



RESEARCH ARTICLE

A STUDY TO ASSESS THE INFECTION CONTROL PRACTICES AS A PART OF PATIENT SAFETY IN A DIALYSIS UNIT OF A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Patient safety is a matter of growing interest and a key component of healthcare quality. Dialysis facilities are complex organizations that involve providers from multiple disciplines and use advanced technology to care for patients with multiple serious illnesses. Hemodialysis (HD) patients have a high comorbidity burden, polypharmacy, and the physiological consequences of established kidney disease mean that patients on Renal replacement therapy (RRT) are potentially vulnerable to medical errors. There can be costly consequences related to safety events, for patients and for health networks, increasing length of stay, readmissions in the hospital and risk of death. HD patients as well as the dialysis staff are vulnerable to contracting health-care-associated infections (HAIs) due to frequent and prolonged exposure to many possible contaminants in the dialysis environment. Infection is the most common cause of hospitalization and the second most common cause of mortality among HD patients, after cardiovascular disease. The study aims to assess the infection control practices in the dialysis unit of a tertiary care teaching hospital and to assess the physical facilities in relation to infection control practices and patient safety. It is a descriptive and observational study and information is collected through observational checklist and personal observation based on the guidelines and patient safety audit checklist given by National Health Authority (NHA), India and Manual for Patient Safety Assessment, 2020, 3rd edition given by WHO. The overall infection control practices in the dialysis unit are satisfactory except for few like shortcomings in audit of physical facilities like inadequate ventilation and lack of adequate examining lights, stretchers and wheel chairs

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INTRODUCTION

Patient safety is a matter of growing interest and a key component of healthcare quality. WHO has defined Patient Safety as "A framework of organized activities that creates cultures, processes, procedures, behaviors, technologies and environments in health care that consistently and sustainably lower risks, reduce the occurrence of avoidable harm, make error less likely and reduce its impact when it does occur." (1) A cornerstone of the discipline is continuous improvement based on learning from errors and adverse events" Patients, family members, managers and health professionals demand a safe, effective and efficient healthcare (2). It is an essential and vital component of healthcare quality and foundation of good

Despite constant vigilance, health care providers face many challenges in today's health care environment in trying to keep patients safe. The issue of patient safety has become one of the most significant challenges facing the health care system. It is estimated that ten million patients worldwide are harmed unnecessarily and suffer from disabling injuries or death each year as a result of unsafe medical practices and care (3). Pronovost et al. (4) estimated that 80,000 patients suffered from hospital acquired infections annually in the United States, and up to 28,000 of them died, and these preventable deaths cost the health authorities around \$2.3 billion. Moreover, Pittet et al. (5) indicated that the number of patients who are affected by hospital infections in developing countries is more than 25 % of all admissions and this figure could be 20 times higher

It is noteworthy that medical care for patients receiving renal replacement therapy (RRT) is complex and technology-dependent. Patients have a high comorbidity burden, polypharmacy, and the physiological consequences of established kidney disease mean that patients on RRT are potentially vulnerable to medical errors (6). There can be costly consequences related to safety events, for patients and for health networks, increasing length of stay, readmissions in the hospital and risk of death (7). The presence of infection in the population in RRT is a complex problem: it is common (the prevalence of septicemia in dialysis patients is more than 100 times higher than in the general population) and multifactorial, associated with high hospitalization rates, to risks of infection and immunosuppression as a consequence of renal impairment, comorbidities and immunosuppressive therapy (6). It should be noted that bloodstream infections and other infections are the leading causes of death and hospitalization among hemodialysis patients second only to cardiovascular disease (8). Complications associated with vascular access and catheter can be serious, causing a high risk of morbidity and mortality for patients. It is the role of nurses to monitor, detect and intervene in complications that occur during hemodialysis sessions, considering their specialty and their responsibility in relation to the hemodialysis unit, which is a differential for achieving safety and quality in the hemodialysis procedure (9).

Nursing team of hemodialysis units must have knowledge about the adverse events, to be able to identify the risks and the situations that allow their occurrence with the intention of seeking alternatives to minimize the failures, adopt methods of risk analysis and, thus ensuring the quality of service (9). Strategies to improve patient safety in dialysis units are emphasized by the importance of effective communication, reduction of medication errors, correct dialysis, equipment preparation and infection control (6).

MATERIALS AND METHODS

The research methodology approach adopted in this study is descriptive and observational study. It includes collection of information through observation checklist and by personal observation on the basis of guidelines and patient safety audit checklist given by National Health Authority (NHA), India and Manual for Patient Safety Assessment, 2020, 3rd edition given by WHO. The parameters will be entered and analyzed in Microsoft excel sheet. Observation is done on both personnel responsible for dialysis as well as patients undergoing dialysis. A total of 160 sessions of dialysis were observed during 3 months period and a total of 27 staff members working in the dialysis unit were interviewed for assessing the Infection control practices with respect to safety of staff.

RESULTS AND DISCUSSION

An APIC guide (10) states in the document about evidence based guidelines for the prevention of the health care associated infections in all hemodialysis settings. Its states that HD patience is uniquely vulnerable to the development of the health care associated infection. So establishing preventive strategies will reduce the risk of infection and ensure the safety of patients. An example of the list of the key infection prevention measures included in the guide is as follows:

- Equipment cleaning/disinfection:
- Hand hygiene
- Medication/injection safety
- Water treatment

In a registry-based study of dialysis patients from Scotland, health care-associated infection contributed to 9.6% of all deaths (11).

Two specific risk areas deserve attention: 1) Infection control practices and 2) Catheter/Fistula related safety events. This study aims to assess the infection control practices in the dialysis unit with respect to patient safety and can be divided into 3 components:

- Infection control and safety practices with respect to the staff which is assessed by interviewing the staff in the dialysis unit.
- Infection control practices followed by the staff in the dialysis unit which were assessed by direct personal observation of 160 dialysis sessions through a time period of 3 months. This is done on the basis of guidelines and patient safety audit checklist given by National Health Authority (NHA), India and Manual for Patient Safety Assessment, 2020, 3rd edition given by WHO.
- Assessment of physical facilities with respect to infection control practices.

Infection control and safety practices with respect to staff in dialysis unit

CRITERIA	YES	NO	YES PERCENTAGE
Immunization against hepatitis-B	27	0	100
Personnel protective equipment	27	0	100
Testing & Classification of patients based on sero positive and negative	27	0	100
Allowing footwear inside unit	0	27	0
Segregation and color coding of bio medical waste	27	0	100
Changing consumables and linens in between patients	27	0	100
Leak proof containers	27	0	100
Standard fumigation procedure	20	07	74
Segregation of biomedical waste	27	0	100

Amongst the 27 staff interviewed, 16 were nurses and 11 were technicians and there is no statistically significant difference between the responses of nurses and technicians as the mean P value for the above questions was 0.59.

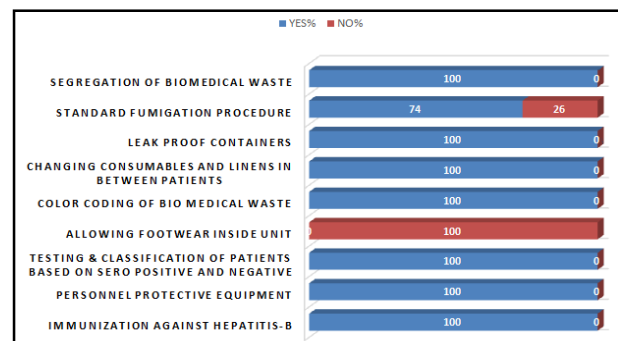
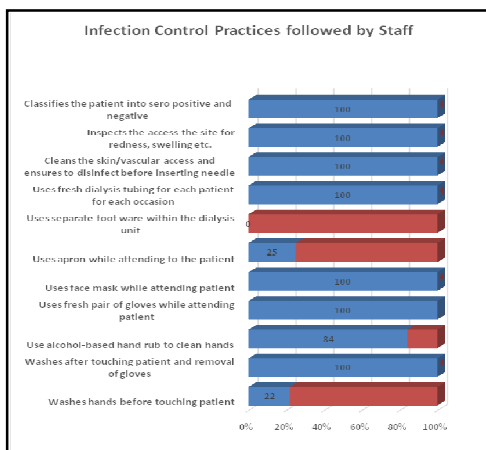


Fig. Infection control and safety practices with respect

All the staff working in the dialysis unit are immunized against hepatitis B and uses Personal protective equipment, tests and classifies patient into seropositive and seronegative, uses leak proof containers, changes consumables and linen in between patients, segregates biomedical waste as per color coding system. None of the staff is allowing foot wear in the dialysis unit. 52% of them are agreeing that they are following standard fumigation procedure in the dialysis unit. 48 % says that they are not following standard fumigation procedure in the dialysis unit because they are following scrubbing process in the unit. For more than a century, hand washing has been recognized as essential to prevent transmission of disease-causing organisms from caregivers to patients (12).



Assessment of Infection control practices followed by dialysis staff based on the observation and checklist

CRITERIA NO:	CRITERIA	YES	NO	%
1	Washes hands before touching patient	35	125	22
2	Washes after touching patient and removal of gloves	160	0	100
3	Use alcohol-based hand rub to clean hands	134	26	84
4	Uses fresh pair of gloves while attending patient	160	0	100
5	Uses face mask while attending patient	160	0	100
6	Uses apron while attending to the patient	40	120	25
7	Uses separate foot ware within the dialysis unit	0	160	0
8	Uses fresh dialysis tubing for each patient for each occasion	160	0	100
9	Cleans the skin/vascular access and ensures to disinfect before inserting needle /shunt connection	160	0	100
10	Inspects the access the site for redness, swelling etc. which might be a sign of local infection.	160	0	100
11	Classifies the patient into sero positive and negative and allots the dialysis machine	160	0	100

In the present study it was found that 22% of staff washes hands before touching patient and 78% are not washing hands before touching patient. It was found that 100% of staff washes after touching patient and removal of gloves. Out of samples 84% used alcohol based hand rub to clean hands and 16% are not following it. 100% used fresh pair of gloves while attending patient. 100% were adhering to practices of using PPE while starting the procedure of dialysis.

Out of samples 76 % uses face mask while attending patient and 24 % were not using face mask while attending patients in between the procedure. One survey of hand hygiene practices in dialysis facilities found that during a 3-month period, 25% of staff and about 10% of patients reported that staff did not wash or use alcohol-based hand gel before touching or interacting with patients and their dialysis machines (13). While many dialysis facilities have installed alcohol based gel dispensers at the patients’ chairside, there are no published data on the frequency of use of these devices. In one study of survey of infection control practices in dialysis unit it was found that 100% of staff used hand hygiene measures, use of sterile gloves and masks during haemodialysis procedures (14). In one study conducted by Suhair Abdulsatir (15) it was found that 72.5% of nurses adhered to hand hygiene practices and 100% of them used gloves during dialysis procedure. In his review of hemodialysis-related bloodstream infections, Camins addresses the history of Central Venous Catheter (CVC) use for dialysis and its associated increase in bloodstream infections (16). Compared with arteriovenous fistulas, CVCs are associated with a 15- to 33-fold increase in bloodstream infections (17).

Out of 160 cases in the present study, investigator found that all the staffs (100%) cleans the skin/vascular access and ensures to disinfect before inserting needle /shunt connection and 100% of the sample inspects the access the site for redness, swelling etc. Segregation of HBsAg positive patients and their equipment has been shown to decrease the incidence of HBV infection in dialysis units (18) However, even with this segregation, transmission of HBV can occur by the contamination of equipment, environmental surfaces and the hands of staff, if the same staff care for both groups of patients in the same shift (19).

In the present study the hospital has separate facility of dialysis with 9 beds allocated for Seropositive cases and all patients are tested before dialysis registration. All the staff classifies the patient into sero positive and negative and allots the dialysis machine accordingly. Also all the staff working in the dialysis unit are immunised against Hep-B. In one study the policy of immunizing staff against HBV was followed and coverage of renal unit staff was generally high. Most units (85%) screened new staff for HBsAg but fewer (65%) were screening at regular intervals in the absence of a needlestick injury (20). In one study conducted by Sais s. Ahmed et al (21) it was found that 63.2% of the 19 studied dialysis units were separating general waste from biomedical waste and that 57.9 % of the employees were vaccinated against hep b. In the present study the staff were strictly following the segregation and color coding for disposal of biomedical waste. The dialysis unit in the study is having adequate physical facilities and equipment with respect to infection control and patient safety. There is inadequate ventilation in the dialysis unit which can be improved.

Assessment of physical facilities with respect to infection control practices and patient safety:

CATEGORY	SL. NO	CRITERIA	YES	NO
PHYSICAL ENVIRONMENT AND FACILITIES	1	The lightening facility of the unit is satisfactory.	YES	
	2	Spacious dialysis unit.	YES	
	3	The ventilation of dialysis unit is satisfactory.		NO
	4	The cleanliness of the unit is satisfactory.	YES	
	5	Air conditioning maintained in the department is comfortable for work.	YES	
	6	Clearly marked areas for different functions of the unit	YES	
	7	Adequate furniture's in the unit.	YES	
	8	Hand washing and changing facilities for staff are satisfactory.	YES	
	9	The unit is equipped with emergency needs like fire extinguisher, essential drugs etc	YES	
	10	The facility is accessible for disabled.	YES	
11	Easy Access to ambulance and stretcher.	YES		

Conclusion

Infections and errors in dialysis care can cause harm and death and are a common cause of morbidity and mortality. Medical directors or administrators of dialysis facilities are responsible for fostering a culture of safety and for creating and supporting policies and practices that reduce errors, infections and improve patient safety.

Better risk assessment, patient assistance protocols, and environmental improvements can reduce this risk. Techniques to improve hand hygiene, reduce central venous catheter use, and improve adherence to sterile technique when these devices are handled reduce the incidence of infections.

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