Original Article

Assessing the Practice of Infection Control Among Dialysis Staff in Dialysis Centers in Northeast India

Abstract

Background: Chronic kidney disease patients on maintenance hemodialysis have multiple co-morbidities and high risk of infections. This study was conducted to assess the idea and practice of infection control measures in dialysis units in northeast India. **Materials and Methods:** This observational descriptive study was conducted among the participants of the 5th hemodialysis technician's conference, held at Guwahati on 29 and 30th October 2022. Data was collected through questionnaire prepared from Center for Diseases Control and Prevention 2016 Infection Prevention and Control Assessment Tool for hemodialysis with some additional parameters. **Results:** A total of 200 dialysis staff working in different dialysis units of northeast India participated in the study. Among infection control practices, 38% of participants said that their centers had no dedicated area for parenteral medication preparation. Twenty two percent did not clean the dialysis machine after each session. Thirty percent of participants responded that they had no regular training for infection control practices. Sixteen percent reported inadequate hand hygiene facilities near waiting areas. **Conclusion:** Dialysis staff has a crucial role in providing good standard dialysis care in ESRD patients. Dialysis facilities should have written policies on infection prevention and control and provide regular training to dialysis staff.

Keywords: *Infection, Hemodialysis, Dialysis staff*

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Introduction

Patients on maintenance hemodialysis (MHD) have multiple co-morbidities and high risk of infections. These can lead to costly consequences like hospital admissions, risk of hospital acquired infections and even death.[1] Infection is the most common cause of hospitalization and second most common cause of mortality among dialysis patients.[2] World Health Organization (WHO), Center for Diseases Control and Prevention (CDC) and Association of Professionals in Infection Control (APIC) address the best practice guidelines for infection control in dialysis units based on several evidence based guidelines and recommendations.[3-5]

The increased risk of contracting health-care-associated infections (HAIs) among hemodialysis (HD) patients are mainly due to immune compromised status, frequent and prolonged exposure of blood through the vascular access and extra-corporeal circuit, contaminated water, close proximity to other sick patients with infectious disease and frequent contact with healthcare workers.[6] Other important factors that increase the risk of infection are non-adherence or a breakdown in the implementation of recommended practices, which may be a result of understaffing, inadequate training of staff and lack of necessary equipment.

HD units should have written policies for prevention of infection-related complications. Staff members should possess thorough knowledge of the correct dialysis techniques, medication related complications and its management and aseptic techniques.[7]

There have been no studies on infection control measures in dialysis facilities in northeastern India thus far. Therefore, this study was conducted to assess the idea and practice of infection control measures in dialysis units in northeast India.

Materials and Methods

This is an observational descriptive study that was conducted among the participants of the

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5th Hemodialysis Technician's Conference, which was held in Guwahati, Assam in India, on the 29th and 30th October 2022. Nearly 200 technicians participated in the conference from more than 30 different dialysis centers in the northeastern states of India. The participants consent was obtained. Data was collected through a questionnaire prepared from CDC 2016 infection prevention and control assessment tool for hemodialysis with some additional parameters.[4]

Questionnaire was made with an aim of assessing the basic knowledge of infection control practice, facilities and policies in HD units, with respect to the following two components: a) infection control and safety practice with respect to the staff and b) infection control facilities and policies in dialysis unit.

The statistical package for social sciences (SPSS version.26) was used for data entry and analysis. Data were presented in descriptive statistics and were analyzed in the form of frequencies and percentages.

Results

A total of 200 dialysis staffs working in different dialysis units of northeast India participated in the study. The male to female ratio of participant was 2.3:1 and the most common age group was 20–30 years (76%) [Table 1]. Eighty five percent (85%) of participants held diploma degree, whereas 13% were graduates in dialysis technology. Their working experience ranged between 1 and 12 years. Twenty five percent (25%) of the study participants had working experience from one to three years whereas 40% had experience from 9 to 12 years.

Seventy six (38%) of participants said that their centers had no dedicated area for parenteral medication preparation. Forty four (22%) participants did not clean dialysis machine after each session, whereas 24% were not recapping needle immediately after use [Table 2].

The provisions available at HD centers for healthcare personnel safety varied considerably. Thirty percent (n = 60) of participants responded that they did not have regular training for infection control practices. Fifty six (28%) technicians said their facilities had no segregating facilities for symptomatic patients by 6 feet. Thirty two (16%) of participants said that facilities for hand hygiene were lacking near waiting areas [Table 3].

Figure 1 shows the different parameters in surveillance facilities and disease reporting pattern, including water quality monitoring and viral markers. In our study only, 80 (40%) staff members said that the blood culture was withdrawn before antimicrobial administration. Vascular access care and policies in HD units are shown in Table 4. Inadequate training with respect to environment cleaning and disinfection was found in 16% and 20%, respectively.

Table 1: Age and sex distribution of participants (n = 200)

Age group (years)	Male n (%)	Female n (%)	Total n (%)
20–30	112 (56)	40 (20)	152 (76)
30–40	20 (10)	10 (5)	30 (15)
40–50	6 (3)	8 (4)	14 (7)
>50	2 (1)	2 (1)	4 (2)

Table 2: Infection control practices amongst dialysis staff (n = 200)

Infection control practice	Yes n (%)
Vaccinated against Hepatitis B	184 (92)
Needle recap immediately after use	152 (76)
Sharp injury	172 (86)
Ever had blood splash	176 (88)
Use of alcohol-based hand rub	180 (90)
Use of Apron/Head cover during HD	184 (92)
Wash hand before examining the patient	176 (88)
Use gloves during dialysis	200 (100)
Dialyzer reuse in Hepatitis B, Hepatitis C and HIV	0
Parenteral medication preparation in dedicated area	124 (62)
Cleaning dialysis machine after each session	156 (78)
Use alcohol based chlorhexidine (0.5 %) as first line skin antiseptic agent during dressing changes of catheter	200 (100)
Routinely apply antibiotic ointment or povidone to catheter	200 (100)

HD: hemodialysis; HIV: human immunodeficiency virus

Discussion

Infection is the second most common cause of mortality among patients on MHD after cardiovascular disease.[8]

Table 3: Provisions available at hemodialysis centers for healthcare personnel safety (n = 200)

Elements assessed	Yes n (%)
Providing personal protective equipment	200 (100)
Post exposure evaluation and prophylaxis at free cost	180 (90)
Hepatitis B vaccination to working personnel	160 (80)
Facilities for hand hygiene in or near waiting areas	168 (84)
Facility of facemask use upon entry to symptomatic patients	200 (100)
Separate symptomatic patients by at least 6 feet from other patients	144 (72)

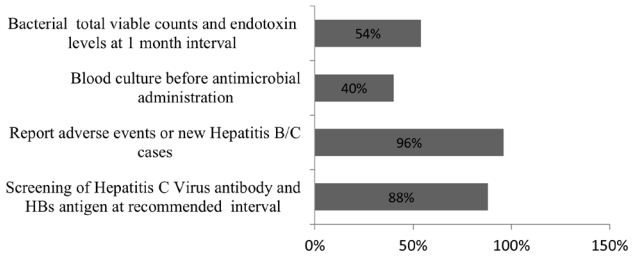

Figure 1: Surveillance facilities and disease reporting (n = 200). HB: Hepatitis B.

Table 4: Vascular access care and policies in HD units (n = 200)

Elements assessed	Yes n (%)
Training of staff specific to catheter or vascular access care	168 (84)
Written policies and procedures for routine cleaning and disinfection of environment surfaces	180 (90)
Training of personnel on environment cleaning and disinfection	160 (80)
Policy for decontamination of spill of blood or body fluid	200 (100)
Policy/procedures for reusable medical devices	200 (100)
Policies on dialyzer reuse	200 (100)
Routine training for infection control practices	140 (70)

HD: hemodialysis

Noncompliance to infection control measures at dialysis unit could cause complications in both dialysis staff and patients.

The WHO has established guidelines on hand hygiene for health care professionals.[9] Previous studies also have shown that major route of transmission of HAIs is through contaminated hands of the health care providers.[10-18] In our study we found that 12% of the staff were not washing hand before procedure and 16% said that their center was lacking inadequate hand hygiene facilities. In a study done in Saudi Arabia also found that 15%–18% of total participants were not compliant to hand hygiene.[19] This lack of compliance may be because of the fact that HD staffs need to perform hand hygiene multiple times during one session of dialysis, leading to work fatigue and shortage of time. Repeated training, provision of sufficient number of sinks with soap dispensers at appropriate locations and alcohol-based hand rubs placed at each patient station can improve the compliance.

Hospital acquired infection is transmitted by contaminated environmental surfaces with different pathogens.[20] Microorganisms can survive on environmental surfaces for varying periods of time. Szewczyk *et al.* recommended that the disinfection of dialysis machine should be done after each dialysis session or after every 72 hours breaks in working.[21] In this study, 22% of dialysis staffs were not following these recommendations. This may be due to lower educational status of participants (80% were only diploma holders) or because of excessive workload with time constraint. Education with regular trainings about the risk and benefit of disinfection to the staff as well as patients will solve these problems.

As per the guidelines by CDC and APIC medications packaged as multi-dose should be assigned to a single patient and preparation should be carried out in a clean area away from the patient treatment area, as well as patients should be segregated by minimum distance of 6 feet.[22-24] In our study, dedicated area for parenteral medicine preparation was not assigned in 38%, and 28% of participants answered that there were no facilities for segregating symptomatic and asymptomatic patients. This may be due to failure of the hospital authority to provide adequate space and lack of knowledge on part of technicians. So a strict enforcement of guidelines for setting up of a new dialysis center in accordance with the national and international norms and adequate training will help in solving this problem.

Infection with tunneled dialysis catheters is found to be the leading cause for bacteremia in chronic HD patients.[25] In this study, staff training with respect to catheter care was not given to 16% of the staff members. This may be because of lack of in house trainer on catheter care technique. So regular in-house training by a trained individual should be carried out.

Hepatitis B vaccination is recommended to susceptible healthcare workers in dialysis units.[26] Ninety two percent (92%) of dialysis staff were vaccinated against hepatitis B in this study. Vaccine was provided by the HD facilities only in 80%. Written policies on control and prevention of infection, and blood sample collection before starting antibiotic therapy was lacking in 10% and 60% of the staff members, respectively. All HD facilities in charge should keep written policies for control and prevention of infection in dialysis unit to improve patient care.

In India, with implementation of the Pradhan Mantri National Dialysis Programme, there has been drastic increase in dialysis centers. However, these dialysis centers should strictly follow the guidelines laid down by the Indian Society of Nephrology for starting new standalone dialysis centers, so as to be able to give a standard care to patients as well as personal safety of the staffs.[27] Training institute of dialysis technician should also strictly follow the minimum standards of teaching set by paramedical council of India.

Our study derives data covering most of the staff working in different dialysis facilities in northeast India and is the first study that has assessed infection control measures in this part of country. An important drawback of our study was that data was collected through questionnaire and there was no direct observations made over the infection control practices which could have resulted in information bias.

Conclusion

A dialysis staff has a crucial role in providing a good standard dialysis care in ESRD patients and an error in dialysis care can have various effects on patient health as well as on staff themselves. In our study, dialysis units were predominantly lacking in providing facilities of dedicated space for parenteral medication preparations, separation of symptomatic patients and providing vaccination of staff and periodic monitoring of water quality. They were also lacking in providing in house or otherwise training of staff

about infection control practices. There should be regular training of dialysis staff on infection control practices. It is the cornerstone for risk reduction and improvement in survival in HD patients.

Conflicts of interest

There are no conflicts of interest.

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