Original Research Article

Study of Hospital Infection Control Practices in Tertiary Care Teaching Hospital

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Abstract

Healthcare-associated infections (HCAI) are a major setback for any organization. The most important mechanism of spread of these HCAI is via the contaminated hands of the healthcare givers that is doctors, nurses, other staff or relatives/friends of the patients. Contaminated environmental surfaces are another important reservoir for the spread of these infections. However, they are often under recognized. HCA is one of the most important public health problems in most countries of the world. In any healthcare setup basic infection control, measures can reduce the rates of healthcare-associated infections, which help to reduce the length of stay, nosocomial infection and cost. It is important to implement the quality system which can be executed and monitored by using compliance measures in the routine process of the hospital in order to improve the standard of patient health care. The quality of hospital infection control program is a reflection of the overall standard care provided by the institution. The current study is aimed to help in assessing the pre-existing knowledge regarding infection control practices among doctors and nurses. In our study, both doctors and nurses had a fair knowledge about the spread of nosocomial infections, practised safe patient-care protocols, and had positive attitudes. Still, some gaps have been identified in their knowledge and practice of infection control. It is suggested that an effective training sessions should be organized at the time of hire and in-service periodically which might help to decrease the healthcare associated infections.

Keywords: Healthcare workers, Infection control practices, Handwashing, Needlestick injury, Biomedical waste management, personal protection equipment.

INTRODUCTION

The quality of hospital infection control program is a reflection of the overall standard care provided by the institution. The major setbacks to any organization are Healthcare-associated infections (HCAI/HAI) as they are the common causes of illness and mortality among hospitalized patients including health-care workers (HCWs). It's been recognized as a major burden to patients, society and healthcare management [1]. HCAIs are infections those that were not actually present or incubating at the time of admission and are acquired by the patient during the process of care in a hospital or any other health care facility. Hepatitis B virus, Hepatitis C Virus, and HIV infection are commonest HAIs, mostly transmitted by healthcare workers who fail to practice infection prevention measures. Hence, Healthcare workers are considered to be the front line in protecting themselves and clients from infection. Infection prevention is actually a process of placing a barrier between

susceptible host and the microorganisms and a major component in providing safe and high-quality service delivery at the facility level [2]. Approximately 5 to 10% of patients admitted to acute-care hospitals or 2 million patients per year in the United States acquire a nosocomial infection [3]. The World Health Organization has reported approximately 1.4 million people to have a healthcare-associated infection (HAI) [4]. HA is one of the most important public health problems in most countries of the world [5]. In any healthcare setup, basic infection control measures can reduce the rates of HAIs, which helps to reduce the length of stay, nosocomial infection and cost [6]. It is important to implement the quality system which can be executed and monitored by using compliance measures in the routine process of the hospital in order to improve the standard of patient health care [7]. The contaminated hands of the healthcare givers that are doctors, nurses, other staff or relatives/friends of the patients are considered to be the most important mechanism of spread of this HCAI. Another important

reservoir for the spread of these infections is contaminated environmental surfaces. However, they are often under recognized [8]. These HCAI are associated with increased morbidity, mortality and healthcare expenditures. There are several evidence-based methods have shown to have reduced the rate of HCAI. Hand hygiene is concluded to be the most effective method in reducing the prevalence of HCAI. Promotion of successful hand hygiene is probably cost-saving [8]. The main theme emerged: 'The health workers can improve their awareness by making data on HAIs available for, which can motivate them to put their existing knowledge into practice, thus decreasing the gap in infection control' with limited resources, high workload and patient overload this could be an appropriate effort to improve infection control practice in the hospitals [9]. The present study was undertaken to assess the awareness and pre-existing knowledge regarding basic infection control practices among doctors and nurses such as hand hygiene, safe practices (SPs), needle stick injury (NSI), post-exposure prophylaxis (PEP) and environmental cleaning protocols of the hospital. Also to find the gap in the hospital regarding infection control programs and help to improve the existing awareness and practice regarding them.

METHODOLOGY OF STUDY

Type of study design
Questionnaire-based an observational cross-sectional study

Site: GMERS Medical College and Hospital, Dharpur-Patan.

Study Duration
January to March 2019

Sample Size
Doctors and Nurses, who are willing to participate in this study

The study was conducted in a 600 bedded tertiary care teaching hospital from January to March 2019. This study was a questionnaire-based, an observational cross-sectional, survey of the HCP including doctors and nurses involved directly with patient care. The demographic details were also included in the survey like age, sex, professional qualification and years of experience. The questioner included contents from the hospital infection control

standards of NQAS [10], which were followed in our hospital with relevant questions related to the everyday practice of the medical staff. The questionnaire comprises of 25 questions which were related to hand hygiene, hospital environment cleaning including blood spillage and biomedical waste management questions. Survey of Hospital Infection practices of the doctors and nursed who are involved directly with patient care. The 25 item questionnaires were distributed to the hospital doctors and nurses, they were asked to fill the survey and return on the same day, so as to avoid any bias among their results. The proforma is in English so doctors and nurses were asked to fill by themselves. This evaluation was done without any prior lecture or training on hospital acquired infection. The HAI control practices were not observed but evaluated based on a self-designed questionnaire. The only completed questionnaire was included in the final study and incomplete ones were excluded.

Inclusion criteria
Doctors and nurses who are involved directly with patient care.

Exclusion Criteria
Incomplete questionnaires were excluded.

Study tools
Data were collected in the questionnaire.

Statistical Analysis
The data were entered into Microsoft office excel and analyzed by Epiinfo software. Qualitative variables were described using absolute (N) and relative frequencies (%). This study was conducted with the permission from the institutional ethical board.

RESULTS AND DISCUSSIONS
This study includes 80 participants, 30 doctors and 50 nurses. Maximum Doctors were in the age group of 21-30yrs (70%) followed by 31-40 years (23.33%), 41-50yrs (3.33%) and 51-60 years (3.33%). Most of them were males 23 (76.67%) and females were 07 (23.33 %). Maximum doctors 13 (43.33%) had less than 1 year of job experience and others 11 (36.67%) had job experience 1-5 years. (Table No: 01) Majority of the doctors had done MBBS 16(53.33%), diploma 9(30%), MD 2 (6.67%) and MS 3 (10%). Out of the 30 Doctors, 22 (73.33%) were Junior Residents (JR), only one senior resident (SR), 3 (10%) MO, and 2 (6.67%) each were an assistant professor and associate professor.

Table-1: Percentage distribution of demographic variables of the samples

DEMOGRAPHIC VARIABLES	DOCTORS		NURSE	
	NUMBER	%	NUMBER	%
AGE				
21-30	21	70	43	86
31-40	7	23.33	7	14
41-50	1	3.33	0	0
51-60	1	3.33	0	0
GENDER				
MALE	23	76.67	15	30
FEMALE	7	23.33	35	70
Experience				
<1	13	43.33	1	2
1-5	11	36.67	35	70
6-10	3	10	13	26
>10	3	10	1	2

Maximum Nurses were in the age group of 21-30 years (86%) and 31-40 years (14%). Among nurses maximum were females 35 (70%) and males were 15 (30%). Majority of them had Job experience of 1 to 5 years 35 (70%) and rest 13 (26%) had job experiences of 6 to 10 years. (Table no:1) Majority of the nurse had GNM degree 35(70%) and BSC nursing was done by 15(30%). Most of them were posted as staff nurse 48(96%).

Out of the total respondents, 41 (51.25%) had the knowledge that inpatient were the ones most susceptible to hospital infection, of which 20 (66.6%) were doctors and 21(42%) nurses. And 48(60%) respondents had the knowledge of Catheter-Associated Urinary Tract Infection, Ventilator-Associated Pneumonia, Central Line Associated Blood Stream Infection and Surgical Site Infection; all are the source of the most commonly occurring healthcare-associated infections. (Table no: 02) Many studies have shown a disparity in knowledge of infection control based on a cadre of HCW and their years of experience. Studies have also found differences in terms of actual knowledge of infection transmission and control, its interpretation and application by HCW [11] Kane *et al.* 2007 stressed on the importance of the proper ratio of nurse and patient to minimize the infections in critical care units and to prevent exhausted which in turn increase the work efficiency of the nurses in the healthcare system [12]. Management should ensure that the quality team is a part of the organization and have a free hand to monitor operational measures.

Most hospital acquired infections are caused by transmission of pathogens from one patient to another, especially by health care workers who failed to wash their hands after evaluating a patient, or who did not properly comply with simple hospital hygiene measures. Most of the health workers in our study 62 (77.5%) strongly agreed that hand washing is the key to infection control and they 76 (95%) were also aware of the six steps of hand washing and had the knowledge as to when to wash hands or use hand rub. A total of 60% of the nurses and 46% of the physicians agreed that over 75% of healthcare-associated infections can be prevented by hand hygiene [13]. Daily washing of white coat or nurse uniform was done by 20 (66.6%) doctors and 32 (64%) nurses, other studies observed this practice among 64.4% of participants [2]. It is mandatory that healthcare workers should practice infection control precautions safely and competently at all time. To ensure this regular knowledge and updates on Infection control programs are needed.

Table-2: Giving correct responses to statements of awareness of hai among doctors and nurses

Statements of Awareness of HAI	Doctors		Nurses		Total	Total
	Nos. 30	%	Nos. 50	%	Nos. 80	%
Mode of transmission						
Which population is the most susceptible to hospital HCAIS	20	66.67	21	42	41	51.25
What are the sources of nosocomial infection	24	80	36	72	60	75
Which is the most commonly occurring Health care Associated Infections (HCAI) are	18	60	30	60	48	60
Standard precautions						
When do you wear medical utility (non-sterile) gloves?	23	76.67	50	100	73	91.25
How often do you clean your stethoscope with antiseptic (e.g., 70% alcohol)?	19	63. 33	41	82	60	75

Which is the single most effective method to prevent H CAIs?	23	76.67	39	78	62	77.5
Staff precautions						
Do you know how to wash your hands in the six-step h and washing technique? Yes/ No	30	100	46	92	76	95
When do you wash your hands/ use hand rub.	26	86. 67	50	100	76	95
How often do you wash your white coat or nurse unifo rm?	20	66. 67	32	64	52	65
Disinfection						
How do you prepare 1% hypochlorite from 5% commercially available hypochlorite solution?	20	66. 67	33	66	53	66.25
BMW						
Where should infectious waste from patients be disposed of?	24	80	48	96	72	90

Around 67 (83.5%) health workers said there is regular monitoring of infection control practices and 70 (87.5%) said the surface and environment samples were taken for microbiological surveillance from their department. Around 24 (80%) doctors and 38 (76%) nurses have been splashed by patient's blood, vomit or other body fluid during duty hours. All the doctors 30 (100%) and 45 (90%) nurses were aware of needlestick injury and post exposure prophylaxis. The respondents were trained for spill management 78 (97.5%). (Table no: 03) while one study showed 86 percent had inadequate practices in spill management [14].

Table-03: Statements of awareness and parameters of practice of hai (yes/no)

Statements of awareness and parameters of practice of HAI	Doctors		Nurses		Total Nos 80	Total %
	Nos. 30	%	Nos. 50	%		
Site of exposure						
Have you ever been splashed by patient's blood, Vomit or other bodily fluids?	24	80	38	76	62	77.5
Are you aware of needle stick injury and post exposure prophylaxis?	30	100	45	90	75	93.75
Spill management						
Staff is trained for spill management.	28	93.33	50	100	78	97.5
BMW management						
Availability of color coded bins at point of waste generation	29	96. 67	49	98	78	97.5
Display of work instructions for segregation and handling of Biomedical waste	28	93.33	50	100	78	97.5
Transportation of bio medical waste is done in close container/trolley	29	96. 67	50	100	79	98.75
Standard precautions						
Surface and environment samples are taken for microbiological surveillance Yes / NO	25	83.33	45	90	70	87.5
Is there regular monitoring of infection control practices	27	90	40	80	67	83.75
Equipment and instruments are sterilized after each use as per requirement	30	100	44	88	74	92.5
Is there Regular validation of sterilization through biological and chemical indicators	27	90	49	98	76	95
Layout of the department is conducive for the infection control practices; layout ensures separation of routes for clean and dirty items.	27	90	49	98	76	95
Staff precautions						
Facility ensures standard practices and materials for decontamination and cleaning of instruments and procedures areas	26	86.67	41	82	67	83.75
Facility ensures adequate personal protection equipments as per requirements	28	93.33	50	100	78	97.5
No reuse of disposable gloves, Masks, caps and aprons.	30	100	49	98	79	98.75

The health workers 67(83.75%) said their facility ensured standard practices and materials for decontamination and cleaning of instruments and procedure areas. The Doctors 30 (100%) and Nurses 44(88 %) confirmed that the equipment and instruments were sterilized after each use as per requirement. Respondents 78 (97.5%) said their facility ensured adequate personal protection equipment (PPE) as per requirements. (Table no: 03) The wearing of protective gloves is a sensible precaution in various clinical situations in order to prevent gross soiling or contamination. PPE is preferred than hand-washing or hand disinfection as it may even break the chain of infection more effectively. A study showed that a training session and the availability of gloves directly at the bedside can significantly reduce the incidence of Clostridium difficile–associated diarrhoea (CDAD). [15]. Das in his study noted in 33.3% observation, syringes were reused for the same patients and in 25% observation, syringes were reused for different patients [16] but in our study 79 (98.75%) HCWs were not reusing the disposable syringes, masks, caps and aprons.

The knowledge of preparation of 1 % hypochlorite from the commercially available 5% hypochlorite was found to be among 53 (66.25%) HCWs (Table no: 02). For inadequate practices in the usage of sodium hypochlorite, awareness can be created among the staff on the importance of using the sodium hypochlorite. There should also be charts, posters, snippets and hand-outs of these guidelines displayed on Strategic places/points of the hospital for ready reference in every department and ward [14]. The HCWs 78 (97.5%) observed availability of color coded bins at the point of waste management and display of work instructions for segregation and handling of biomedical waste. The participants 79 (98%) even noted the biomedical waste was transported in closed containers/trolleys. Total 72 (90%) participants, 24 (80 %) doctors and 48 (96%) nurses had the knowledge of disposal of infectious wastes from the patient (Table no: 03). But one study noted 72 percent had inadequate practices in biomedical waste management practices [14]. The doctors 27(90%) and nurses 49(98%) said regular sterilization was validated through biological and chemical indicators. The doctors 27(90%) and nurses 49(98%) agree that the layout of their department is conducive for the infection control practices and the layout ensures separate routes for clean and dirty items. (Table No: 3).

A study conducted by Parmeggiani *et al.* [17] demonstrated that most of the nurses had a high level of knowledge about standard precautions. In contrast, Abdullahi and colleagues [18] showed that out of 518 subjects 26.5% of nurses had a very low level of knowledge with respect to infection control measures. Kamulegeya *et al.* [19] also found that 51.4% of nurses

out of 209 participants had poor or wrong knowledge about the transmission of blood-borne organisms. These studies showing differences among HCW may be due, to some extent, to the use of different questionnaires in the cited studies or because of the difficulty of the questions (multiple choices vs. yes/no answers), design and difference in the content, various classification of knowledge in different studies makes it impossible to compare them accurately [3].

In the existing curriculum of undergraduate medical and nursing disciplines, knowledge regarding prevention and control of HAIs is done but with a very little emphasis. Mostly it is restricted to a few didactic lectures on important aspects of infection control, aiming at the attainment of only theoretical knowledge. Very less effort is put for skill based learning or hands-on workshops. Less emphasis is put on their positive attitude towards infection control while working independently, thus avoiding the serious consequences [20]. Lack of resources, excess workload and time constraint have been reported as major factors influencing the poor practice of infection control in healthcare facilities in Nigeria, and other countries of the world [11].

SUMMARY AND CONCLUSIONS

Doctors and nurses, both had a fair knowledge about the spread of nosocomial infections, practised safe patient-care protocols, and had a positive attitude. Still, some gaps have been identified in their knowledge and practice of infection control. This underscores the need for continued refresher training and measures to compel implementation of infection control in the hospital. This suggests the academic curriculum should be more focused on both theoretical and practical knowledge of infection control. And effective training sessions should be organized at the time of hire and in-service periodically which might help to decrease the healthcare associated infections.

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