not encouraging [11-13]. The Medical students during the MBBS curriculum are regularly attending in-patient and out-patients clinics and also operation theatres and hence are exposed to risk of acquiring or transmitting infections especially the blood borne pathogens [14]. With a competency based medical curriculum on the helm of getting implemented, the undergraduate medical students are bound to have an early exposure to clinical settings and therefore play a very crucial role in the epidemiology of HAI [15]. Thus, it is imperative that undergraduate medical students are well aware of the basic principles of hand hygiene. The present study was undertaken to access the level of awareness and

knowledge amongst undergraduate medical students regarding hand hygiene.

MATERIAL AND METHODS

A cross sectional study was conducted in a medical college teaching hospital within the time period of November 2018 to January 2019. The study participants included students from I MBBS, II MBBS, III MBBS part I and II and also students undergoing internship in the hospital. A semi structured, anonymous, questionnaire was used to collect information regarding student's awareness and knowledge of hand hygiene protocols as given by WHO. The simple random sampling technique was used to select students for the study after taking informed consent. The questionnaire was pretested before being utilized for data collection and necessary modifications were made in terms of content and language. The items included in the questionnaire were designed for assessing both the awareness and knowledge domain of hand hygiene amongst students across six semesters. There were either multiple choice questions or had options "yes" / "no" as answer and each correct answer was given a point. The scores were calculated and expressed in percentages.

Statistical Analysis

The data obtained from the completely filled questionnaire was entered into Microsoft excel sheet and analyzed using SPSS ver. 17. The analysis was performed in terms of descriptive statistics (percentages and averages). Kruskal-Wallis Test was used to compare between the groups and $P < 0.05$ was considered as statistically significant.

Ethical Clearance

The study was presented before the Institutional Ethics Committee (IEC) before commencing and due clearance was taken.

RESULTS

A total of 383 students took part in the study which was 100% participation with no students declining to take the test. Amongst the participants 201 (52.4%) were female and the rest 182 (47.5%) students were male, all in the age bracket of 18 to 25 years with a mean age of 21. Semester wise distribution of the study group is detailed in Table-1.

Table-1: Semester wise distribution of the study group (N=383)

	I MBBS (1 st semester)	IIMBBS (3 rd semester)	II MBBS (5 th Semester)	III MBBS Part I (7 th semester)	III MBBS part II (9 th semester)	Interns
Male	34	32	36	27	32	22
Female	31	38	45	23	35	28
Total	65	70	81	50	67	50

Awareness of study participants regarding hand hygiene

Study result for awareness of the study group towards hand hygiene is depicted in table 2. Assessment of the students regarding their awareness showed that over all the awareness ranged between 39.2% and 89.2%. The batch that showed the least awareness was the I MBBS (1st semester) and maximum was displayed by the III MBBS part I (7th semester) closely followed by the II MBBS (5th semester) students. There was

significant difference between the 1st semester students and the rest of the students. The aspect which had the least positive responses was for the formal training on hand hygiene. Of the 383 students only 264 (68.9%) had received training and amongst them there were only 12 students (18.5%) of the 1st semester. 318 (83%) of the total students knew the importance of hand hygiene in preventing HAI. In the study the maximum non responders were in the batch of I MBBS (9, 13.8%).

Table-2: Awareness of study participants regarding hand hygiene

	Awareness of Hand hygiene as an effective tool for preventing HAI. N (%)	Received formal training on Hand hygiene in the last three years. N (%)	Awareness regarding 'My 5 moments of hand hygiene' N (%)	Total non responders N (%)	Average awareness N (%)
I MBBS (1 st semester) (N=65)	40 (61.5)	12 (18.5)	25 (38.5)	09 (13.8)	25.6 (39.2)
IIMBBS (3 rd semester) (N=70)	58 (82.9)	49 (70)	51 (72.9)	03 (4.2)	52.6 (75.1)
II MBBS (5 th Semester) (N= 81)	73 (90.1)	63 (77.8)	74 (91.4)	04 (4.9)	70 (86.4)
III MBBS Part I (7 th semester)	43 (86)	47 (94)	44 (88)	none	44.6 (89.2)

(N=50)					
III MBBS part II (9th semester) (N=67)	59(88)	53 (79.1)	60 (89.5)	02 (2.9)	57.3 (85.0)
Interns (N=50)	45(90)	40 (80)	37 (74)	04 (10%)	40.6 (81.2)
Total	318 (83)	264 (68.9)	291 (75.9)	09 (13.8)	290.7 (80.5)
P value(Chi-square)	.000 (27.768)	.000 (89.743)	.000 (71.642)		

Assessment of knowledge of hand hygiene techniques

Table-3 illustrates assessment of knowledge of the study group. The questionnaire had few selected items related to the key areas of Hand hygiene as per the guidelines given by WHO. It was evident in the study that overall the awareness of the students towards the importance of hand hygiene was much better than their knowledge of the correct technique (80.5% vs 56.7%). II MBBS (5th Semester) and IIIMBBS (7th

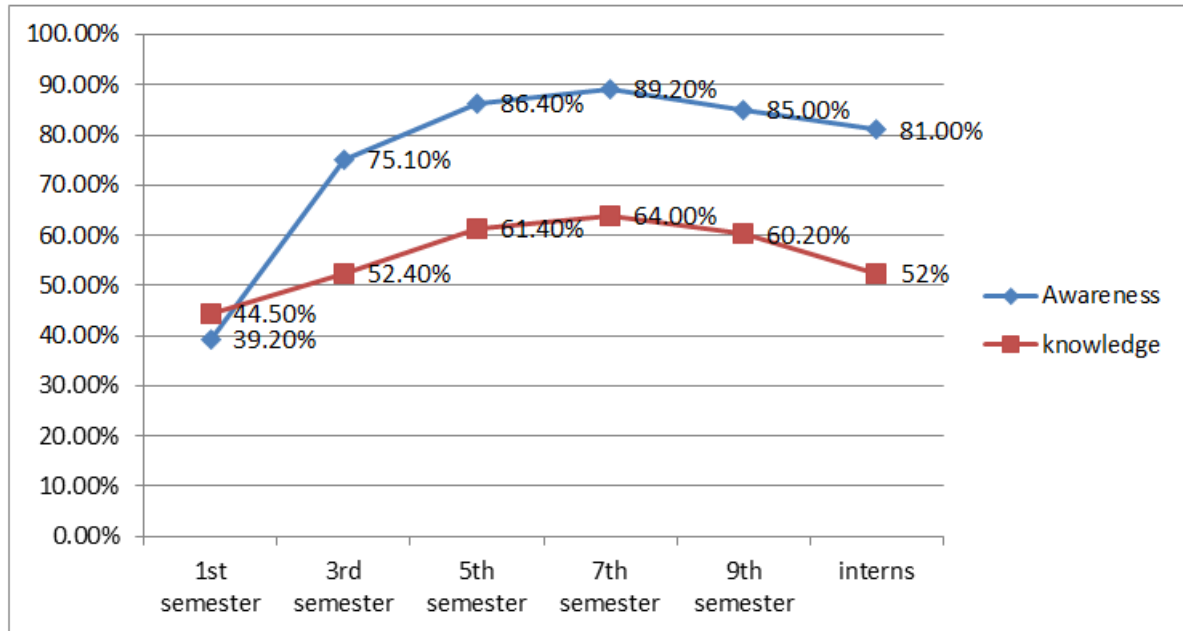
Semester) were the batches which fared marginally better than the other batches with an average knowledge of 64% and 61.4% respectively. Components of the hand hygiene procedure where the students fumbled were related to the appropriate method of hand drying, minimum time required and composition of alcohol based hand rub. The one item which had the maximum positive responses (340, 88.7%) was regarding the use of gloves as a replacement of hand washing.

Table-3: Assessment of knowledge of hand hygiene techniques

	Minimal time needed for hand washing N (%)	Most appropriate method of drying hand after washing with soap and water N (%)	Correct hand hygiene sequence identification N (%)	Gloves as replacement for Hand washing N (%)	% of alcohol in alcohol based hand rub. N (%)	Total non responders N (%)	Average knowledge N (%)
I MBBS (1st semester) (N=65)	25(40.9)	13 (20)	11 (16.9%)	54(83.1)	16(24.6)	4	23.8 (36.6)
II MBBS (3rd semester) (N=70)	49 (70)	8(11.4)	40(57.1)	61(87.1)	23(32.8)	1	36.2 (52.4)
II MBBS (5th Semester) (N= 81)	54 (66.6)	19(23.5)	55(67.9)	67(82.7)	54(66.6)	None	49.8(61.4)
III MBBS Part I(7th semester) (N=50)	36 (72)	8(16)	35(70)	46(92)	35(70)	2	32 (64)
III MBBS part II (9th semester) (N=67)	40(59.7)	11(16.4)	47(70.1)	64(95.5)	40(59.7)	3	40.4(60.2)
Interns (N=50)	6 (12)	17(34)	35(70)	48(96)	25 (50)	none	26.2 (52.4)
Total	210 (54.8)	76 (19.8)	223 (58.2)	340 (88.7)	193(50.3)	10	211.8 (56.7)
P value(Chi-square)	.000(56.036)	.051(11.003)	.005(16.726)	.043 (11.459)	.000(43.691)		

Taking into consideration both awareness and knowledge amongst the students, a distinct trend was seen from the junior most to the senior most batch of students (Graph-1). It was evident that I MBBS students (1st semester) were least informed (39.2% & 44.5%). Then an upward trend was seen which peaked

in II MBBS (5th semester) and III MBBS Part I (7th semester). The students of III MBBS Part II (9th semester) and the interns again showed a down ward graph. Over all the students were aware but had gaps in specific knowledge components (80.5% vs 56.7%).



Graph-1: Awareness and knowledge of students regarding Hand Hygiene

DISCUSSION

The last decade has seen a lot of initiatives by International Health Agencies such as the WHO and Centre for Disease Control and Prevention to promote hand hygiene and has also brought forth evidence based concepts and guidelines on hand hygiene in healthcare settings. In 2009 The World Health Organization launched SAVE LIVES: Clean Your Hands global campaign which is celebrated annually on 5 May. This campaign has played a major role in promoting hand hygiene in health care around the world [16, 17]. Today's scenario mandates all health care workers including undergraduate medical students not only to be aware but also know the accurate process and method of hand hygiene. Although, numerous studies have been done for the knowledge attitude and practise, but very few have representations from all batches of students.

This questionnaire based study was undertaken in a medical college and included all available batches of students with the intent to assess awareness and knowledge of hand hygiene right from the first year students till students who were undergoing internship. There was slight preponderance of female students in the study participants which is similar to other studies [11]. In our case it may be due to their higher attendance in class as the study was conducted during regular class hours. It was encouraging to note that majority of students (318, 83%) recognized washing hands as an important preventive measure for spread of

infection. Kulkarni et al who conducted their study on students of 2nd, 3rd, and 4th year MBBS reported a combined score of 77.2% and M Bouwer *et al.*, in their study on final year students showed that 53.3% knew that the single most important way to prevent the spread of infection in the hospital environment is good hand hygiene practices [18, 11]. The students gave an exceptionally good response to the concept of "My 5 moments of hand hygiene" with a total of 291 (79.6%) students answering affirmatively. Most of the studies conducted amongst students on this concept have reported variable scores. Salati *et al.*, showed a low score of just 21.4%. In another questionnaire based study by Kadi A, 56% of the study group were aware of the indications of hand hygiene [19, 20]. A formal training session on a regular basis on hand hygiene is pre-requisite for better compliance and studies done on medical undergraduate students reveal that the numbers are in wide range. Thakker *et al.*, and Kamble VS *et al.*, in their study on 2nd MBBS students had 14.2% and 85.4% students respectively who claimed to have received formal training [21, 22]. In the present study overall there were 264 (68.9 %) students who had undergone a formal training, out of which only 12 were from 1st MBBS. This study demonstrates that the awareness amongst our students is fairly high (80.5%). Our higher scores are probably due to the deliberate sensitization of the students especially during practical classes and clinical rounds. At the same time it is

worthy to note that 1st MBBS students are falling back significantly from the rest of the batches.

The assessment of knowledge of the various key areas of hand hygiene is essential for identifying the gaps in the knowledge and for taking effective remedial measures. In the present study we incorporated five crucial and often missed aspects of hand hygiene as propagated by WHO. Majority (88.7%) of the study participants knew that wearing of gloves do not replace the need of washing hands which is similar to the results of study done by Prabhakumar *et al.*, [23]. Our study showed that the students had lacunae in specific areas like selection of most appropriate method for drying hands after washing, where in only 19.8% of the students gave the right answer. Also, the correct sequence of hand washing was identified by 58.2% and 50.4% of students had knowledge of the % of alcohol in hand rub. These findings are although better than that of Kulkarni *et al.*, yet cannot be termed as good. The minimum time required for hand washing and rubbing should be essentially known to HCW. Modi *et al.*, and kulkarni *et al.*, both the studies included students from more than three batches, showed an overall score of 36.1% and 45.7% respectively in this particular item in their questionnaire [18, 11]. Our students scored only marginally better with 54.8%. Hence it is amply clear that there are gaps in knowledge which require attention. These conclusions are in consensus with other studies in literature [24]. The Hand Hygiene Liaison Group and the Department of Health in UK, two decades ago pointed towards the fact that hand hygiene compliance is linked with the attitude, behavior and beliefs of HCWs therefore any desired change needs to be introduced as early as possible [25, 26].

CONCLUSION

Hand hygiene is corner stone to reduction of HAI in health care settings. The poor performance of first year students brings forth the need for making hand hygiene an educational priority in the early years of Medical training by incorporating a concrete plan in the curriculum. Also, our study reveals that not only there are specific gaps in knowledge but also a dip in scores for senior batches, which emphasizes the required implementation of a continued educational and practical training program on hand hygiene.

Limitations of the Study

The study inherent a limitation for being questionnaire based, with items having choices which may provide the opportunity for guessing. Also, the study does not give any insight as to the practises adopted by the participants.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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