Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/15635
DOI URL: http://dx.doi.org/10.21474/IJAR01/15635

RESEARCH ARTICLE

COMPARATIVE STUDY OF THE KNOWLEDGE, ATTITUDES, PRACTICES, AND SATISFACTION OF FACILITIES IN HAND HYGIENE AMONG CRRIS AND NURSING STUDENTS IN A TERTIARY TEACHING HOSPITAL IN SOUTH INDIA

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Manuscript Info

Manuscript History
Received: 05 September 2022
Final Accepted: 09 October 2022
Published: November 2022

Key words:-
Hand Hygiene, Curriculum, CRRIS, Nursing Trainees, And Gap Analysis

Abstract

Background: Practising hand hygiene is essential in minimizing morbidity and mortality in surgical services. Compliance with proper hand hygiene is reportedly lacking among house surgeons (CRRIS) and nursing trainees that need to be addressed as formal training prior to posting is not in the curriculum.

Objective:

1. To undertake a gap analysis in knowledge, attitudes, and practice compliances in HH among CRRIS and graduate nursing trainees at KIMS, a tertiary teaching hospital
2. To compare facilities, knowledge, attitudes, practices, and satisfaction.

Materials and methods: A cross-sectional Institutional-based study for a period of 6 months among 90 CRRIS and 60 Nursing trainees. WHO hand hygiene questionnaire was used to assess Knowledge and prevalidated structured questionnaire was used to assess Attitude and practice. Z test was used to compare the percentage of correct responses of the two study groups.

Result: A significant difference with a p-value of 0.0025 was observed as the most frequent source of germs responsible for healthcare-associated infections. The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses (62.5%) as compared to residents (21.3%) which was found to be highly significant with p-a a value <0.001.

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Conclusion: Our study highlights the need for training sessions regarding hand hygiene practices among the CRRIS and nursing students to provide the current knowledge in the area with a change in attitudes, approaches, and practices leading to the reduction of nosocomial infections.

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Introduction:-

Surgical site infection due to poor hand hygiene practice is a dreaded complication that may increase the morbidity and mortality of the patients. Proper hand hygiene practice before and after touching the patient proved to be useful in reducing surgical site infection and Nosocomial infections[1]. Hand hygiene practice remains the most important measure to reduce this infection, especially among House surgeons and Staff nurses, whose lack of awareness about the importance of hand hygiene increases the chance of surgery-associated infections. Currently, there is no scope in the curriculum for mandatory training and assessment of CRRIS and Staff in Hand hygiene practice.[2] This results in a lack of knowledge and a poor attitude towards hand hygiene from this section of healthcare professionals resulting in preventable hospital-acquired infections. A simple hand hygiene practice can help in the prevention of resistant hospital-acquired infections, thereby preventing unnecessary hospital stays to complications. [3]The senior consultants must set an example by following this mandatory routine in surgical wards so that the junior will emulate this practice. Proper hand hygiene practice is abysmally low among consultants and other health care staff generally, and in addition, we found a lack of knowledge and understanding of the importance of HH among CRRIS and nursing staff. Gap analysis of knowledge and their responses will help us to analyze the reason behind this, and this gap analysis and suitable remedial measures will benefit the patients.

The World Health Organization guidelines on evidence-based hand hygiene education, and training if properly given to our students, interns, and staff, Healthcare-associated infections can be drastically reduced. Lack of awareness and lack of supervision are considered the main reason for this casual attitude among our young healthcare professionals[4]. By updating the undergraduate curriculum periodically our budding doctors and staff and be made aware of this hand hygiene practice[5]. Unless there is a provision for assessment for these procedures in their curriculum the objective can't be achieved. Since the study population is in direct contact with the patient, this study assesses and compares the knowledge and practice of hand hygiene among the CRRIS, and nursing trainees and do a gap analysis to address the issues if any will help in reducing infection transmission.

Objectives of the study:-

1. The objective was Gap analysis in the knowledge, attitude, and practice of hand washing and associated factors among CRRIS and Nursing staff
2. To analyze measures to address the issues found in gap analysis and addresses the issues if any.

Materials and Methodology:-

A cross-sectional single Institutional questionnaire-based study was conducted for a period of six months from May 2020 to October 2020, at the Department of General Surgery, Karpaga Vinayaga Institute of Medical Sciences &Research Centre, a tertiary teaching hospital in Suburban South India. The study population of CRRIS and nursing interns was sensitized about how the study was going to be conducted and its importance. Implied consent was obtained orally by the investigators and same documented. A quantitative analysis was done based on a structured prevalidated questionnaire approved by microbiologists and hospital infection control team members. Printed forms were used to collect data on knowledge attitude and practice. The Z test was used for Qualitative analysis and to compare the percentage of suitable responses of the CRRIS and nursing interns. This study was approved by the Institutional Ethical Review Committee of Karpaga Vinayga Institute of Medical Sciences. Participants were given a focused group discussion on this study after obtaining their consent.

Data collection process and tools

WHO's hand hygiene questionnaire was used to assess Knowledge of hand hygiene. This consisted of 25 questions with multiple-choice answers. Prevalidated questionnaire consisted of 5 sections with demographic, socioeconomic, educational level, professionalism, and awareness, with 5 questions, in each section. 1 point was given for each correct response to positive attitudes and good practices, so the maximum score for attitude is 10 and for practice, it

is 8. A score of more than 80% was considered good, 60–79% was moderate, and less than 50% was taken as poor. Data were analyzed using SPSS 21 version software. Descriptive statistics were used to calculate percentages for each of the responses given. Qualitative analysis was done with the Z test and a P value less than 0.05 was considered significant. Inconsistencies in data were checked for any missing values. The entire distribution of the study subject with the variables under study was checked with simple frequencies. The outcome of the variable and association between multiple factors are determined by Bivariate and multivariate analysis.

Inclusion Criteria
CRRIS Currently doing internship

Nursing Interns

Exclusion Criteria
CRRIS and Nursing Interns who had any form of formal training on Hand Hygiene

Not interested in participation

Results:-

Our study population comprised 90 CRRIS and 60 nursing staff. (76%, 114 out of 150) had stated they received some semi-formal training in hand washing but no assessment was done. A significant difference of ($P < 0.001$) was observed between CRRI (63 out of 90, (74.2%)) and nursing staff (70.1) (95.4%) who had received formal training in hand hygiene practice. When questions were asked about the correct technique of hand hygiene, 79 out of 90 CRRIS (91.3%) and 56 of 60 nursing students (97%) said they knew the correct technique of hand washing. A significant difference with a p-value of 0.0025 was observed regarding the most frequent source of germs responsible for healthcare-associated infections among residents and nurses. A significant difference with a p-value of 0.0001 & 0.04 was observed in colonization due to jewellery and artificial nail among the study groups. The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses (62.5%) as compared to residents (21.3%) which was found to be highly significant witha p-value<0.001.Our study results are found comparable to the study conducted by Van de Mortel et al. in 2010 compared the hand hygiene knowledge, beliefs, and practices between nursing and medical students

Knowledge of Hand Hygiene Comparison of knowledge in medical and nursing students on each question. Table:1
Among the total study population of 150 the knowledge of hand hygiene was moderate (72%) population. 10 % of participants (14 out of 140) had reasonably good knowledge of correct hand hygiene practices. The nursing staff was found to have significantly better knowledge than medical students. ($P = 0.024$) as shown in Table 1.

Table1:-

Slot number	**Questions (answers)**	**CRRIS (n = 90)**	**Nursing Interns (n = 60)**	P **value**
1	Which of the following is the main route of transmission of potentially harmful germs between patients? (Healthcareworkers' hands when not clean)	74 (75.6 %)	32 (76.2%)	NS
2	What is the most frequent source of germs responsible for healthcare-associated infections? (Germs already present on or within the patient)	44 (41.5%)	12 (26.6%)	0.0025

Which of the following hand hygiene actions prevents the transmission of germs to the patient?				
3	Before touching a patient (yes)	90 (91.6%)	45 (97.8%)	NS
4	Immediately after the risk of body fluid exposure (yes)	81 (82.4%)	39 (84.3%)	NS
5	After exposure to the immediate surroundings of a patient (no)	26 (26.7%)	13 (28.4%)	NS
6	Immediately before a clean/aseptic procedure (yes)	79 (80.3%)	40 (86.7%)	NS
Which of the following hand hygiene actions prevents transmission of germs to the health care worker?				
7	After touching a patient (yes)	92 (94.2%)	46 (99.6%)	0.02
8	Immediately after a risk of body fluid exposure (yes)	86 (87.8%)	41 (90.2%)	NS
9	Immediately before a clean/aseptic procedure (no)	48 (48.9%)	28 (61.2%)	0.05
10	After exposure to the immediate surroundings of a patient (yes)	70 (71.2%)	35 (77.1%)	NS
Which of the following statements on alcohol-based hand rub and hand washing with soap and water is true?				
11	Hand rubbing is more rapid for hand cleansing than hand washing (true)	68 (69.6%)	36 (78.9%)	NS
12	Hand rubbing causes skin dryness more than hand washing (false)	30 (30.2%)	10 (20.8%)	NS
13	Hand rubbing is more effective against germs than hand washing (false)	45 (45.7%)	16 (34.2%)	0.01
14	Hand washing and hand rubbing are recommended to be performed in sequence (false)	45 (46.3%)	11 (24.2%)	NS
15	What is the minimal time needed for alcohol-based hand rub to kill most germs on your hands? (20 seconds)	38 (38.3%)	13 (27.8%)	NS
Which type of hand hygiene method is required in the following situations?				
16	Before palpation of the abdomen (rubbing)	27 (27.3%)	18 (38.8%)	0.02
17	Before giving an injection (rubbing)	25 (25.2%)	14 (31.4%)	NS

18	After emptying a bed pan (washing)	67 (68.2%)	34 (79.8%)	0.02
19	After removing examination gloves (rubbing/washing)	64 (65.6%)	36 (78.7%)	NS
20	After making a patient's bed (rubbing)	30 (30.9%)	6 (12.6%)	0.0005
21	After visible exposure to blood (washing)	46 (46.7%)	27 (57.9%)	0.03
Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?				
22	Wearing jewellery (yes)	76 (77.7%)	44 (96.6%)	0.0001
23	Damaged skin (yes)	93 (95.3%)	43 (93.9%)	NS
24	Artificial fingernails (yes)	79 (80.9%)	41 (90.1%)	0.04
25	Regular use of a hand cream (no)	54 (54.8%)	31 (67.4%)	NS

Z test. **P** < 0.05 (significant), **P** < 0.001 (highly significant), and NS (not significant).

Comparison of hand hygiene practice among medical and nursing students.Comparison of the practice of hand hygiene practice among medical and nursing students.

Nursing interns showed better attitudes toward hand hygiene than medical interns. A majority (74%) of nursing interns believe they had the required knowledge about hand hygiene compared to just 35% of medical interns. This stresses the need to conduct hand hygiene practice and formative assessments for medical interns. Further, a significantly higher percentage of nurses (62.4%) reported adhering to correct hand hygiene methods compared to just 20% of medical students. (P < 0.01). This may be due to the constant supervision of the senior staff nurses on duty. In our study, 26% of medical students and 39% of nursing students thought that wearing gloves could replace hand hygiene. More nursing students (69%) claimed that they felt guilty about omitting hand hygiene as compared with medical students (39%) as shown in [Table2.]

Table2:-

Statement	**Medical students (n = 98)**	**Nursing students (n = 46)**	P **value**
I adhere to correct hand hygiene practices at all times	21 (21.4%)	28 (61.8%)	<0.001
I have sufficient knowledge about hand hygiene	35 (35.3%)	34 (74.4%)	<0.001
Sometimes I have more important things to do than hand hygiene	20 (20.5%)	16 (35.2%)	0.004
Emergencies and other priorities make hygiene more difficult at times	74 (7.6%)	22 (4.7%)	NS
Wearing gloves reduces the need for hand hygiene	25 (25.8%)	18 (38.6%)	0.01
I feel frustrated when others omit hand hygiene	27 (27.6%)	25 (54.5%)	<0.001
I am reluctant to ask others to engage in hand hygiene	21 (21.2%)	8 (16.4%)	NS
Newly qualified staff has not been properly instructed in hand hygiene in their training	26 (26.6%)	23 (49.8%)	<0.001
I feel guilty if I omit hand hygiene	39 (39.4%)	32 (68.9%)	<0.001
Adhering to hand hygiene practices is easy in the current setup	27 (27.2%)	21 (46.1%)	0.008

Z test. **P** < 0.05 (significant), **P** < 0.001 (highly significant), and NS (not significant).

Comparison of the correct responses to hand hygiene practices of medical and nursing students.
Although these nursing interns had a better level of attitudes regarding hand hygiene, there was a lack of compliance and understanding regarding the importance of hand hygiene after preparing a patient's bed. We found overall the study group was unsatisfied with the facilities provided for hand hygiene as we found only 27% medical interns and 46% nursing interns) felt that hand hygiene can be practised routinely following each step as per WHO guidelines.In our study also compared to CRRIS nursing interns fare better in the hand hygiene practice may be due to constant supervision which is comparatively less among the medical fraternity.(table3)

Table 3:-

Statement	**Medical students (n = 98)**	**Nursing students (n = 46)**	P **value**
Sometimes I miss out on hand hygiene simply because I forget it	16 (16.2%)	21 (46.1%)	<0.001
Hand hygiene is an essential part of my role	46 (46.7%)	38 (83.6%)	<0.001
The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	63 (6.4%)	13 (27.7%)	<0.001
Infection prevention team have a positive influence on my hand hygiene	20 (20.7%)	25 (54.8%)	<0.001
Infection prevention notice boards remind me to do hand hygiene	26 (26.5%)	24 (52.9%)	<0.001
It is difficult for me to attend hand hygiene courses due to time pressure	11 (11.4%)	14 (30.3%)	<0.001
Water supply inadequate	26(28.8%)	24(40%)	<0.01
Inconvenient placement of hand rub dispenser or sink	26 (26.5%)	24 (52.9%)	<0.001
Feeling hurried or attending to emergent patient conditions	46 (51.1%)	37(62.3%)	<0.001

Z test. **P** < 0.05 (significant), **P** < 0.001 (highly significant), and NS (not significant).

Discussion:-

In this study, we included only CRRIS and Nursing interns, who are in contact with the patients in surgical wards as part of their training. We found that both groups had only moderate knowledge of hand hygiene, as expected since the study was being done during the covid pandemic. Feather et al., in one study on a similar topic the hand hygiene practices of 187 candidates of MBBS students at The Royal London Hospital School of Medicine and Dentistry in the UK found that only 8.5% of candidates follow hand hygiene practice properly.[6]Anwar MA, Rabbi S, et al in their study in resource constraint centre reported that compliance with hand hygiene is abysmally low at10 % only.[7] Since there is more chance for interns to be in contact with patients than medical students, poor results among CRRI are mainly due to a lack of knowledge and formal training during their undergraduate training in this important aspect of patient care.Patarakul K et al in their study also reported that the nursing interns' hand hygiene attitude and knowledge were comparatively better than medical interns.[10]Basurrah M, Madani T., et al reported that hand washing and gloving in Saudi Arabia found compliance with hand hygiene was seen in 70% of medical interns, 18.8% of nurses, and 9.1% of senior medical staff, but the technique was suboptimal in all.[11] Most of the studies on hand hygiene from developing countries reported quite a deplorable hand hygiene practice and our study also showed that the overall compliance with hand hygiene among our study population was less than 50%, however, compliance with hand hygiene practices differed among nursing interns and medical interns. This may be due to the constant supervision of the senior staff nurses on duty. Practising Hand hygiene plays an important role in reducing morbidity and mortality in surgical patients hence sensitizing, periodic training and assessment are mandatory. [12]Unless there is a provision for assessment for these procedures in their curriculum the objective can't be achieved. Hand hygiene must be made part of the undergraduate curriculum, of both medical and nursing courses. Formative assessment with credits will make the trainees take these hand hygiene practices seriously in their regular patient contact.[13] For senior consultants and other nursing faculties also, we have to conduct orientation programs so that they can act as good role models[14]. Senior faculties and consultants must practice routine hand hygiene during their

patient contact and act as a role model for their trainees will go a long way in this area.[15]Since the study population is in direct contact with the patient, this study assesses and compares the knowledge and practice of hand hygiene among the CRRIS, and nursing trainees and do a gap analysis to address the issues if any will help in reducing infection transmission.

Conclusion:-

Our study stresses the need for hand hygiene in the curriculum of medical students with the scope for formative assessment. Currently, UG students and medical interns do not have training programs on hand hygiene practices and no supervision of their compliance. Periodic training assessment must be made mandatory during an internship with credits. We conclude that there is a need to address not only the knowledge gaps regarding the relationship between appropriate hand hygiene practice and nosocomial infection, during their internship. Resources should be made available without compromise, including alcohol rubs for all healthcare professionals including Medical and nursing interns as they also form part of the treating team. Senior faculties and nursing tutors can lead the way by themselves following hand hygiene practices meticulously.

Conflict of Interests:
The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding:
Nil

This paper was presented at the Association of Surgeons of Tamil Nādu conference "TANSICON 'held at Tanjore Tamil Nādu and won 2nd prize in the paper presentation section

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