



Complications of Hemodialysis: Hospital Based Cross Sectional Study

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ABSTRACT

Hemodialysis is a life saving measure when the kidneys are not able to perform its functions. However patients may encounter the complications of hemodialysis. Hospital based cross-sectional study was conducted with 100 samples who met the inclusion criteria in the dialysis unit with the aim to assess the complications of hemodialysis among patients on hemodialysis. The tool used for the study was demographic variables and checklist to assess the complications. The results revealed that out of 100 samples 62% of them had shortness of breath, 68% had intradialytic hypotension, 55% had nausea and vomiting, 65% of them had muscle cramps and 82% of them had fatigue. The study findings concluded that the patients undergoing hemodialysis had encountered the complications. This finding will help to identify the underlying cause for complications of hemodialysis thereby help the patient to cope up with the treatment and for better quality of life.

Keywords: Complications, hemodialysis, hypotension, fatigue, depression.

INTRODUCTION

The kidneys have an important role in maintaining health. Kidney failure is a condition in which the kidneys are fail to function. Chronic Renal Failure is a complex debilitating condition affecting more than 70 million people worldwide¹. Current projections indicate that, by 2030, the global population of ESRD patients living on dialysis may exceed 2 million². In India, it has been recently estimated that the incidence rate of chronic renal failure to be 229 per million populations and more than 100,000 new patients annually entered. Almost more than 2.5 lakh people die of renal failure in India every year³. The Global Burden of Disease (GBD) study 2015 ranked chronic kidney disease 17th among the causes of deaths globally (age-standardised annual death rate of 19.2 deaths per 100 000 population). In many countries, chronic kidney disease is now among the top five causes of death. In India, GBD 2015 ranks chronic kidney disease as the eighth leading cause of death⁴. Due to financial burden nearly six percentages of these patients go for ambulatory peritoneal dialysis and many patients stops treatment and die⁵.

Dialysis is the method used to treat advanced and permanent kidney failure. Hemodialysis (HD) is one of the main modalities of renal replacement therapy⁶. The number of patients undergoing hemodialysis has increased from approximately 10.000 in 1973 to 615.899 in 2011. The total number of incident dialysis patients was predicted to increase by 12.8% from 36,590 in 2012 to 41,270 in 2025, with higher increment in the oldest age group (≥ 85 years). Male and female patients were expected to increase by 92.6% and 62.2%, respectively⁷.

Despite the increase of survival of patients with ESRD, complications of the disease or its treatment are

cardiovascular problems⁸, amyloidosis and malnutrition⁹, are still problems which must be addressed to prevent cardiovascular mortality. The survival of Hemodialysis patients is related to the adequacy of hemodialysis and hemodialysis dose which has great impact on both morbidity and mortality¹⁰. In recent years more compact and simpler dialysis machines have made dialysis increasingly attractive. But even with better procedures and equipment, hemodialysis is still a complicated and inconvenient therapy. However, the patients often have to encounter various side effects of hemodialysis. The most common side effects of hemodialysis are hypotension. It is occurs when too much fluid is removed out of body during dialysis. It also causes muscle cramps which leads to discomfort and pain in the legs due to electrolyte imbalances especially sodium. Many people treated with hemodialysis complain of itchy skin and lose their appetite due to uremia. Patients on dialysis often have insomnia, sleep apnea syndrome, and restless legs syndrome. They may also have symptoms of pain, stiffness, and fluid in the joints result from amyloidosis. Anemia is also occurs due to frequent withdrawing of blood for investigation, bleeding from the access point during dialysis process which may leads to fatigue too. The hemodialysis patients are subjected to encounter psychological problems such as depression, anxiety, fear. They may also have potential losses like independence financial status, altering their role self-image and diminishing self-esteem¹¹.

Perhaps consistent monitoring the effect of hemodialysis among patients undergoing hemodialysis might improve the behavioral pattern with regards to renal regimen because most of the life time they spend with the side effect. Despite the great significance of side effects or complication for hemodialysis, health professionals are



unaware of both the existence and severity of complications and often under treated. Hence the study was conducted to assess the complications of hemodialysis which helps the health care personnel to identify the underlying cause thereby can prevent or control the complications of hemodialysis in turn promote the survival for the patients with quality of life.

METHODOLOGY

A descriptive – hospital based cross sectional research design was chosen to assess the complications of hemodialysis with 100 samples at dialysis unit in Chennai. The samples were selected by convenience sampling technique who met the inclusion criteria. Patients with Stage V renal failure and on hemodialysis treatment regularly with age group between 18 years and more than 71 years of both male and female, receiving HD 3 times per week or 2 times per week for 4 hours per treatment, willing to sign an informed consent and participate in the study were included in the study. Patients with hemodynamically unstable and active mental disorders were excluded from the study. The participants were explained about the study and its purpose by the investigators and obtained informed consent from the participants. Collected the socio demographic variables followed by assessed the side effects on one to one basis. The tool used for the study was demographic variables and check list to assess the side effects. Demographic variables consist of age, sex, education, occupation, monthly income, marital status, duration of hemodialysis and no of hemodialysis cycle per day. Checklist consists of the 15 items related to the complications of hemodialysis which has two options such as Yes or No and gave the response based the problems they have faced. The complications are hypotension, muscle cramps, nausea and vomiting, headache, chest pain, fever, itching, cardiac arrhythmia, shortness of breath, access the site complication, depression, sleep disturbance, fatigue, thrombosis and embolism, anxiety. The participant's responses were counter checked with medical record, health care professionals and care giver. This tool was prepared after reviewing the related literature and obtained experts' opinion in the nephrology and medical surgical nursing. Confidentiality was maintained throughout the procedure. Collected data were analyzed by using descriptive statistics.

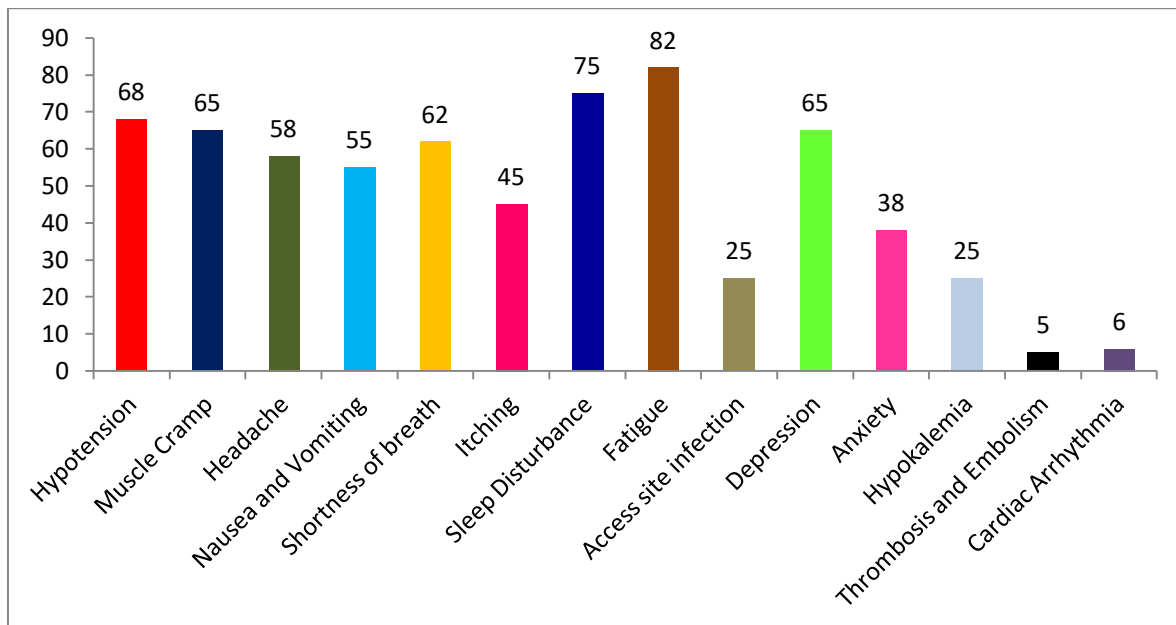
RESULTS

The present study revealed that that out of 100 samples, 46% of them were belong to the age group of 41-50 years. Majority (63%) of the samples was male and 90% of them were married. Regarding the duration of hemodialysis treatment 35% of them were on the treatment of hemodialysis for less than 6 six months and more than one year. 26% of them were receiving hemodialysis twice a week and remaining 64% of them were receiving thrice in a week in relation to no of hemodialysis treatment per week as depicts in Table 1.

Table 1: Frequency and percentage distribution of demographic variables among patients on hemodialysis (n=100).

Sl.No	Demographic Variables	Frequency (N)	Percentage (%)
1.	Age in Years		
	a. 21-30	5	5%
	b. 31-40	13	13%
	c. 41-50	46	46%
2.	Sex		
	a. Male	63	63%
	b. Female	37	37%
3.	Marital status		
	a. Married	91	91%
	b. Unmarried	7	7%
	c. Widow / Divorced	2	2%
5.	Educational Status		
	a. Primary	44	44%
	b. Higher Secondary	52	52%
	c. Illiterate	4	4%
6.	Occupation		
	a. Daily wages	24	24%
	b. Business	53	53%
	c. Unemployed	23	23%
7.	Monthly Income in Rupees		
	a. Less than 5000	19	19%
	b. 5001- 10,000	53	53%
	c. More than 10000	28	28%
8.	Duration of haemodialysis		
	a. Less than 6months	35	35%
	b. 6 months -1 Year	35	30%
	c. More than 1year	35	35%
9.	No. of hemodialysis cycle per week		
	a. Thrice in a week	64	64%
	b. Twice in a week	26	26%

Figure 1 shows that out of 100 samples, 68% of them had hypotension, 65% of them had muscle cramps & depression, 62% of them had shortness of breath, 72% of them had sleep disturbances, 82% of them had fatigue, 58% of them had head, nausea & vomiting, 45% of the had itching, 35% of them had access site infection and very few 10% of them had cardiac arrhythmia

Figure 1: Percentage distribution of complications of hemodialysis among patients on hemodialysis

DISCUSSION

Patients on hemodialysis are likely to have complications. The reason may be due to patient related, vascular access related and technical complications. However, there are numerous complications which are related to hemodialysis, some of them are life-threatening (Prabhakar et al, 2015)¹². The frequency and severity of the complications usually depend upon the comorbid conditions of patients undergoing hemodialysis such as diabetes mellitus, coronary artery disease, hypertension, congestive cardiac failure and the patient's degree of compliance with a complex medical regimen (Davenport, 2006)¹³. The current study also assessed complications of hemodialysis and found to be had complications of HD. The majority of them experienced the complication are hypotension, muscle cramps, shortness of breath and also psychological problems such as depression, anxiety and sleep disturbances. This study findings is consistent with the study conducted by Syed Marghoob Hasan et al who reported that hypotension (26.8%) is the commonest followed by headache (25.1%) and hypertension (24.7%), frequency of vascular access-related complications (4.4%) and technical complications (3.1%) was very low¹⁴. In present study also there is no technical complication and however intradialytic hypotension percentage was high. It mainly occurs during dialysis when plasma fluid removal through ultrafiltration outpaces the rate of refilling¹⁵, effects of antihypertensive drugs and dietary and fluid intake. Kidney Disease Outcome Quality Initiatives defined that intradialytic hypotension occurs in approximately 20%–30% of all hemodialysis sessions¹⁶.

Muscle cramp is one of the terrible complains faced by the patients during hemodialysis and also cause problems in sleeping. It occur in as many as 20% of dialysis treatments but current study reported that 65% of

muscle cramps and 75% of sleep disturbance. Although the pathology of muscle cramps is exactly unknown, cramps are known to be more frequent when ultrafiltration rate is high, loss of fluid and or low sodium dialysate (Golper et al., 2014)¹⁷.

The major source of morbidity and mortality among HD patients are infection at the vascular access site. Previous studies have reported infection as a common cause of death; accounting for 9.5 to 36% of deaths in HD patients¹⁸. The current study found that 25% of infection and 5% of thrombosis. Thrombosis and infection are the most common vascular access dysfunctions¹⁹ and it may lead vascular access loss. Similarly another study investigated and compared long term complications of the hemodialysis and peritoneal dialysis in patients with history 10 years duration and found that vascular diseases were common complication in both modalities²⁰. Patients with ESRD frequently have cardiac problems such as coronary heart disease, left ventricular hypertrophy, coronary artery and pericardial disease, and valvular sclerosis (Singh et al., 2014)²¹. In our study did not assess the chest pain perhaps found 62% of them experienced shortness of breath during hemodialysis and 6% had cardiac arrhythmias but no mortality was seen. It is not surprising that hemodialysis may provoke cardiac arrhythmias. The conduction system may be affected due to rapid changes in electrolyte concentrations inherent in the hemodialysis.

In the study of Chang & Tan, it is clearly stated that nausea and vomiting are common complications during hemodialysis, similarly another study conducted by Chong & Tan, 2013 and reported that an incidence of nausea and vomiting are reported as 18.2% and 9.8% respectively²². The occurrence of nausea and vomiting is mainly due to rapid fall of blood pressure and urea during

hemodialysis²³. The headache came to be second most frequent complications which may be caused due to shifting of the large amount of water and electrolytes during hemodialysis procedure. The commonest feature of a headache which was observed are fronto temporal in location, moderate in severity, pain is of short duration less than 4 hours and of throbbing type (Göksan et al)²⁴. In present study the percentage of head ache and nausea and vomiting was 58% and 55% respectively.

HD patients suffer from low levels of physical activity and decreased functional capacity while suffering from general muscle weakness resulting in a general feeling of fatigue²⁵. The term fatigue is difficult to describe and Hardy & Studenski refer two types of fatigue: mental (including emotional and cognitive) and physical (including insomnia, lack of energy and weakness)²⁶. The incidence of fatigue in HD patients ranges from 60%–97%²⁷. The current study reported the level of fatigue was 82% which highest among all other complications.

HD is a lifelong treatment that significantly and sometimes adversely affects patients both physically and mentally (Kimmel, 2001)²⁸. Chong & Tan stated that the common psychological effects include depression, anxiety, fatigue, decreased quality of life (QoL) and increased suicide risk²⁹. Kring & Crane, 2009 who found that anxiety is also commonly seen in HD patients³⁰. Cukor et al demonstrated a 27% incidence of anxiety among 70 urban HD patients³¹. (Kessler et al., 2005 who found in twelve-month prevalence which estimates 18.1% anxiety and 9.5% mood disorders among general population³². In current study 65% of them affected with depression and 38% of them were anxious. The current study lacks in assessing the quality of life and allergic reaction. Allergic reaction is also one of the common complications due to allergic to dialyzer membranes, sterilizing and reprocessing agents and contaminated dialysate related complications were very common in earlier days of hemodialysis.

CONCLUSION

The study findings concluded that the patients undergoing hemodialysis have complications though there is advancement in technology and skilled health care personnel. These findings will help to identify the underlying cause for a complication. Further studies can be conducted based on this study to analyze cause for complication. Alternative and complementary interventions like exercise program, yoga, meditation, counseling can be implemented in the dialysis unit thereby helps the patient to cope up with the treatment and for better quality of life.

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