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Knowledge, attitude and practices of hand hygiene among nurses and nursing students in a tertiary health care center of Central India: a questionnaire based study

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ABSTRACT

Background: Health care associated infections and emerging multi drug resistance in nosocomial pathogens is perceived as a serious public health threat with grievous concerns. Hand hygiene if practiced properly is cheapest, simplest and most effective tool in tackling this problem. The objective of this study was conducted to assess levels of knowledge, attitude and practice in various aspects of hand hygiene in nurses and nursing students in the study area for identifying gaps for planning necessary corrective measures.

Methods: A cross sectional study involving self-administered pre-structured anonymous questionnaires administered to 50 staff nurses and 80 nursing students posted at a tertiary health care center of Central India. Z test of proportions was used to compare the percentages for each of the appropriate responses between the two study groups.

Results: Most of the study participants exhibited moderate levels of knowledge and practice with marginal difference between two study groups. While nursing students were found to exhibit a remarkably higher level of attitude than staff nurses, difference being statistically significant.

Conclusions: This study stresses upon the growing need for prompt interventions at institutional level for addressing the gaps evident from the study.

Keywords: Knowledge, Attitude, Practice, Nurses, Nursing students, Hand hygiene, Questionnaire, Health care associated infections

INTRODUCTION

Health care associated infections is an evolving problem globally and is being perceived as a serious threat to the health care system.¹⁻³

It is well evident that most often nursing care requires direct or close contact with the patients which serve as a channel for the transfer of pathogens if proper hand hygiene is not followed. Most of the health care associated infections (HCAIs) are acquired via the contaminated hands of health care workers (HCWs).

Effective hand hygiene practices are simplest proven instrument in reducing prevalence of HCAI. But most of the HCWs do not adhere to hand hygiene recommendations. 1,2,4-6

Guidelines for hand hygiene practices have been issued by World Health Organisation (WHO) and centers for disease control and prevention (CDC), Atlanta but lack of awareness amongst HCWs result in poor compliance which could have serious after effects on a health care system. Adherence to standard guidelines could be determined by level of awareness, threat perceptions, individual's attitude, availability of resources, workload and work culture. ^{2,6-8}

To formulate a proper strategy to minimize HCAI it is very important to assess the level of adherence to standard hand hygiene practices and factors resulting in poor compliance could be accordingly dealt with.

Nursing students are considered as the health care workers in training. As they have direct contact with patients during their clinical posting, they can also serve as vehicles of cross-contamination within the hospital. Nursing instructors should train students in appropriate hand hygiene practices during clinical postings, for improving the compliance. Assessing the factors affecting hand hygiene compliance in nursing students also provide a chance to address any gaps in knowledge and practices before the students complete their course and enter into the medical community. ^{6,9}

Under the light of above facts, the current questionnaire based study was planned and undertaken in order to assess knowledge, attitude and practices of staff nurses and nursing students regarding hand hygiene at a tertiary care teaching hospital of Central India.

METHODS

This questionnaire based cross sectional study was carried out to assess knowledge, attitude, and practices (KAP Survey) of staff nurses and nursing students of Government Medical College and associated District Hospital, Datia, Madhya Pradesh from October to November 2018 after obtaining clearance from Institutional ethics committee. The content, purpose, scope and nature of the study was very well explained to both target groups and they were told that participation was voluntary, and that their responses were anonymous. Only those who volunteered to participate were included in the study after obtaining informed consent.

A total of 130 subjects (50 staff nurses and 80 nursing students) were targeted for the study through convenience sampling. A self-administered pre structured anonymous questionnaire was administered to each participant. Whenever the subjects felt difficulty in understanding the questions their doubts were cleared and questions were explained properly.

Questionnaire was designed on the basis of related relevant literature. ^{2-4,7,10} Questions were checked for their relevance, clarity, understandability and necessary changes were made to make them simple and easily understandable in order to improve the face validity of the questionnaire before their final use in the survey.

Questionnaires don't reveal any personal identification details of participants and confidentiality was maintained in this regard.

Questionnaire consisted of total 66 questions divided in four parts:

- Demographic information (six questions).
- Assessment of knowledge (27 questions).
- Assessment of attitudes/perceptions (20 questions).
- Assessment of practices (13 questions).

Knowledge was assessed using 27 questions which included MCQs (multiple choice questions) and yes/no type questions.

Attitudes/beliefs were assessed on the basis of 20 questions and practices on the basis of 13 questions where the respondents have the choice to give their opinion on a 1 to 5 point Likert scale ranging from strongly agree to strongly disagree for attitude and from never to always for assessing practices.

Assessment of knowledge, attitudes and practices was done on the basis of a scoring system where 1 point was given for each correct response to knowledge, positive attitude and correct practices; 0 was given for incorrect knowledge, negative attitude and puny practices. For each of the three sections, a score of 75% and above was considered good, 50-74% as moderate and below 50% as poor.

Statistical analysis

Tabulation and compilation of data was done using Microsoft Excel 2010 software. Appropriate statistical tools were used as per requirement. Z test of proportions was used to compare the percentages for each of the appropriate responses between the two study groups. P value of 0.05 was considered as statistically significant. Mean scores of the knowledge, attitudes and practices of the two study groups were compared using paired t test and the significance level was set to 0.05. 57,11,12

RESULTS

Out of total 130 participants (50 nurses and 80 nursing students) 97% were females. Only 40% of all participants (52) claimed to have received a formal training in hand hygiene practices. All nursing students and 50% of staff nurses participating in the study were in 19-25 yrs age group. While 44% of nurses were in 26-35 yrs. group and only 6% in 36-45 yrs age group.

Knowledge on hand hygiene

The knowledge level on hand hygiene was almost same in both study groups with no significant difference. Most of the nurses (78%) and nursing students (75%) showed moderate level of knowledge regarding different aspects of hand hygiene. Significant difference was observed in both study groups regarding knowledge about routes of transmission of infection and most frequent source of germs responsible for health care associated infections.

Out of 27 questions asked, significant difference in knowledge levels between the two study groups was seen

in only eight questions (Table 1).

Table 1: Comparison of knowledge between nurses and nursing students regarding hand hygiene.

Question/Item	Nurses		Nursing students		P value
	(n=50)	0/	(n=80	<u> </u>	
	N	%	N	%	
Which of the following is the main route of transmission of	27	7.4	5 0	46.4	*0.002
harmful germs between patients? (health-care worker's	37	74	58	46.4	*0.002
hands when not clean)					
What is most frequent source of germs responsible for health care associated infections (germs already present on	20	40	18	22.5	*0.0328
or within the patient)	20	40	10	22.3	0.0328
According to WHO how many steps of hand washing do					
you know?	20	40	24	30	NS
What is the minimum time needed for alcohol based hand					
rub to kill most germs on your hands? (20 sec.)	17	34	20	25	NS
The most appropriate timing for Hand hygiene to prevent tr	ansmissio	n of gern	ns to patie	nts	
Before touching a patient	49	98	77	96.25	NS
Immediately after a risk of body fluid exposure	45	90	69	86.25	NS
Immediately before a clean/aseptic procedure	45	90	60	75	*0.0348
After exposure to the immediate surroundings of a patient	18	36	24	30	NS
The most appropriate timing for hand hygiene to prevent tra					
After touching a patient	48	96	75	93.75	NS
Immediately after a risk of body fluid exposure	45	90	70	87.5	NS
Immediately before a clean/aseptic procedure	24	48	32	40	NS
After exposure to the immediate surroundings of a patient	38	76	72	90	*0.0314
Which of the following statements on alcohol based hand rule					
Hand rubbing is more rapid for hand cleansing than hand) Y C
washing (true)	41	82	64	80	NS
Hand rubbing causes skin dryness more than hand washing	22	4.6	1.0	22.5	*0.005
(false)	23	46	18	22.5	*0.005
Hand rubbing is more effective against germs than hand	23	46	27	33.75	NS
washing (false)	23	40	21	33.73	
Which type of hand hygiene method is required in the follow	ing situat	ions?			
Before palpating abdomen (rubbing)	30	60	29	36.25	*0.0081
Before giving an injection (rubbing)	32	64	24	30	**0.0001
After emptying a bed pan (washing)	42	84	64	80	NS
After removing examination gloves (rubbing / washing)	35	70	58	72.5	NS
After making a patient's bed (rubbing)	8	16	10	12.5	NS
After visible exposure to blood (washing)	42	84	58	72.5	NS
Which of the following should be avoided as associated with	increased	likelihoo	d of colon	ization of ha	nds with
harmful germs?					
Wearing jewellery (Yes)	40	80	60	75	NS
Damaged skin (Yes)	42	84	56	80	NS
Artificial fingernails (Yes)	44	88	67	83.75	NS
Regular use of a hand cream (No)	34	68	39	48.75	*0.0314
If hands are not visibly soiled/contaminated which method					
is most effective for reducing number of pathogenic	14	28	16	20	NS
bacteria on the hands of personnel (applying 1.5 ml to 3 ml	17	20	10	20	110
of ABHR to the hands & rubbing hands together until dry)					
Which of the following hand hygiene actions prevents	40	0.5	70	07.5	NG
infection of the patient by his/her own germs? (hand	48	96	78	97.5	NS
hygiene immediately before an aseptic procedure)					

Correct answer to each question is enclosed in brackets; Significance calculated using Z-test of proportions.

^{*}p<0.05 (significant), **p<0.001 (highly significant), p>0.05 (NS: not significant).

Table 2: Comparison of positive attitudes between nurses and nursing students regarding hand hygiene.

Question/Item	Nurse (n=50		Nursi stude (n=80	nts	P value
	N	%	N	%	
Every HCW should have sufficient knowledge and training about hand hygiene	45	90	77	96	NS
Correct hand hygiene practices should be adhered at all times	32	64	59	73.75	NS
Following hand hygiene is difficult in case of emergencies	05	10	20	25	*0.0348
Wearing gloves reduce the need for hand hygiene	28	56	32	40	**0.0007
I feel uncomfortable when others omit hand hygiene	15	30	44	55	*0.0053
I feel guilty when I omit hand hygiene	30	60	64	80	*0.0132
I am reluctant to ask others to engage in hand hygiene	10	20	36	45	*0.0024
Hand hygiene practices should be an acquired personal habit in life	47	94	75	93.75	NS
Hand hygiene should be a part of the curriculum for paramedical students	45	90	80	100	*0.0039
It is gross negligence not to perform hand hygiene practices	44	88	78	97.5	*0.0283
Hand hygiene is an essential part of my role	42	84	72	90	NS
I feel disappointed if my supervisors don't implement hand hygiene policy	25	50	56	70	*0.0221
I have sufficient knowledge to properly practice hand hygiene	40	80	36	45	**<0.0001
Adhering to hand hygiene practices is easy in the current set up	20	40	40	50	NS
I practice hand hygiene only in presence of my colleagues/supervisors	35	70	48	50	*0.0247
I feel safe and secure from getting any infection after practicing hand hygiene	30	60	69	86	**0.0007
Sometimes I miss out hand hygiene simply because I forget it	20	40	40	50	NS
Sometimes I had more important tasks to do than hand hygiene	21	42	48	60	*0.0454
I have the capability to curb poor practices in my work place	25	50	20	25	*0.0036
Proper hand hygiene practices can reduce medical costs associated with hosp. acq. infections and can reduce patient's mortality	47	94	77	96	NS

Significance calculated using Z-test of proportions. *p<0.05 (significant), **p<0.001 (highly significant), p>0.05 (NS: not significant).

Table 3: Comparison of good practices between health care workers and nursing students regarding hand hygiene.

Items	Health care workers (n=50)		Nursing students (n=80)		P value	
	N	%	N	%		
I cleanse my hands under following conditions:	:					
Before physical contact with a patient	35	70	32	37.5	**0.0003	
After physical contact with a patient	37	74	72	90	*0.0159	
Before caring for wound	43	86	67	83.75	NS	
After wound care	41	82	64	80	NS	
After touching potentially contaminated objects	44	88	72	90	NS	
After contact with blood/body fluids/Patient's secretions	48	96	78	98	NS	
After inserting an invasive device	42	84	58	72.5	NS	
Before entering into isolation room	44	88	48	60	**0.0006	
After exiting from isolation room	43	86	61	76.25	NS	
Before endotracheal suctioning	40	80	54	67.5	NS	
Before clean/aseptic procedure	45	90	71	88.75	NS	
After removing gloves	39	78	48	60	*0.0338	
If they look or feel dirty	48	96	75	94	NS	

 $Significance\ calculated\ using\ Z-test\ of\ proportions.\ *p<0.05\ (significant);\ **p<0.001\ (highly\ significant);\ p>0.05\ (NS:\ not\ significant).$

Attitudes on hand hygiene

The nursing students had significantly better attitude than nurses in terms of hand hygiene. 62% of nurses and 45% of nursing students showed moderate attitude. Good attitude level was seen in 50% of nursing students and 20% of nurses. 18% of Nurses and only 5% nursing students showed poor attitude. Out of 20 questions asked for assessing attitude, a significant difference in attitude levels between two study groups was seen in 13 questions (Table 2).

Practices of hand hygiene

Most of nurses (74%) and nursing students (74.5%) showed moderate level of correct practices of Hand hygiene. While poor level of practices was seen in 8% of staff nurses and 11.25% of nursing students. Regarding good practices staff nurses were ahead of nursing students by a margin of 3.75%. There were significant differences in level of practices between two study groups regarding cleansing hands before and after physical contact with a patient, before entering into isolation room and after removing gloves (Table 3).

DISCUSSION

The knowledge level on hand hygiene was almost same i.e., moderate in both study groups with no significant difference. The nursing students had significantly better attitude than nurses in terms of hand hygiene. Good attitude level was seen in half of nursing students and only 20% of nurses. Most of nurses and nursing students (75%) showed moderate level of correct practices in hand hygiene.

Most of the nurses (78%) and nursing students (75%) showed moderate levels of knowledge regarding different aspects of hand hygiene. Similar findings were reported in a number of studies conducted in the recent past.^{3-5,7,13,14}

In this study 16% of nursing students showed poor levels of knowledge, the same was reported in only 6% of Staff nurses. Only 40% of study participants had received formal training in hand hygiene in any form and 26% of respondents showing good level of knowledge in this study had received such training in recent past. This shows the importance and growing need for such sensitization programmes to increase the level of knowledge among nursing staff as a strategic move for increasing compliance to hand hygiene practices.

In our study a majority of staff nurses (74%) correctly opined that the unclean hands of health care worker were the main route of transmission of harmful germs between patients. Our finding is in agreement to other studies by Zakeri et al (79.3%), Shinde et al (75%), Maheshwari et al (75%), Nair et al (76.2%) and Ariyaratne et al (72.4%).

Most of the respondents (80%) found Hand rubbing to be more rapid for hand cleansing than hand washing but majority carried wrong notions like hand rubbing being more effective against germs than hand washing and former causing more skin dryness than later. This finding is in accordance with other studies (Mahmood et al, Ariyaratne et al, Nair et al).^{4,7,13}

In this study, only 46.4% of nursing students were able to tell the main route of cross transmission of germs which is similar to the study by Zakeri et al and in contrast with other studies by Ariyaratne et al (73.1%), Nair et al (76.2%), Nawab et al (73.8%), Shinde et al (76%). 5,4,7,14,15

Most of the study participants were not able to tell the most frequent source of germs responsible for health care associated infections. Only 40% of nurses and 22.5% of nursing students were able to answer this correctly which is in agreement with the studies conducted by Shinde et al, Nair et al. 4.14

More than half of the participants were not able to answer the questions regarding steps of hand washing and minimum time required for alcohol based hand rub to kill most of the germs. Similar findings were reported by previous studies by Maheshwari et al, Shinde et al, Khaled et al, Nair et al and Gunasekara et al. 3,4,7,14,16

The nursing students had significantly better attitude than nurses in terms of hand hygiene.74% of nursing students and 64% of nurses strongly agreed that correct hand hygiene practices should be adhered to at all times. Similar findings were reported in other studies too. 3,4,7

It is good to know that 80% of nursing students in this study felt guilty on omitting hand hygiene which is comparable to similar study by Nawab et al (83%) but was higher than other studies by Ariyaratne et al (69%), Nair et al (69%), Shinde et al (68%).

But only 60% of nurses felt so in this study which was higher than other studies by Aledilah et al (33%), Shinde et al (39%), but lower than a study by Nawab et al. 5,12,14

As evident from this study one of the most important reason for missing hand hygiene in routine health care is simply forgetfulness to do so. Similar findings were seen in other studies (Hussain et al, Pittet et al, Larson et al). Forgetfulness factor can be dealt by displaying posters on walls, Sensitisation programmes, CMEs and regular onsite and offsite training sessions. ^{11,17,18}

In this study majority of respondents, nurses as well as nursing students had strongly agreed that Hand hygiene being an essential part of their role, should be an acquired personal habit in life and failure to practice hand hygiene amounts to gross negligence. Most of the participants want hand hygiene to be a part of the curriculum for nursing students. Similar response was reported in a study by Ansari et al.¹⁹

In a similar study by Aledielah et al most of the Nursing students found it difficult to attend hand hygiene courses/workshop due to time pressure. So, rather than conducting separate training programmes on Hand hygiene it will be far better to incorporate the hand hygiene practices more comprehensively into the course curriculum itself.¹²

Most of the study participants felt that following hand hygiene is difficult in case of emergencies. Similar finding was reported in studies conducted by Maheshwari et al, Nair et al, Ariyaratne et al, Shinde et al, Nawab et al, Aledeilah et al. Whenever health care providers are busy in emergency sevices, they are more likely to omit hand hygiene if proper facilities are not easily accessible to them which is not possible without institutional support. ^{3-5,7,12,14}

It is a very well established fact that Hand hygiene if practiced properly in a health care system is most important infection control measure in curbing health care associated infections.²⁰

Though it is very effective, simple and much publicized measure, still awareness level, compliance rates and adherence to proper hand hygiene practices is reported to be unsatisfactorily low in the health care workers as evident from number of studies in the recent past.

Knowledge on hand hygiene is considered as a predictor of good hand hygiene practices. Instilling correct knowledge and attitude towards hand hygiene among the nursing students can play a major role in ensuring compliance to good practices among the future health care providers. It is imperative to address the gaps in knowledge during training sessions to nurture better hand hygiene practices.⁵

Assessing the factors affecting hand hygiene adherence provide a chance to address any gaps in knowledge and practices and help in formulating strategy and necessary interventions for minimizing the risk of health care associated infections to health care workers as well as patients.

An important limitation of this study is using self-administered questionnaires to assess the levels of practice among the respondents. Although self-reporting may be the simplest, easiest and less time consuming but there is always a risk of bias on the part of respondent who will intend to report better practice than what they actually do.

CONCLUSION

There is a need to raise the awareness about hand hygiene practices among HCWs to minimize HAIs. The study highlights the need for improving the existing hand hygiene training programs to address the gaps in knowledge, attitude and practices. It will be better to

incorporate it in the course curriculum of nursing students.

We recommend monitoring and periodic surveillance of hand hygiene practices under strict supervision so that necessary corrective measures can be taken promptly to fulfill the deficits.

Hospital authorities should ensure adequate availability of resources and easy access to hand hygiene facilities including water, soap, tissue papers, hand rubs, sanitizers etc. as any deficit of resources and facilities could be a major deterrent in implementing hand hygiene policy. It is recommended a quantitative measure of hand hygiene facilities be done for planning better access to the available resources.

A multi-pronged approach of availing resources/facilities, sensitization, regular training sessions, educational and motivational activities should be adopted for improving hand hygiene compliance.

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Institutional Ethics Committee

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