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## Post Hemodialysis Effects In Chronic Renal Failure Patients

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### ABSTRACT

The burden of Chronic Kidney Disease (CKD) is increasing in alarming proportion all over the world. According to World Health organization (WHO), CKD is 12<sup>th</sup> leading cause of death and 17<sup>th</sup> cause of disability. In India, an estimated 100-120 per million population reach Chronic kidney disease stage-V. In India due to lack of financial resources, lack of trained manpower & infrastructure leads to severe strain on existing health policies in the light of the increasing burden of Chronic kidney disease. Maintenance dialysis is a well-recognized modality of treating patients having end stage renal disease. Good quality of life and survival on maintenance dialysis depends on various factors but unfortunately in our country, the quality of dialysis delivered to patients can vary from center to center that may affect the health of hemodialysis patients. This study was undertaken to analyze the post hemodialysis effects in patients with ESRD. A Prospective observational study was conducted on total of 150 out-patients undergoing maintenance hemodialysis, in order to find out the post hemodialysis effects in chronic renal failure patients and patient information was collected accordingly. In this study most of the patients undergoing hemodialysis experienced hepatitis, arthropathy and disequilibrium effects after repeated hemodialysis process. We observed that people undergoing hemodialysis experiences severe side effects which can be minimized by creating awareness so that the life expectancy of the hemodialysis patients can be increased.

**Keywords:** End stage renal disease (ESRD), Chronic kidney disease (CKD), Hemodialysis (HD), Arteriovenous fistula (AV).

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## INTRODUCTION

Chronic kidney disease (CKD) is a worldwide public health problem<sup>1</sup>. According to World Health organization (WHO) Global Burden of Disease project, diseases of the kidney and urinary tract contribute to global burden with approximately 850,000 deaths every year and 115,010,107 disability adjusted life years. Globally, Chronic kidney disease is the 12<sup>th</sup> cause of death and the 17<sup>th</sup> cause of disability<sup>2</sup>. In India, an estimated 100-220 per million population reach Chronic kidney disease stage-V<sup>3</sup>. In India due to lack of financial resources, lack of trained manpower & infrastructure led to severe strain on existing health policies in the light of the increasing burden of Chronic kidney disease. In India, the average prevalence for treated End stage renal failure; dialysis and transplant patients were 70, 60 and 10 patients per million, respectively. This number is increasing globally at a rate of 7% every year<sup>4</sup>. Maintenance dialysis is a well-recognized modality of treating patients having end stage renal disease. Several thousands of patients all over the world are surviving and achieving reasonable quality of life on maintenance dialysis. Good quality of life and survival on maintenance dialysis depends on i) the dose of dialysis delivered or solute removal achieved, ii) time on dialysis, iii) adequacy of nutrition, iv) family and socio-economic support, v) management of co-morbid illnesses and vi) prevention & management of infections. Unfortunately in our country the quality of dialysis delivered to patients can vary from center to center. The quality could range from very poor to as good as any center in world<sup>5</sup>.

Cardiovascular disease is the major cause of death in end stage renal disease patients and atherosclerosis is present in all long-term dialysis patients. Premature cardiac death has reached epidemic levels in the world's dialysis populations and accounting for at least half of all patient deaths<sup>6</sup>. Infections are second cause of death in hemodialysis patients. The annual mortality due to bacteremia is 100-300 times higher in hemodialysis patients compared to the general population. The blood transmitted viral infections includes Hepatitis B and Hepatitis C. There are about 170 million hepatitis C virus (HCV) carriers and 350 million people are chronic hepatitis B virus (HBV) carriers worldwide and hemodialysis patients belong to a high-risk population<sup>7</sup>. Transient hypotension, arterial hypoxemia, and fluctuations in electrolytes and cerebral water content might occur during hemodialysis and possibly induce subtle brain damage. Dialysis disequilibrium syndrome is because of plasma/brain osmotic gradient, caused by rapid dialysis, which generates cerebral edema<sup>8</sup>. Hyperparathyroidism is a risk factor for survival of hemodialysis patients as well as hypoparathyroidism, which is another feature in hemodialysis patients<sup>9</sup>. Fever is a symptom that physicians frequently encounter in dialysis patients in clinical settings. The main pathogenic

mechanism underlying the development of dialysis-related fever is based on allergic reactions to the materials used in dialysis devices and the contaminants (endotoxins) in the dialysate. Patients on hemodialysis may develop a fever as an allergic reaction after blood comes into contact with a dialysis device as an artificial material<sup>10</sup>.

## MATERIALS AND METHOD

A Prospective observational study which was conducted in out-patient department of hemodialysis in order to find out the post hemodialysis effects in chronic renal failure patient. This study was conducted for six months. A total of 150 out patients undergoing maintenance hemodialysis were considered and patient information was collected. Patients diagnosed with chronic kidney disease, with all physical and biochemical parameters, both male and female genders, co morbid conditions and past medical history were enrolled. Both positive and negative hemodialysis patients were taken. Patients who are not diagnosed with chronic kidney disease, patients undergoing hemodialysis for less than one year, AIDS patients and pregnant patients were excluded.

## RESULTS AND DISCUSSION

This study elucidates the appropriate data regarding the patient's age, sex, past medical history, and medication adherence, hemodialysis schedule and hemodialysis effects experienced by patients in 150 patients. In this study, 150 patients were collected with their complete medical data and their results were interpreted.

**Table 1: Age wise distribution among hemodialysis patients.**

Age groups(years)	No of patients	Percentage
21 – 30	12	8 %
31 – 40	22	14.66%
41 – 50	55	36.66%
51 – 60	33	22%
61 – 70	19	12.68%
Above 70	9	6%

**Table 2: Gender wise distribution among hemodialysis patients.**

Gender	No .of patients	Percentage
Male	90	60%
Female	60	40%
Total	150	

Among 150 patients, majority of the patients are from the age group 41-50 years followed by 31-40 years. Among them 90 (60%) are male and 60 (40%) are female. Ajay K Singh et al (2013) conducted a study on Epidemiology and risk factors of chronic kidney disease in India – and analyzed in the population of 5588 subjects. Among them male were 55.1% and female were

44.9%. Male are susceptible to end stage renal disease because of their Occupational status, sedentary lifestyle and social habits.

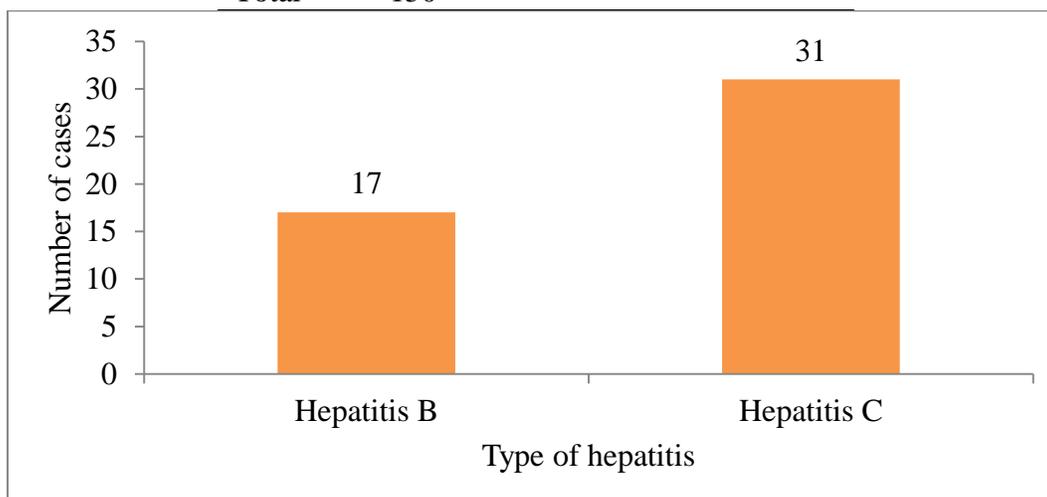
**Table 3: Weekly based hemodialysis schedule**

Category	Number of patients	Percentage
Thrice hemodialysis	110	73.33%
Twice hemodialysis	40	26.67%
Total	150	

110 (73.33%) patients have undergone hemodialysis thrice a week and 40 (26.67%) patients twice a week.

**Table 4: Mode of access.**

Access	Number of patients	Percentage
Av fistula	145	96.67%
Femoral	2	1.33%
Jugular	3	2.0%
Total	150	

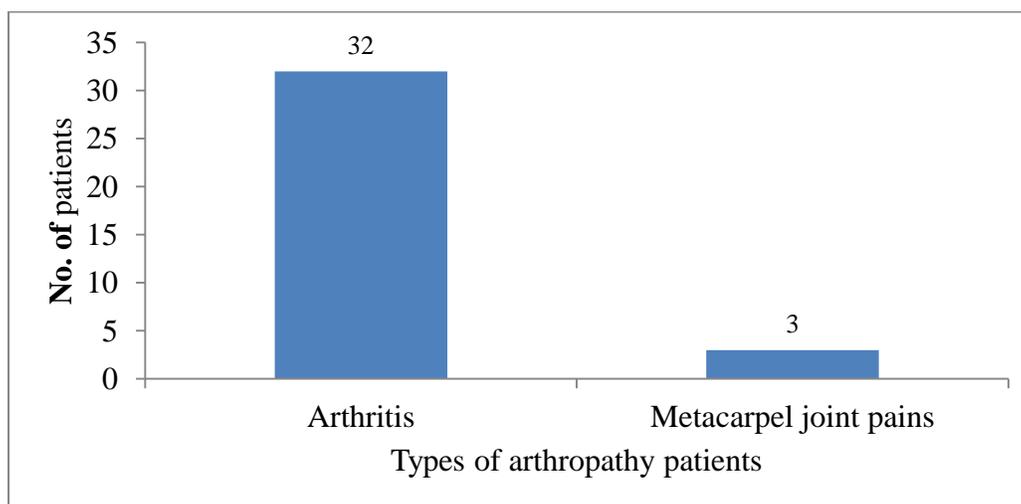


**Figure 1: Number of hepatitis patients among 150 patients.**

In order to undergo hemodialysis pattern, patients should get fixed dialysis schedule with proper access site management. Patient may undergo hemodialysis in the pattern of weekly twice or thrice. Dialysis is usually performed via access sites such as arteriovenous fistula (96.67%), Femoral (1.33%) or Jugular (2%). Based on the patient comfort, the access site is decided. It takes 45 days to develop a proper fistula; meanwhile patient will undergo hemodialysis through jugular or femoral site for the first time. Patients who do not develop AV fistula will have their hemodialysis through femoral or jugular. Majority of the patients undergo their hemodialysis through AV fistula site only. A study done by George M Nasser and Juan Carlos Ayus ( 2001) in Infectious complications of the hemodialysis access , reported that 48-73% of patients are with

vascular access. Due to lower infectious rates, as no foreign material is involved in their formation, higher blood flow rates (which translates to more effective dialysis), and lower incidence of thrombosis, AV fistulas are commonly used as access site. The complications are fewer with other access methods.

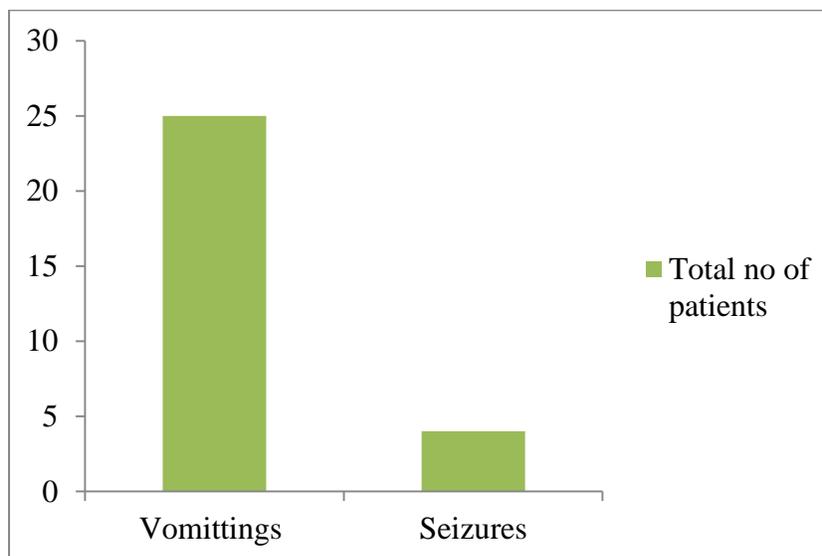
Among 150 patients undergoing hemodialysis, 48 patients are with hepatitis infection, among them 17 are with hepatitis B and 31 are with hepatitis C. Hepatitis is the common problem where both hepatitis B and hepatitis C are observed. A study done by Reddy GA et al. (2005) on Prevalence of HBV and HCV dual infection in patients on hemodialysis. They reported that out of 134 patients, 5.9 % were HCV and 1.4 % were HBV. Chronic renal failure patients do not clear these viral infections efficiently. HBV and HCV share a common route of transmission and can coexist with each other. Hemodialysis patients are at high risk of developing hepatitis viral infections due to the high number of blood transfusions, prolonged vascular access and the potential for exposure to infected patients and contaminated equipment.



**Figure 2: Total number of arthropathy patients among 150 hemodialysis patients.**

Arthropathy is the condition where both arthritis and metacarpal joint pains were involved. Among 150 patients arthritis were 32 and metacarpal joint pains were 3. A study done by E A Brown et al on Dialysis arthropathy : complication of long term treatment with hemodialysis that of 28 patients, 14 patients were affected with arthropathy. This condition is due to patients receiving maintenance hemodialysis suffer from various problems of the joints, soft tissues, and tendons, including acute monoarthritis or polyarthritis due to periarticular calcification, ruptured tendons from gout or pseudo gout, avascular necrosis and carpal tunnel syndrome. The presence of joint symptoms is evident from normal hand radiographs even in the absence of hyperparathyroidism.

Here absence of parathyroid hormone results in not releasing the calcium required for the bone strength, thus the bone mineral density is decreased resulting in arthropathy condition.



**Figure 3: Disequilibrium reactions among 150 patients.**

Disequilibrium reactions include vomiting 25% and seizures 4 % among 150 patients. This is evidenced by a clinical review of Cosmo L. Fraser, MD. et al on Nervous System Complications in Uremia. According to this study the pathogenesis of Dialysis Disequilibrium Syndrome is controversial, the first theory blamed in etiology is the fast urea removal theory. According to this theory, the fast removal of urea from plasma in patients who newly started a hemodialysis therapy creates an osmotic gradient between the brain cells and plasma and the fluid enters the brain cells due to this osmotic gradient.

## CONCLUSION

Majority of the post hemodialysis effects observed were hepatitis, disequilibrium reactions and arthropathy. Creating awareness in medical practitioners regarding blood bank screening rules, use of erythropoietin instead of blood transfusions and regular monitoring of the quality of the dialysate and the appropriate purification of the dialysate may help to reduce the prevalence of hepatitis infections. In order to avoid the calcium deficiency due to improper absorption in hemodialysis patients, calcium and vitamin D supplements through diet is to be advised. Disequilibrium reactions may be iatrogenic in the hemodialysis patients; therefore regular screening of blood urea levels and proper therapy can minimize this condition. By minimizing post hemodialysis effects, we can increase life expectancy in hemodialysis patients with proper lifestyle management.

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