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Hand-Hygiene awareness and Compliance from a tertiary care teaching hospital, Kolhapur

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Abstract

Introduction: *Rate of developing hospital acquired infection (HAIs)in both developing and developed countries still high in the modern medicine world. Hand hygiene (HH) is the effective method to minimize the rate of HAIs. It is usually neglected in hospital setting. The present aimed to evaluate the awareness, attitude of HH among healthcare workers and stimulate the improvement in HH practices by using various tools and methodologies.*

Materials and Methods: *This study was conducted in a tertiary care teaching hospital, Kolhapur, India from June 2018 to August 2018. The study included three phases i) Pre-intervention Phase, ii) Intervention Phase and iii) Post- intervention Phase. A total of 70 Health-care workers (HCWs) were included. Knowledge of Hand-washing from HCWs was evaluated by using direct observation and survey was conducted by using Semi-structured questionnaire.*

Results: *A total of 9600 opportunities were recorded by direct observation from post and pre-intervention phases. Over all hand hygiene rate (HHAR) in post and Pre-intervention phase was found to be 35.40% and 86.27% respectively. Hand Hygiene Complete Adherence rate (HHCAR) was highest among the by Nurses (64.56%) followed physicians (61.54%), resident doctors (52.28%) and Interns (46.39%) from post- intervention phases. Overall knowledge, attitude and awareness of Hand Hygiene (HH) from HCWs after intervention phase were evaluated by using semi structured questionnaire. We found overall score of 84.28% was good. Of these, Physicians (91.66%) had better knowledge about HH followed by Nurses (87.5%), Interns (81.25%) and Resident doctors (77.77%).*

Conclusion: *Significant improvement in HH compliance from baseline pre-intervention (35.40%) to post-intervention (86.27%) can be achieved by conducting world HH day, creating awareness, regular meetings, discussion, visual modalities in hospitals, increasing staff rotations, regular internal audits and feedback.*

Keywords: *HHAR, HHCAR, HAIs.*

Introduction

Rate of developing nosocomial infections in both developing and developed countries are high and worldwide 1.4 million patients are affected every year[1].It leads to increase length of the patient's hospital stay and development of antimicrobial resistance; resulting in higher rate of morbidity and mortality. Health care workers can transfer pathogens directly or indirectly from one patient to another by their own contaminated hands and it

is the one of the major sources of acquiring HAIs[2]. Hand hygiene is an important element to reduce the risk of HAIs.

World alliance for patient safety in 2004 launched the first global challenge to reduce the risk of HAIs. It was implemented in 2005-2006 biennium meeting in Brazil entitled as "Clean care is safe care[3]"and hand hygiene was promoted as effective and sensitive method to reduce the HAIs. International nosocomial infection control consortium reported that overall HAIs in 2007 were 4.4%[4].

Hand washing is a simple and easy way to reduce the potential pathogens from contaminated hand by using antiseptic hand wash, alcohol-based hand rub or soap and water[5]. Hand washing with soap and water are inexpensive methods which can reduce HAIs and save millions of lives. Moreover, it is easy to implement in small hospitals.

To overcome these problems, WHO introduced the evidence based concept of "My five moments of HH" which includes i) before touching of patients, ii) before performing cleaning or aseptic procedures, iii) After being at risk of exposure to body fluids, iv) After touching patients v) After touching patient surroundings[6]; However hand washing in hospitals is not given importance by HCWs. The present study was assessed to know the awareness, attitude and knowledge about HH among healthcare workers and stimulate the improvement in HH practices by using various tools and methodologies.

Materials and Methods

Knowledge of Hand-washing from Health-care workers was evaluated by using

1. Direct observation &
2. Survey by using Semi-structured questionnaire

This observational, Prospective and quasie-experimental study was conducted at a tertiary care teaching hospital and Research institute, Kolhapur.

Study Period: June 2018 to August 2018(3 Months)

Inclusion Criteria: Staff members including Physicians, Nurses, Resident doctors, Interns in different ICUs (Medical Intensive care, Neonatal Intensive care, Pediatric Intensive care, Surgical Intensive care units l) and General wards (Obstetrics &Gynecology, Medicine, Surgery, Ophthalmology & ENT) were included in the study.

Exclusion criteria: Those who were absent or not available at work place, during this study period were excluded.

The study included 3 phases: pre-intervention, intervention and post-intervention.

Pre-intervention Phase

The observer analyzed the Baseline Hand Hygienic Complete Adherence Rate (HHCAR) Hand Hygienic Partial Adherence Rate (HHPAR), and Hand Hygienic Adherence Rate (HHAR) by direct observation and the baseline Knowledge, Attitude and Practice by semi-structured questionnaire was assessed.

Intervention Phase

Based on the pre-intervention phase, in our study we used 4 modalities to improve the hand hygiene in our hospital; such as i) education of HCWs by a brief lecture along with video demonstration ii) Poster competition iii). Visual reminders (distribution of WHO HH procedure stickers to each ward) and iv) Practical demonstrations organized by Microbiology department and trained 2nd MBBS students.

Post-intervention Phase

The effect of intervention phase, HHCAR, HHPAR, HHAR was measured and analyzed by direct observation. Knowledge, Attitude and Practice was analyzed by using a semi-structured questionnaire and audit analysis.

Direct Observation

Our observer visited the respective wards on daily basis from 9.00 am to till 1.00 pm and observed 200 opportunities per day. Each ward was visited for one week (6 days) and the observations were noted before and after patient contact. Average of these was taken and the Adherence rate was calculated by using the following formulae[1]:

Hand Hygiene Complete Adherence Rate (HHCAR)

$$= \frac{\text{No. of times hand hygiene followed completely}}{\text{No. of opportunities of hand hygiene moments available}} X100$$

Hand Hygiene Partial Adherence Rate (HHPAR)

$$= \frac{\text{No. of times hand hygiene followed partially}}{\text{No. of opportunities of hand hygiene moments available}} X100$$

Hand Hygiene adherence rate (HHAR)

$$= \frac{\text{No. of times hand hygiene followed (Partial + Complete)}}{\text{No. of opportunities of hand hygiene moments available}} X100$$

Survey: Survey was done by using WHO semi structured questionnaire. It was distributed to ward-wise staff members before and after conducting direct observation. It consisted of 15 questions. Each correct question carried one mark and wrong answers carried zero marks. Overall score was calculated and given scoring system i.e.,< 50% were considered poor, 50-74% as moderate and 75% was taken as good.

Statistical analysis

Statistical analysis was done by using S.PS version 23.0 software P and X^2 value was calculated and P valve <0.05 was considered as statistically significant.

Results

A total of 70 health care workers were included in this study. Of these, there were 24 staff nurses, 18 resident doctors, 16 Interns and 12 physicians.

Each ward was visited for one week (6 days) and 1200 opportunities were observed per week. Total of (8 wards X 6 days=48 days) i.e., 9,600 opportunities were observed.

Figure 3.1: Distribution of the total participants in the study (N=70)

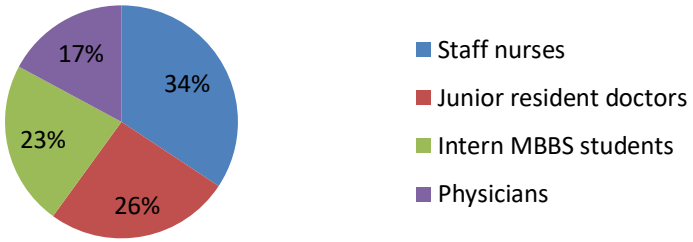


Table 3.1: Ward wise distribution of total number of participants (N=70)

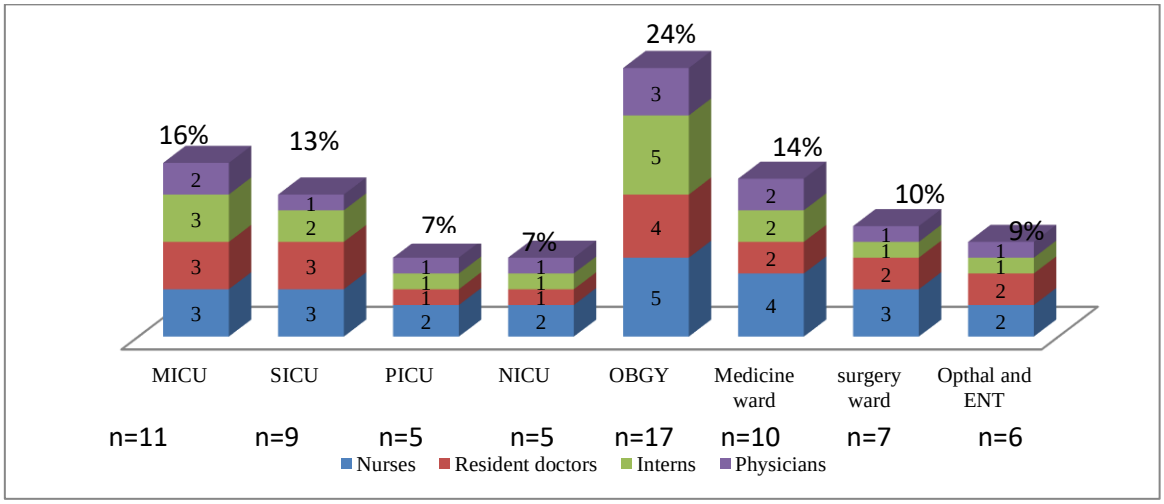


Table 3.2: Total number of observation per day and per week (6 days)

HCWs	Total observation	
	Per Day	6days(one week)
Nurses	570	3420
Resident doctors	408	2448
Intern students	342	2052
Physicians	280	1680
Total Observation	**1600**	**9600**

Table 3.4: Distribution of Hand Hygiene Adherence Rate: Pre- intervention Phase

	Resident doctors(2448 observations)	Interns (2052 observations)	P-value	Nurses (3420 observations)	Physicians (1680 observations)	P-value	Total (9600 observations)	X^2-value
HHCAR	204(8.33%)	181(8.82%)	0.56	508(14.85%)	321(19.10%)	0.0001*	1214(12.64%)	32.25 P <0.0001
HHPAR	464(18.95%)	342(16.66%)	0.046*	974(28.47%)	405(24.10)	0.00096*	2185(22.76%)	
HHAR	668(27.28)	523(25.48)	0.17	1482(43.33)	726 (43.21)	0.93	3,399(35.40%)	

P<0.05 is considered as significant.

Table 3.5: Hand Hygiene Adherence Rate- Post intervention Phase

	Resident doctors(2448 observations)	Intern (2052 observations)	P-value	Nurses (3420 observations)	Physicians (1680 observations)	P-value	Total (9600 observations)	X^2-value
HHCAR	1280(52.28%)	952 (46.39%)	0.00008	2208 (64.56%)	1034 (61.54%)	0.035*	5474 (57.02%)	142.8 P<0.0001
HHPAR	762 (31.12%)	742 (36.15%)	0.00038 *	852 (24.91%)	452 (26.90%)	0.12	2808(29.25%)	
HHAR	2042 (83.41%)	1694 (82.55%)	0.76	3060 (89.47%)	1468 (88.45%)	0.025*	8282 (86.27%)	

P<0.05 is considered as significant.

Table 3.6 Survey: WHO questionnaire – Before and after conducting direct observation

Sr. No	Questions	Nurses (n=24)		Junior Resident Doctors (n=18)		Intern students (n=16)		Physicians (n=12)	
		Before	After	Before	After	Before	After	Before	After
1	Do you routinely use an alcohol-based hand rub for hand hygiene?								
	Yes	**18**	**21**	**12**	**16**	**14**	**12**	**12**	**12**
	No	6	3	6	2	2	4	0	0
2	In your opinion, What is the percentage of hospitalized patients who will develop a health care associated infection								
	20-40%	8	6	10	8	12	3	4	0
	Above 50%	14	16	6	10	4	11	8	12
	Don't Know	2	2	2	0	0	2	0	0
3	What is the effectiveness of hand hygiene in preventing HAI?								
	High	**20**	**22**	**14**	**17**	**12**	**14**	**11**	**12**
	Low	4	2	4	1	4	2	1	0
4	Do you know the 5 moments for HH?								
	Yes	**19**	**21**	**13**	**16**	**14**	**15**	**11**	**12**
	No	6	3	5	2	2	1	1	0
5	Hand Hygiene is regularly talked about at staff meetings								
	Yes	**17**	**20**	**12**	**16**	**10**	**13**	**9**	**11**
	No	7	4	6	2	6	3	3	1
6	What is the minimal time needed for alcohol based hand rub to kill germs on your hands?								
	20s	**18**	**22**	**14**	**16**	**12**	**14**	**11**	**12**
	Others	6	2	4	2	4	2	1	0
7	Wearing jewelry or wrist-watch while washing hands								
	Yes	12	2	2	1	10	4	2	0
	No	12	22	16	17	6	12	10	12
8	Among all patient safety issues, how important is hand hygiene at your institution?								
	High priority	**14**	**21**	**15**	**17**	**10**	**14**	**11**	**12**
	Low priority	10	3	3	1	6	2	1	0
9	The best way to be reminded to wash my hands is by my								
	Co-worker	12	8	8	7	9	4	4	2
	Leader	**10**	**16**	**10**	**11**	**7**	**12**	**8**	**10**
	Patient	2	0	0	0	0	0	0	0

10	In your opinion, how effective would the following actions be to improve hand hygiene permanently in your institution? [Effective/Not effective]								
a.	The health care facility makes alcohol- based hand rub always available at each point of care	20	23	13	16	8	13	7	9
b	Hand hygiene posters are displayed at point of care as reminders	21	23	16	17	9	13	9	11
c.	Each health care worker receives education on hand hygiene	17	21	15	16	12	15	10	12
d	Clear and simple instructions for hand hygiene are made visible for every health care worker	19	23	14	16	13	15	08	11
e.	Health care workers regularly receive feedback on their hand hygiene performance	16	22	13	15	11	14	07	10
f.	Patients are invited to remind health care workers to perform Hand hygiene	18	24	12	16	10	13	11	12

Table 3.7: Distribution of score level- pre intervention Phase

Score Level	Nursing (n=24)	Resident doctors (n=18)	Physicians (n=12)	Intern students (n=16)	Percentage (N=70)
Moderate	5(20.83%)	4 (22.22%)	2(16.66%)	4 (25%)	15 (21.42%)
Good	17 (70.27%)	13 (72.22%)	9(75%)	10 (62.5%)	49 (70%)
Low	2(8.33%)	1 (5.55%)	1(8.33%)	2(12.5%)	6 (8.57%)

Table 3.8: Distribution of score level- post intervention phase

Score Level	Nursing (n=24)	Resident doctors(n=18)	Physicians (n=12)	Intern students (n=16)	Percentage (N=70)
Moderate	2(8.33%)	4 (22.22%)	0	2 (12.5%)	9 (12.85%)
Good	21 (87.5%)	14 (77.77%)	11(91.66%)	13(81.25%)	59 (84.28%)
Low	1(4.16%)	0	1 (8.33%)	1(6.25%)	2 (2.85%)

Discussion

India is one of the predominant members among the countries included in "World Alliance for Patient Safety[7]". Ministry of Health and Family Welfare, Government of India in 2006 made a collaboration with the WHO and pledged "clean care is safe care" and a commitment to promote high standards of clinical practice and reduce the HAIs and its risk factor[8].

The present study focuses on the knowledge, attitude, awareness and compliance rate about hand-hygiene practices among staff nurses, junior resident doctors, interns and physicians in a tertiary care teaching hospital, Kolhapur. 65% of the respondents had less than 5 years of experience but overall score of hand hygiene and compliance rate after intervention phase was found to be excellent.

The most effective and frequent methods for measuring the hand hygiene compliance are direct observation, measurement of the product consumption and electronic counters for dispensing antibacterial hand-rub[9,10]. However, in the present study we followed the direct observation method.

Hand hygiene compliance rates from different studies show a wide variation ranging from 8% to 84.5% as reported by health care professionals[23]. In our studies, overall rate of hand hygiene compliance during pre- intervention phase was found to be 35.40%.

In pre-intervention phase, Venkatesh et al used electronic alerts in small hematological unit and showed that overall compliance rate of HH was 36.35%[11]. Ashu et al used direct observation method in a tertiary care hospital adult ICU during a period of 6 months and showed an overall

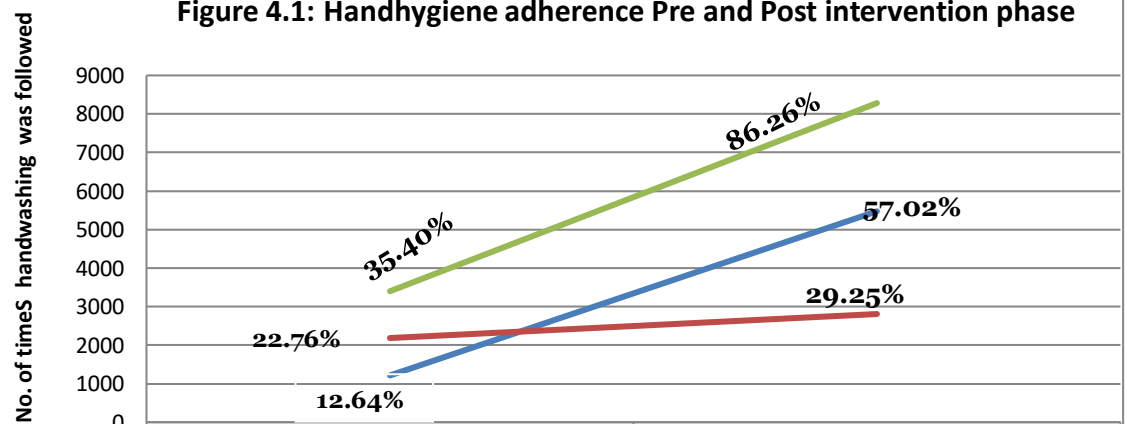
compliance of 29.5%[12], which is comparable in our study.

In the present study, nurses and physicians observed a compliance rate of 43.33% and 43.1 % but some other studies show variation; Pittet Et al used seven years data from a tertiary care hospital and included all HCWs. hey observed a HH compliance rate which was more in nurses (52%) than the physicians (23%) by direct observation method[13]. This may be due to lower awareness among the health care workers. Moreover sometimes when any nursing staff is absent, the same staff member has to do two or three shifts in day. Rynga et al found more compliance rate in a tertiary care hospital in physicians (16.4%) than the nurses (8.9%) by direct observation[14]. This could be due to the nurses' belief that HH is not important to be practiced with each patient. They suggested that nurses to patient ratio is also important in hospitals to practice HH regularly.

HHAR in junior resident doctors and Interns was found to be 27.28% and 25.48% respectively in baseline pre- intervention phase. The HHAR rate was 83.41% and 82.55% respectively in post-intervention phase.(P value 0.76)There was no significant difference between resident doctors and Interns. Sen et al included HCWs from small ICUs in their study and observed more compliance in resident doctors (50.8%) than the nurses (41.3%)[15]. They have included grade II and outsourced nursing staff who might not know about the hospital policy and were not given proper training about HH.

In our study, we observed overall HH compliance rate to have improved from base line (pre-intervention) HHAR which was 35.08% to Post-intervention rate of 86.27%. High compliance of hand hygiene in this study could be due to adequate awareness of HH, Visual modalities in each and every corner, frequent feedback and audit analysis done during our study. Studies from the various other developing countries and those from India show variation from base- line intervention to post- intervention phase, for example Thailand(6.3% to 81.2%)[16] Argentina (23.8% to 64.8%)[17], Mexico(45% to 79%)[18]. Indian studies from post intervention phase include Chandigarh (86.0%)[19], Tamil Nadu (69.7%)[20] etc

Figure 4.1: Handhygiene adherence Pre and Post intervention phase



	pre-intervention	post intervention
HHCAR	1214	5474
HHPAR	2185	2808
HHAR	3399	8282

In response to questionnaire, physicians had more knowledge (91.66%) than nursing staff (87.55%), interns (81.25%) and resident doctors (77.77%) in post- intervention phase. Bhagavati 2018 found higher awareness in physicians (>80%) and satisfactory attitude among nurses (80-50%)[21]. In another study, Ariyartne et al showed nurses (69%) had more knowledge than medical students

(39%)[22]. In the current study, overall score for hand hygiene knowledge was found to be 59% (good), 12.85% (moderate) and 2.85%(low) after intervention.

Conclusion

In the present study we conclude that, overall hand hygiene compliance rate was 86.27% and knowledge, attitude about hand hygiene was found to be 59% (good). Knowledge about HH was not much significant but compliance rate was found to be satisfactory after the intervention. However this study has some limitations. We used only direct observation and survey method and could not include product utilization and electronic counter dispensers. In our study knowledge about HH and compliance rate was not satisfactory before intervention and good results were seen after intervention. Direct observation is time- consuming and requires manpower; it is not possible for continuous monitoring. A single trained observer was observing and monitoring for 3 hours only; and there could be a chance of missing some opportunities. Recommended level of HH compliance among health care workers by WHO was 90% for critical areas. Routine evaluation of HCWs, conducting world HH day, creating awareness, regular meetings, discussion, visual modalities in hospitals, increasing staff rotations, regular internal audits and feedback can substantially improve the HH in hospitals. This will save the patients from nosocomial infection and prevent the cross- transmission of antimicrobial resistance among patients.

Fig 5.1: Celebration of HH day

Fig 5.2: Role play in HH day

Fig 5.3: Visual modalities (WHO HH sticker)

Fig 5.4: Poster competition in HH day

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