

Article

Management of hemodialysis unit in a specialized hospital

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Abstract: Chronic Kidney disease is becoming a global public health problem throughout the world. The aim of the study was to assess management status of the hemodialysis unit in a specialized hospital. It was a hospital based descriptive cross sectional study. A total of 17 participants were selected by purposive sampling method on the basis of defined selection criteria from January 2015 to December 2016. The place of study was National Institute of Kidney Diseases and Urology (NIKDU) hospital, Dhaka. The research instruments were a semi structured questionnaire and a checklist. The socio-demographic status of the respondents showed that 11.8 % (n=02) were doctor, 58.8 % (n=10) nurses and 29.4 % (n=05) were technician. Mean age of care providers was 38.82±8.79 years. Majority of respondents, were satisfied regarding the unit including physical facilities 76.5% (n=13) cleanliness of the unit 58.8% (n=10) and medical record facility 52.9% (n=9). Need to strengthen infection control measure and BCC activities among the service providers to improve the management status of the hemodialysis unit of NIKDU hospital.

Keywords: dialysis; hemodialysis; chronic kidney disease (CKD); dialyzer; vascular access; equipment facility

1. Introduction

Renal Dialysis is a medical process that becomes necessary when the normal functions of the kidneys become compromised by reduced kidney function and kidney failure. This may be due to disease, injury, infection or genetic factors. Renal failure may be classified as either Acute Renal Failure or chronic Kidney Disease. Haemodialysis and Peritoneal dialysis services involve filtering the blood of excess fluid, and waste products normally filtered by the kidneys. Haemodialysis is a treatment for end stage renal failure where the function of the kidneys to remove substances from the blood is replaced by the use of a haemodialysis (dialysis) machine. Haemodialysis requires the patient to have one of the following - arterio-venous fistula, vein graft (artificial graft) or central line catheter inserted into their neck or upper chest for dialysis. Haemodialysis management may require the patient to undergo dialysis for 3 to 6 hours on a daily basis over 3 to 4 days a week (International Health Facility Guidelines, 2014).

The purpose of renal replacement therapy with hemodialysis (HD) is to keep renal patients in optimal conditions and improve their quality of life during the transition to transplantation or death. Health professionals and the patients' family must work as a team for providing quality care to these patients (Tejada-Tayabas *et al.*, 2015).

The number of hemodialysis patients and dialysis facilities is increasing each year, but there are no surveillance programs validating that the services and equipment of each hemodialysis unit meet specified safety and quality standards. There is a concern that excessive competition and illegal activities committed by some dialysis

facilities may violate patients' right to health. Contrastingly, developed countries often have their own survey program to provide initial certification and monitoring to ensure that these clinics continue to meet basic requirements. Because hemodialysis units provide renal replacement therapy to critical patients suffering from severe chronic renal failure, appropriate legal regulation is important for the provision of initial certification and maintenance of facility, equipment, and human resource quality. Therefore, several standards providing minimum requirements for the area of hemodialysis unit, equipment for emergency care, physician and nurse staffs, water purification and quality management are urgently needed (Lee *et al.*, 2013).

Hemodialysis patients are gradually increasing every year. According to the statistics of National Health Insurance Service (NHIC) on medical aid, the number of hemodialysis patients increased by 31.9% from 44,136 in 2006 to 58,232 patients in 2010. Hemodialysis centers have been increased in number by 30.2% from 545 to 710 centers. The total medical cost for hemodialysis surpassed KRW 1 trillion in 2008 from KRW 848.8 billion in 2006. However, there is an excess supply of hemodialysis machines relative to the number of patients. The recommended number of patients is 4 per hemodialyzer, but there are 2.6 patients per machine as of 2011. There is therefore an excess investment of around 50% (ESRD Registry Committee, Korean Society of Nephrology, 2011).

It is hard to accurately estimate the number of patients requiring dialysis in the developing world. Referral patterns have a bearing on the population reaching the tertiary care hospitals, from where these figures are derived. The annual incidence of ESRD patients varies widely, from as low as 13 per million population (pmp) in Paraguay to as high as 250 in the Dominican Republic and 340 in Mexico. In 1993, the average incidence rate reported by the Latin American Registry was 33.3 pmp (Mazzuchi *et al.*, 1997).

Very little is known about the pattern of end-stage renal disease (ESRD) care in the developing world. The major reason for this is a lack of renal registries, which are functional throughout the advanced countries (Jha and Chugh, 1996). Well-being of dialysis patient not only depends on the proper treatment but also the overall management of dialysis services. For this, proper management of the unit is essential to deal with this important public health issue. The present study has been carried out to assess the management status of hemodialysis unit in a specialized hospital, National Institute of Kidney Disease and Urology. The study has been designed to assess the strength of management of hemodialysis unit, personnel management, and availability of physical facilities and also to determine the socio demographic characteristics of the respondents.

2. Materials and Methods

2.1. Ethical implication

This study was conducted with the intention of protecting the human rights of all subjects. All the information collected for the study was utilized only for the purpose of thesis and was not disclosed to anyone outside the research team. At the beginning, approval was obtained from the ethical committee of NIPSOM, under the Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Before collection of data, written permission was taken from the director of the corresponding hospital and also informed written consent was obtained from participants after informing about the purpose of the study. A complete assurance was given that all information keeps confidentially.

2.2. Study design

The study is a descriptive type of cross sectional study.

2.3. Study population

Health care providers of hemodialysis unit.

2.4. Study period and others

The study period was 1st January, 2016 to 31st December, 2016.

2.4.1. Place of study

The study was carried in hemodialysis unit of National Institute of Kidney Disease and Urology (NIKDU), Dhaka.

2.4.2. Sampling method

Purposive sampling technique was done, sample size 17.

2.4.3. Inclusion criteria

The inclusion criteria were, permanent employee of the institution irrespective of age, gender and religion; having work experience in the study place for more than six months and willing to participate in the study.

2.4.4. Exclusion criteria

The Exclusion criteria were, mentally retarded and severely ill.

2.4.5. Tool of the study

A Semi-structured interviewer administered questionnaire was developed to collect the data. The questionnaire was prepared by using the selected variables according to objectives. Data were collected from respondents by face to face interview and an observational Checklist was also used to collect information regarding administrative facility, physical facility and utility services.

3. Results and Discussion

Table 1 showed that the 11.8% were doctor, 58.8% were nurse and 29.4% technicians. Among the respondents 41.2% (n=7) respondents were from 36-45 years age group. 35.3% (n=6) respondents were from up to 35 years age group and rest of 23.5% were from above 45 years of age. The mean age of the health care providers was 38.82 ± 8.79 years. Majority of the respondents (n=11, 64.8%) were Muslims. (n=3, 17.6%) respondents were Hindus and. (n=3, 17.6%) were Christian. Most of the respondents (n=10, 58.8%) had training on hemodialysis. Among them, 40.0% respondents had one month training on hemodialysis, 30% had seven days training on hemodialysis.

Table 1. Socio-demographic status of the health care provider (n=17).

Personnel	Frequency	Percentage
Doctor	2	11.8%
Nurse	10	58.8%
Technician	5	29.4%
Age of the respondents	Frequency	Percentage
Up to 35 years	6	35.3%
36-45 years	7	41.2%
Above 45 years	4	23.5%
Gender of the respondents	Frequency	Percentage
Male	6	35.3%
Female	11	64.7%
Religion of the respondents	Frequency	Percentage
Islam	11	64.8%
Hindu	3	17.6%
Christian	3	17.6%
Special training on hemodialysis of the respondents	Frequency	Percentage
Have training on hemodialysis	10	58.8%
Don't have training on hemodialysis	7	41.2%
Training duration	Frequency	Percentage
Seven days	3	30.0%
One months	4	40.0%
Three months	1	10.0%
Six months	1	10.0%
Eighteen months	1	10.0%

Above Table 2 shows the equipment facilities of hemodialysis unit. In hemodialysis unit, there were 56 dialysis machines in total. But only 15 dialysis machines were functioning. Nursing station was laterally placed. Head end of each bed should had stable electrical supply, oxygen and vacuum outlet, treated water inlet and drainage facilities. Facilities for hand washing or alcohol based hand rub dispensers absent in each patient area.

Table 2. Equipment's of the unit.

Equipment's	Criteria
Number of dialysis machine	56
Number of functioning dialysis machine	15
Reverse Osmosis System	In build
Dialysis unit size	100 to 110 square feet area per station
Position of the nursing station	Laterally placed
Head end of each bed should have stable electrical supply, oxygen and vacuum outlet, treated water inlet and drainage facilities.	Present
Facilities for hand washing or alcohol based hand rub dispensers available in each patient area	Absent

Above Table 3 shows the separate space facilities of hemodialysis unit. In hemodialysis unit, there was no waiting room for dialysis patient. There was separate room for high risk patients. Store room for medicine and consumable materials is Present. In hemodialysis unit, there was separate toilet for health care providers and health care receivers. There was also separate toilet for male and female.

Table 3. Separate space and toilet facility of the unit.

Space facility	Criteria
Waiting room for dialysis patient	Absent
Store room for medicine and consumable materials	Present
Separate room for high risk patient	Present
Toilet facility	Criteria
Total no. of toilet in the unit	Two
Separate toilet for male and female	Present
Separate toilet for patient and staff	Present

Above Table 4 shows the total number of personnel in hemodialysis unit. In hemodialysis unit, there are 28 personnel in total. Among them, no. of physician for dialysis patient is 4 and no. of nurses for dialysis patient is 15, no of technician were 5 and word boy 4. Ratio of health care receiver and provider in the unit was Patient-doctor ratio 1:15 and Patient-nurse ratio 1:6.

Table 4. Distribution of personnel and ratio of health care receiver and provider in the unit.

Personnel	Number
Physician for dialysis patient	4
Nurse	15
Technician	5
Word boy	4
Total	28
Patient : Health care provider	Criteria
Patient-doctor ratio	1:15
Patient-nurse ratio	1: 6

Above Table 5 shows the infection control measures taken in the unit. In the unit, hand hygiene practice was adequate. But use of personal protective equipment's was inadequate. Vaccination facility was absent for both health care provider and receiver. Dialyzer reprocessing was done and disposal of bio hazardous materials Adequate, Isolation facility for high risk patient was Present. In the unit, routine hepatitis checking facility was present. Frequency of routine hepatitis test was thrice annually. Vaccination facility was absent for both health care provider and receiver and Isolation facility for high risk patient was present.

Table 5. Infection control and Hepatitis control measures taken in the unit.

Infection control measures	Criteria
Maintenance of hand hygiene	Adequate
Use of personal protective equipment's	Inadequate
Provide vaccination facility for patients	Absent
Provide vaccination facility for stuffs	Absent
Dialyzer reprocessing	Present
Disposal of bio hazardous materials	Adequate
Isolation facility for high risk patient	Present
Hepatitis control measures	Criteria
Routine hepatitis checking facility	Present
Frequency of routine hepatitis test	Thrice annually
Provide vaccination facility for patients	Absent
Provide vaccination facility for stuffs	Absent
Isolation facility for high risk patient	Present

Above Table 6 shows the support services of the unit. In the unit, equipment and stationery were supplied always. But medicine and investigation facility were Sometimes.

Table 6. Support services of the unit.

Support services	Criteria
All the necessary equipment's are supplied to patients from the hospital	Always
All the necessary medicines are supplied to patients from the hospital	Sometimes
Necessary investigation facilities are available in the hospital	Sometimes
All the necessary stationeries are supplied from the hospital to the unit	Always

Above Table 7 shows the medical record services in the unit. The unit had medical record keeping facility, medical records were kept manually in the unit and nurses involved in record keeping. The unit had store room facility. Store room was audited in every one year.

Table 7. Medical record and Store room facility of the unit.

Medical record facility	Criteria
Facility to keep medical record	Present
Personnel involved in record keeping	Nurse
Process of keeping medical record	Manually
Store room facility	Criteria
Store room	Present
Audit of the store room	In every one year

Above Table 8 shows the service provider's satisfaction regarding the unit. Majority of respondents, were satisfied regarding the unit including physical facilities (13, 76.5%), cleanliness of the unit (10, 58.8%) and medical record facility (9, 52.9%).

Table 8. Service provider's satisfaction regarding the unit (n=17).

Service provider's satisfaction regarding the unit	Frequency	Percentage
Satisfied with physical facilities		
Satisfied	13	76.5%
Not satisfied	4	23.5%
Satisfied with cleanliness of the unit		
Satisfied	10	58.8%
Not satisfied	7	41.2%
Satisfied with cleanliness of the toilet		
Satisfied	6	35.3%
Not satisfied	11	64.7%
Satisfied with infection control measures		
Satisfied	4	23.5
Not satisfied	13	76.5
Satisfied with CSSD department		
Satisfactory	4	23.5%
Not satisfactory	13	76.5%
Satisfied with equipment supplies of the unit		
Satisfactory	5	29.4%
Not satisfactory	12	70.6%
Satisfied with support services of the unit		
Satisfactory	4	23.5%
Not satisfactory	13	76.5%
Satisfied with medical record facility		
Satisfactory	9	52.9%
Not satisfactory	8	47.1%

4. Conclusions and Recommendations

CKD is becoming a major public health problem worldwide. Hemodialysis is the ultimate treatment of CKD in developing country like Bangladesh. NIKDU is the only Institute for Nephrology & Urology in Bangladesh and provides education, research & treatment facilities for nephrology & urological diseases. From the current study it was found that the functioning dialysis machine and medicine supply was inadequate to meet the huge patient load. Need to strengthen infection control measure at all levels in the hemodialysis unit. To ensure separate toilet facilities in hemodialysis unit. Strengthen supportive supervision, monitoring and evaluation activities.

Conflict of interest

None to declare

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