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AN EPIDEMIOLOGICAL STUDY ON HAND WASHING PRACTICES AMONG HEALTH CARE WORKERS IN HOSPITALS OF MANGALORE CITY

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ABSTRACT

Introduction: There is very little published information on hand washing practices of Health Care Workers (HCWs), their knowledge, perceived barriers & facilities for practicing hand washing in hospitals from India. So this study was undertaken. Such studies give important inputs for further research, policy & planning.

Materials & Methods: This cross-sectional study conducted in hospitals of mangalore city had two components: 1) Direct observation of hand washing pre & post patient contact followed by 2) administration of anonymous questionnaire testing knowledge. A total of 142 hand washing opportunities were studied. The study was conducted in consenting hospitals affiliated to medical schools, nursing homes, corporate hospitals. Two study tools based on used were: 1) Proforma to record practices; and 2) Questionnaire to test knowledge of HCWs.

Results: Only 129 observations could be made. Though the HCWs had general awareness about Hand Washing Practices (HWP), they lacked information about specific aspects & the practices were poor. Low hand washing rates (%) were observed among nurses (28) & doctors (23). There was gap between knowledge and practice. Knowledge of doctors on various aspects of hand washing was inadequate though it was better than nurses. "High Work Load" & "Lack of Time" were perceived to be important barriers for HWP. Shortage of sinks was noticed in hospitals.

Conclusion: There is a need to evolve guidelines for hand washing practices & the facilities for it in hospitals of India.

Keywords: Hand washing, health care worker, hospital

INTRODUCTION

Health Care Workers' (HCW) hands become progressively colonized with commensal flora as well as with potential pathogens during patient care. ¹ Contaminated hand could be vehicles for the spread of certain viruses and bacteria. ¹ Nosocomial infections constitute a major challenge of modern medicine. On an average, infections complicate 7% to 10% of hospital admissions. ² Transmission of microorganisms from the hands

of Health Care Workers (HCWs) is the main cause of nosocomial infections, and hand washing remains the most important preventive measure. ³

A review on Hand hygiene practices suggests that the compliance of HCW to recommended hand hygiene procedures ranges from 5% to 89% with an average compliance rate of less than 50%. ¹ There is evidence that hand antisepsis reduces the transmission of health care asso-

ciated pathogens and the incidence of Health Care Associated Infection (HCAI).⁴

A study on hand washing practices (HWPs) would help in understanding 1) Problems that need to be addressed in this area; 2) Identify the training needs for planning intervention; 3) Give inputs for policy makers; and 4) Areas that need further research. This information would help in reducing the magnitude of HCAs. There are two published studies from India. One reports the compliance rates of HWPs in ICUs of tertiary care centers.⁵ Other reports the facilities for HWPs in OPD Complexes of PGIMER Chandigarh.⁶ There is no published study that examines the HWPs, knowledge of HCWs, perceived barriers & facilities available in nursing homes, hospitals (including smaller ones). Hence this study was undertaken with the following objectives: 1. To know the knowledge of HCWs with regard to hand washing techniques and choice of agents used for antiseptics before and after contact with patients. 2. To observe the hand washing practices among HCWs before and after contact with patients. 3. To identify the barriers for practicing hand hygiene.

MATERIALS & METHODS

Study Setting: Mangalore city located in coastal Karnataka has got 8 hospitals affiliated to 5 medical schools. There are also Private Corporate Hospitals, Nursing Homes & Polyclinics. These health care facilities not only provide services not only to the local population but also for neighboring state of Kerala.

Study Design: This is a cross sectional study with two components. Firstly direct observation of HWPs among HCWs before and after patient care followed by administration of an anonymous questionnaire to test their knowledge.

Study Units: Corporate Hospitals &, Nursing Homes with in the city. The health care facilities with following criteria were included: 1. Inpatient admissions. 2. Intensive Care Unit (ICU). 3. Facilities for performing minor surgeries. Those excluded were: 1. Diagnostic Centres and Laboratories. 2. Hospitals that refuse to give consent.

Study period: The study was conducted between July 1st to September of 2011.

Sample size: The only published study about compliance rates for HWPs from India⁵ reported the compliance rate of 74.8% among HCWs of the hospitals. Using the formula for infinite

population, at 5% allowable error, 90% power & 10% non-response the sample size was computed to be 142 hand washing opportunities pre & post contact with the patients.

Sampling: As hospitals affiliated to medical schools are offer the maximum opportunities for observation of hand washing practices, 4 out of the 8 medical college hospitals were selected using simple random sampling. To get representative sample a list of corporate hospitals / multispecialty hospitals / Nursing homes were obtained from the local chapter of Indian Medical Association, Mangalore. The hospitals were approached & consenting hospitals were selected one at a time by simple random sampling. The data was collected. The process was repeated till the required sample size was obtained.

Operational definitions: Based on World Health Organization (WHO) guidelines¹ the following operational definitions were used: 1. Handwashing: Washing hands with plain or antimicrobial soap and water. 2. Antiseptic agent: An antimicrobial substance that inactivates microorganisms or inhibits their growth on living tissues. Eg: alcohol, chlorhexidine, iodine etc. 3. Compliance with hand washing: defined as either washing hands and wrists with water and plain soap or rubbing with an antiseptic solution before and after patient care. 4. Non Compliance: Any deviation from the above mentioned definition of compliance & departure from the room after patient care without handwashing. 5. Health care worker: A Nurse or doctor involved with patient care

Study Instruments: Based on WHO guidelines¹, two instruments were devised.

1. An anonymous questionnaire to test the knowledge of HCW. It covered the following components of information (Scoring Range): 1) Indications (0-11); 2) Choice of agents (0-5); 3) Duration (0-1); and 4) Barriers of handwashing. The questionnaire had a mix of open and close ended questions (including single and multiple response questions).

2. A Proforma to observe and know handwashing practices. It covered the following components: 1) Areas scrubbed; 2) Agent used; 3) Time taken for hand washing; and 4) Methods of drying hands. The areas scrubbed and the washing techniques were encircled on a pictorial scale consisting of 12 steps devised by the WHO.¹ This contains pictures of correct and wrong tech-

niques. Presence / Absence of certain facilities for HWP's in these hospitals were also included.

Pre-Testing & Modification: The English version of Questionnaire was translated to two local languages (Tulu & Kannada). They were, back translated to English and checked for conceptual equivalence. When the Proforma & questionnaires were pretested in neighbouring Udupi City, the following circumstances compelled us to make certain modifications: 1. As per the WHO guidelines, HCWs should wash their hands even before recording the pulse or blood pressure. As this was not practiced in many of the hospitals we omitted it from our proforma. So, certain activities which had a higher risk of microbial transmission like: all contacts with mucous membrane, non intact skin, any secretions and excretions and manipulations (opening or disconnecting) of patients' vascular lines or other tubes were observed. For example, in surgical wards we observed wound dressing, debridement, insertion of urinary catheter etc. 2. Certain wrong practices like washing of hands only once before attending to many patients in the ward, cleaning of visibly soiled hands with alcohol based handrubs, concomitant use of soap and alcohol based handrubs etc were observed. So questions about the appropriateness of these practices were included in questionnaire (in true / false format) & scored on 5 point scale (Range 0-30).

Data Collection: From each hospital included, the data was collected from a maximum of two HCWs from ICU, each ward and minor OT. The practices were observed before and after contact with the patients and the proforma were filled. This was followed by administration of questionnaire in the language of the preference (English/Kannada) of the HCW. If both the activities could not be performed on the same day, a revisit was made.

Data Analysis: Information obtained was analyzed by SPSS version 10. Results have been expressed as proportions. The knowledge component has been expressed as total scores, mean and standard deviation. Significance of difference in 'Mean' knowledge scores was assessed using students' independent 't' test. Comparison of proportion of doctors and nurses with inadequate/ satisfactory and good knowledge was done. 'p' <0.05 was considered significant.

RESULTS

Only 129 observations could be made from 4 medical school hospitals, 3 private hospitals & 1 Nursing Home giving us a response rate of 90.8%. the number of observations from each of these are as follows (%): Medical school hospitals 91 (70.5), private hospitals 33 (25.6), Nursing Homes 5 (3.9). the breakup of the HCWs are as follows (n): Interns (32), Post-Graduate Students (51), Nurses (46).

Knowledge on various aspects of hand washing

Overall knowledge of the HCWs for various indications of Hand washing are as follows [Correct answers (%): Before touching the patient (100), after touching patient (97.7), Before handling an invasive device for the patient (86.7), Working in ICU (96.1), After handling blood or other body products with gloves (83.7), While examining patients in OPD (76.7), After using a hand sanitizer (58.1), Attending to a patient after being interrupted by a phone call (57.4). Most of them (46.5) had satisfactory knowledge about the choice of agents used & inadequate knowledge (34.1) about duration of hand washing. Knowledge about certain common wrong practices are presented in Table 1. Comparison of knowledge between doctors & nurses (Table 2) on various aspects of hand washing reveals that doctors had better knowledge though the knowledge of doctors on some aspects is inadequate.

Table 1: Knowledge of HCWs regarding certain wrong practices

Knowledge about wrong practices	Correct Answer (%)	Wrong Answer (%)
Hand washing should be practiced only before touching a patient	96 (74.4)	33 (25.6)
It is sufficient to wash hands only once before attending to many patients in the ward.	109 (84.5)	20 (15.5)
Visibly soiled hands can be cleansed using an alcohol based hand rub	73 (56.6)	56 (43.4)
Soap and alcohol based hand rub can be used concomitantly	56 (43.4)	73 (56.6)
Generally it is not essential to wash hands after patient contact to prevent health care associated infections.	106 (82.2)	23 (17.8)
Gloves should be changed or removed if moving from a contaminated body site to either another body site within the same patient or the environment.	100 (77.5)	29 (22.5)

Table 2: Comparison of knowledge between Doctors and Nurses

Grading of Knowledge on Hand washing (Scores)	Doctors (%)	Nurses (%)	Mean Scores (Standard Deviation)	Student's Independent 't' Test (p)
Indications				
Inadequate (< 5)	1 (1.2)	3 (7.0)	Doctors 8.69 (1.23)	4.19 (0.000)
Satisfactory (6 to 9)	59 (71.1)	34 (79.1)	Nurses 7.65 (1.46)	
Good (10 - 11)	23 (27.7)	6 (14)		
Choice of Agents				
Inadequate (< 2)	6 (7.2)	12 (27.9)	Doctors 4.41 (1.14)	5.68 (0.000)
Satisfactory (3-4)	34 (41)	26 (60.5)	Nurses 3.19 (1.16)	
Good (5-6)	43 (51.8)	5 (11.6)		
Knowledge of certain wrong practices				
Inadequate (< 15)	0 (0)	4 (9.3)	Doctors 23.04 (2.77)	4.33 (0.02)
Satisfactory (16 to 24)	63 (75.9)	33 (76.7)	Nurses 20.47 (3.80)	
Good (25-30)	20 (24.1)	6 (14)		

Hand washing Practices

Use of gloves before contact with patients, disposing it and walking away without washing hands after contact was the common practice in these hospitals (Table 3). Less or inadequate time was spent on hand washing (12.36%). Most of the times (78%) the areas scrubbed were not adequate. Rubbing "palm to palm" was the common practice (68%). Missed areas included: 1. Dorsum of the hand. 2. Interdigital spaces. 3. Tips of the fingers. Enough soap was not applied to cover all the areas (83%). Wiping the hands to Non-Sterile cloth was the most common (57%) method of drying. These cloths were not single use cloths. Uses of other methods for drying are as follows (%): Sterile cloth (19), Tissue paper (16), Not drying (8). Those who used alcohol hand rubs did not apply it completely on the entire palm (42%). Long nails could be seen on the hands of some (14%) HCWs. Proportion of nurses (28%) who followed hand hygiene practices was higher than doctors (23%).

Table 3: Practices Pre & Post contact with patients

Hand washing Practices	Pre-Contact (%)	Post-Contact (%)
Use of Gloves	81 (62.8)	--NA--
Soap & Water	13 (10.1)	23 (17.82)
Alcohol based agents	16 (12.4)	18 (13.95)
No Hand washing	19 (14.7)	88 (68.21)

Barriers & facilities for hand washing

HCWs perceive that high work load, shortage of time & not enough sinks are some important barriers for practising hand washing (Table 4). Though the hospitals made available gloves, soap, water there were inadequate number of sinks (Table 5).

Table 4: Perceptions on the barriers of hand washing

Perceived Barriers for practising hand washing	Yes (%)	No (%)
Increased workload	92 (71.3)	37 (28.7)
Lack of time	86 (66.7)	43 (33.3)
Location and shortage of sinks	81 (62.8)	48 (37.2)
Lack of encouragement	78 (60.5)	51 (39.5)
Irritation and dryness of hand	71 (55.0)	58 (45.0)
Lack of role model from senior staff	70 (54.3)	59 (45.7)
Shortage of water	58 (45.0)	71 (55.0)
Low risk of acquiring infection from patient	43 (33.3)	86 (66.7)

DISCUSSION

The knowledge of doctors on various aspects of hand washing is better than nurses. There are no comparable studies from India. Poor knowledge about hand washing practices are reported from turkey.⁷ Though the level of knowledge of doctors is better than nurses, it is inadequate regarding choice of agents. Many HCWs do not recognize the inappropriateness of certain wrong practises (Table 1). Information about hand hygiene is generally limited to antiseptic / disinfecting agents in the undergraduate medical curriculum. Though the nurses study it in detail, knowledge acquired during student days seem to have been forgotten. There is a need to reorient the interns, postgraduates & nursing students before they begin their work in the hospitals.

Practices of the HCWs reflect that it is not in tune with their knowledge. They do not practice what they know. Use of gloves is not a substitute for hand washing.¹ so, the use of gloves without associated hand washing amounts to non-compliance. Low proportion of HCWs practiced hand washing with soap & water. But when we

include glove users the proportion is higher. Higher rates of hand washing are reported by Mehta et al.⁵ Their study was conducted in ICUs of tertiary care centres where the compliance rates are likely to be higher. Our study is the first one to be conducted including the nursing homes / small hospitals. We included ICUs and also other sites in a hospital. So it reflects the poor state of hand hygiene practices in smaller hospitals which is more likely to be case in many such hospitals in India.

Table 5: Facilities for hand washing available at the site of patient care

Presence of following facilities	Number (%)
Antimicrobial Soap	
1. Yes	106 (82.2)
2. No	23 (17.8)
Alcohol Based Agents	
1. Yes	115 (89.1)
2. No	14 (10.9)
Sinks	
1. Yes	117 (90.7)
2. No	12 (9.3)
Sterile Towel	
1. Yes	72 (55.8)
2. No	57 (44.2)
Sterile Gloves	
1. Yes	126 (97.7)
2. No	3 (2.3)
Hand Drier	
1. Yes	4 (3.1)
2. No	125 (96.9)
Continuous water supply at sinks	
1. Yes	103 (79.8)
2. No	26 (20.2)
Posters Explaining Hand washing technique	
1. Yes	63 (48.8)
2. No	66 (51.2)
Sink Bed Ratio (n=95)	
1. Less than 1:10	44 (46.3)
2. Atleast 1:10	44 (46.3)
3. More than 1:10	7 (7.4)

The pattern of perceived barriers for practicing hand washing practices has not been explored in both the studies conducted in India. The pattern reflects that the HCWs seem to consider hand washing as “burdensome”. The nature of facilities available is reasonable considering the fact that this study included not only hospitals affiliated to medical schools but also smaller ones. The sink bed ratio is less in these hospitals. Problems with sinks & water has been reported from a premier institute like PGIMER,⁶ the existence of such a problems in smaller hospitals comes as no surprise.

There are some limitations in our study. The number of hospitals included in our study is small. These kind of studies are considered “sensitive” by the private hospitals so it is difficult to conduct such studies on a “large scale”. The findings provide important inputs for policy makers. Absence of standard guidelines for hand hygiene & facilities for practicing it for our small hospitals in our country compelled us to develop our own tools which may have limited the extent of facilities studied in hospitals. There do not exist clear cut guidelines for what constitutes “adequate hand washing facility” for Nursing Homes & / Corporate Hospitals. So we could only report the presence / absence of facilities for hand washing.

CONCLUSION

Though the HCWs have a general awareness about the HWPs they lack specific information. Incorrect HWPs were observed.

Recommendations

There is a need to reorient the HCWs before they begin the hospital work about hand hygiene practices. There is a need to evolve national guidelines on standard hand washing practices and facilities in hospitals in our country.

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