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A PROSPECTIVE STUDY ON IMPACT OF COVID-19 ON MAINTENANCE HEMODIALYSIS PATIENTS

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ABSTRACT

COVID-19 is crucial. Coronavirus disease causes a wide spectrum of symptoms from Due to rapid progression of Corona virus disease 2019 pandemic, the whole world is currently witnessing a dramatic disruption of livelihood. Hemodialysis patients have higher risk for developing severe COVID-19 because of older age, multi-co-morbid conditions and impaired immune system compared to general population. Previous studies reported that 2.15-11% patients receiving Maintenance Hemodialysis were susceptible to COVID-19. This research study aimed in evaluating and analysing the impact of COVID-19 on maintenance hemodialysis patients.49 patients were observed for COVID symptoms and details were collected and findings were recorded. In methodology, various criterias were used and treatment given was analysed. Quality of life of patients were evaluated before and after the treatment and patient counselling was provided. From this study, we concluded that impact of COVID 19 on hemodialysis patients were quite bad and few were able to overcome with minor impact.4 out of 49 patients died during the treatment due to severity of Corona. It was concluded that COVID-19 have significant impact on hemodialysis patients.

KEYWORDS: COVID-19, Maintenance Hemodialysis patients, Methodology, Immune system, Patient counselling.

INTRODUCTION

SARS-CoV2 infection in patients with Chronic Kidney Disease in dialysis is also associated with complications and prolonged hospitalization remarkably increases morbidity, mortality rate and is associated with higher infection risk, mainly respiratory and a more precise comprehension of the prognosis and the clinical evolution of Chronic Kidney Disease patients infected by asymptomatic conditions to severe inflammatory response.[5]

Chronic Kidney Disease

Chronic Kidney Disease is a disease condition in which the functioning of kidney is partially or completely disabled. Kidneys are the main filtering and excretory organ of the body. Damage to the kidney's filter system leads to blood and protein to leak into the urine. The term 'chronic' means that it is a long-term condition.[1]It is a progressive disorder that has no cure and has high rate of morbid and mortality commonly seen in general adult population especially those with other co morbidities such as diabetes and hypertension. Treatment can be initially through non pharmacological manner which may include dietary management and lifestyle management and later on by pharmacological interventions.[3]

CKD has no proper and complete cure, but treatment can help relieve the symptoms and stop it getting worse. CKD can range from a mild condition with no or few symptoms, to a very serious condition where the kidneys stop working, which can also be called as kidney failure. For most people CKD can be controlled with medicine and regular check-ups. CKD only progresses to kidney failure in around 1 in 50 people with the condition. Treatment will depend on severity of disease condition. The main treatments are lifestyle[2] changes to help you remain as healthy as possible, medicine to control associated problems such as high blood pressure and high cholesterol, dialysis to replicate some of the kidney's functions this may be necessary in advanced CKD, kidney transplant may also be necessary in advanced CKD.[12]

Hemodialysis

Hemodialysis is a treatment to filter wastes and water from your blood, as your kidneys did when they were healthy. Hemodialysis helps control blood pressure and balance important minerals such as potassium, sodium and calcium in your blood.[6]

In a dialysis center, hemodialysis is usually done 3 times per week for about 4 hours at a time. People who choose to do hemodialysis at home may do dialysis treatment more

frequently, 4-7 times per week for shorter hours each time. Most people who require hemodialysis have a variety of health problems. Hemodialysis prolongs life for many people, but life expectancy for people who need it is still less than that of the general population.[8]

Covid -19 Infection in Chronic Kidney Disease Patients Undergoing Hemodialysis

Hemodialysis patients are exposed to a higher risk than the general population because they must attend the dialysis center by collective transport three times a week for 4 hours, where many patients are treated at the same time in overcrowded areas, thus favoring cross contamination, Respiratory droplets released when someone with the virus coughs, sneezes, breathes and these droplets can be inhaled or land in the mouth, nose or eyes of a person nearby, When vaccination is not completely taken, Unhygienic condition,[4] Not wearing mask and gloves during dialysis, Chronic infections, Auto immune disease. Risk factors are Age, Hypertension, Diabetes Cancer, Chronic respiratory disease, cardiovascular disease, Cholesterol.[13]

Drugs Given During Covid-19 on Maintainance Hemodialysis Patients

- Bamlanivimab 700mg/Etesevimab 1400mg
- Casirivimab 600mg/Imdevimab 600mg
- Sotrovimab 500mg
- Small molecule antivirals
- Remdesivir
- Molnupiravir
- Paxlovid

Inflammatory Response Phases Are Treated Using

- Corticosteroids
- Interleukin -6 receptor antagonist- Tocilizumab and Sarilumab
- Janusse kinase inhibitors- Baricitinib and Tofacitinib[10]
- Interleukin -1 receptor antagonist -Anakinra
- Anti-GM-CSF monoclonal antibodies
- Interferon beta-1a

COVID-19 patients who needed Hemodialysis had a more severe course and had the worst outcome. Clinicians should be aware of potential risk factors for poor outcomes in Hemodialysis patients. The common outcome variables noticed in Hemodialysis patients with

COVID-19 infection are increased mortality rate, increase in the frequency of dialysis, and need for ventilatory support.[7]

Recently, numerous studies have shown an increase in anxiety, depression, and stress levels in different populations with corona virus disease.[11] However, the impact of pandemics on the mental health and quality of life in CKD patients with COVID 19 under hemodialysis remains unknown. So, one of the objectives of the study is to investigate the quality of life of dialysis patients at the time of covid-19 pandemic compared to the period before the pandemic.[14]

Literature Review

1. Harsh Vardhan et al. conducted a study on "Clinical profile and outcome of Hemodialysis in patients with COVID-19". The study was a retrospective study of adults hospitalized from May 1st 2020- March 31st 2020. They were admitted with COVID -19 and needed hemodialysis. 261 patients were presented out of which 195 were male patients. A total of 183 patients were having mild/ moderate disease, 118 suffering from acute or chronic kidney disease. 143 patients received SLED. Mortality rate was 153 (73%) concluded that patients doing hemodialysis were having worst outcome. All efforts should be made to search for preventable causes of AKI[15]

2. Hossein Akbarialiabad et al. conducted study on "COVID-19 and maintenance hemodialysis, a systemic scoping review of practice guidelines" collected database according to December 1- April 27, 40 records were screened and 5 of them were excluded. Eligible articles were 31 and additional records collected between April 28 and May 13. By conclusion, 188 articles were retrieved. Here objectives were patient related recommendations, staff related recommendations, Dialysis facility related recommendations.[9]

METHODOLOGY

The study was carried out for a period of 6 months after getting clearance from Institutional Human Ethical Committee. The study was conducted at the Nephrology Department of Cosmopolitan Hospital, atertiary care centre, Thiruvananthapuram, Kerala. It is a 360 bedded multispeciality hospital having all the departments and facilities like ICU, CCU and operation theatre.

Study Procedure

The prospective observational study was carried out in 49 MHD patients who were found COVID positive. The data required for the study was collected from direct assess to the patient and from demographic details of the patients after getting signature of the patient on suitable consent forms Demographic details and clinical presentation were used to evaluate impact of COVID-19 on Maintenance Hemodialysis patients using suitably prepared questionnaire. Clinical presentation consist of signs and symptoms, diagnosis and laboratory findings. Quality of life is assessed before treatment using Missola Vitas Quality of Life Index consisting of 15 questionnaire. COVID associated treatment was given to the patients along with their CKD medication.

The commonly used medication for management of COVID patients were antibiotics, Remdesivir, Monoclonal antibody and steroids and treatment was monitored. Outcome from the treatment was compared with 4 criteria which includes mortality rate, increased in frequency of dialysis, ventilatory suppot and hospitalization. After treatment quality of life was assessed using same scale. Score from the questionnaire was used for comparison between before and after treatment for finding out improvement in quality of life. At the end of the study all the parameters and scores were compared from baseline to end of study. Patient counselling was given to the patients to improve their knowledge regarding their disease condition and the various do's and don'ts that one should practice for getting better treatment outcome. Data entered using Microsoft Excel and it will be analysed by SPSS Software.

Statistical Analysis

The collected data on the study variables are subjected to suitable statistical analysis. Quantitative variables were expressed as mean, standard deviation, minimum, maximum, median and inter quartile range. Qualitative variable was expressed as frequency and proportions. Sample size calculation and other statistical analysis were done using Cochrans formula, paired t test and Chi square test. Comparison of quantitative variables between two groups analysed by t test .A p value <0.05 will be considered as statistically significant. Data analysis was performed using SPSS version 16.

OBSERVATION AND RESULT

The proposed study entitled, "A Prospective Study On Impact Of Covid -19 On Maintenance Hemodialysis Patients" was a prospective observational study carried out in a multispeciality

tertiary care hospital. In our study it analyzed the data collected from 49 Hemodialysis patients diagnosed COVID-19 infection. This study aimed to assess impact of COVID-19 infection in Maintenance Hemodialysis patients in a single hemodialysis centre. To analyse the treatment and outcome variables among Hemodialysis patients with COVID-19 infection and to assess Quality Of Life of the selected population. In order to avoid the error caused due to the incorporation and discontinuation of patients from the study initially 52 patients were selected out of which 3 patients discontinued the study in between. All the patients were evaluated to find out impact of COVID-19 on their health.

All the datas were collected with maximum accuracy and with the consent of patients. Patients who were not able to respond were assessed by interacting with their bystanders and collecting their consent. The results were statistically analysed to achieve the results which is described in the upcoming session and the final conclusions were derived on the basis of the results. The study aimed on improved care for Hemodialysis patients.

Distribution of Patients Based on Age

	Number	Mean	Std. Deviation	Minimum	Maximum
AGE in years	49	62	12	33	86

Table1:Distribution of patients based on age

Percentage Distribution Based on Symptoms

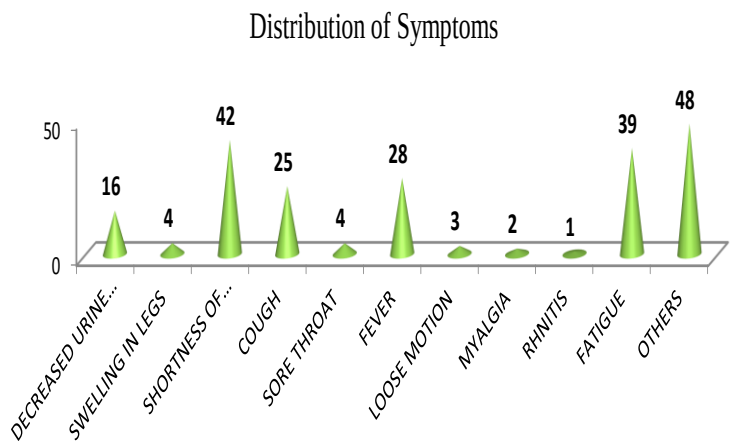

Figure no-1.Diagrammatic representation of percentage distribution of patients based on symptoms.

Percentage Distribution of Co Morbidities

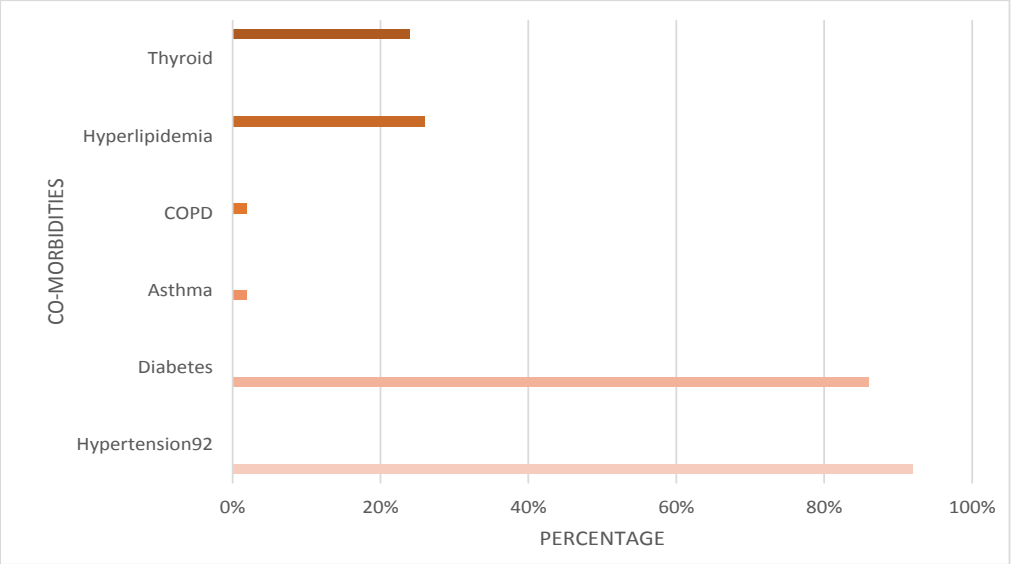

Figure no-2.*Diagrammatic representation of percentage distribution of patients based on co morbidities*

Percentage Distribution of Vaccination Status

Table no-2. Percentage distribution of patients based on vaccination status.

Vaccination Status	Number	Percent
COVAXIN	16	33
COVISHIELD	32	65
NOT VACCINATED [BOOSTER DOSE]	1	2
TOTAL	49	100

Percentage Distribution of Covid-19 Infected Hemodialysis Patients Based On Laboratory Investigation

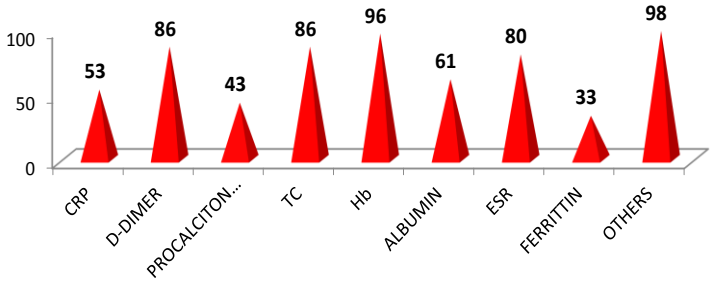

Figure 3 *: Diagrammatic representation of laboratory investigation of COVID-19 patientsundergoing hemodialysis*

Percentage Distribution of Covid-19 Infected Hemodialysis Patients Based On Medication Given

Table no 3: Percentage distribution of COVID -19 infected hemodialysis patients based on Medications given.

MEDICATIONS	NUMBER	PERCENTAGE
MONOCLONAL ANTIBOODY	12	24
REMDESIVIR	37	76
ANTIBIOTICS	41	84
STEROIDS	36	73

Outcome of The Disease Condition And The Medication Given To Covid-19 Infected Hemodialysis Patients

- **Frequency Of Dialysis**

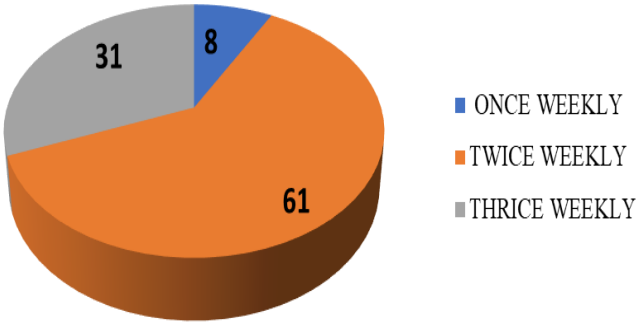

Figure no-4: Diagrammatic representation of frequency of dialysis done by COVID-19 infected hemodialysis patients.

- **Ventilatory Support**

Table no-4: Outcomes due to COVID-19 infection on hemodialysis patient and its percentage.

OUTCOME AND FOLLOW- UP	NUMBER	PERCENTAGE
DECREASE IN URINE OUTPUT	14	29
VENTILATORY SUPPORT	24	49

Death

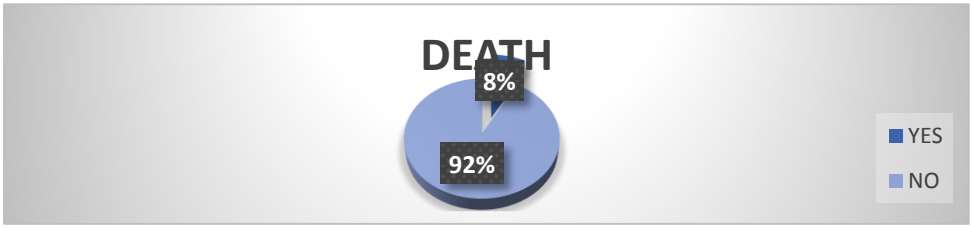

Figure 5: diagrammatic representation of death of COVID-19 patients on maintenance hemodialysis.

Assessment of Quality Of Life Using Missoula- Vitas Quality Of Life Index

Assesment of quality of life of COVID-19 infected hemodialysis was done musing Missoula Vitas Quality of life index which consist of 15 questions. The questionnaire was filled before and after treating the hemodialysis patients for COVID-19 infection. The results are tabulated below.

	Mean	SD	Paired Mean Difference	Paired t-test	p-value
Pre	2.40	0.81	-0.80	-8.58	0.01*
post	3.20	0.55			

Table no 5 – *Pre and post intervention of patients based on quality of life*

From all the parameters under Missoula- Vitas Quality of life index in general we can conclude that their was a significant improvement in the quality of life of person after receiving treatment for COVID-19 infection and being infection free.

DISCUSSION

Patients undergoing maintenance hemodialysis (MHD) have abnormal immune system because of Uremic state which is often accompanied by significant comorbidities like Cardiovascular Disease, Diabetes and hypertension Patients undergoing MHD having COVID-19 is different from that of other COVID-19 patients.

Patients undergoing MHD in outpatient department must routinely visit the hospital and stay with dozens of patients undergoing MHD in a dialysis unit for 3-4 hours at a time which may lead to widespread cross-contamination.

Symptomatic treatment are done for COVID-19 infection in MHD patients and there is great importance to prevent spread in dialysis centres and patients undergoing MHD.This study aims to evaluate and analyse the impact of COVID-19 on maintenance hemodialysis patients. Quality of Life assessment was done focusing on treatment provided to patients.

In this study, 49 CKD patients undergoing hemodialysis with COVID-19 infection were taken. 36 males and 13 females were selected. Dyspnea was considered to be one of the most

common symptoms and other symptoms like cough fatigue, fever, sore throat, swelling in legs were also mentioned. Statistical analysis was performed using Cochran's formula and a detailed analysis was performed.

CONCLUSION

COVID-19 is a very high transmission disease with a variable prognosis in the general population. Patients in hemodialysis therapy are particularly vulnerable to developing an infectious disease**.** Treatment for MHD patients with Covid-19 were completely symptomatic and other supportive measures were given. Patient Counselling was done to improve patients knowledge and to help them modify their lifestyle as required clinically and thereby support the treatment given to them to enhance their health state.

Pharmacist play a key role in patients education, ensuring well being of the patients and in optimizing patient care. The knowledge along with all information reported in this study can be useful to ensure effective treatment and to improve the quality of life of hemodialysis patients infected by COVID-19.

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