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Dialysis In Chronic Kidney Disease: Social,Economic And Psychological Implications In Indian Scenario

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Abstract: *CKD is a multifactorial diseases having physical, psychological, social and economic implications. Data from a study in 2017 shows that the Global prevalence of CKD was 9.1% (697.5 million cases). Around one third of CKD cases were found in China (132.3 million) or India (115.1 million**).** There are two treatment modalities for CKD: Dialysis and Renal transplant. Haemodialysis imposes many physical and psycho social stressors which is a big challenge for patient as well as caregiver. Care is not only required for dialysis patients but also to the family and caregivers as patients QOL is dependent on caregivers QOL. Dialysis is an expensive treatment modality and it becomes an area of concern for those who cannot afford these expenses and thus tend to quit the treatment because of financial restraints. Dialysis as a procedure is stressful for the patient because of inadequate education and preparation with reference to Endstage Renal Disease (ESRD). It can lead to depression, anxiety, delirium, suicidal behaviors, etc. hence, they have to be mentally prepared for the forthcoming event, hence mental health professionals are needed for counseling and psychotherapy. Multidisciplinary approach is necessary for effective management of such patients for improved outcomes and better quality of life.*

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I. Introduction:

Chronic Kidney Disease (CKD) is defined as progressive structural and functional kidney damage which lasts for more than 3 months characterized by decreased eGFR and increased markers of kidney damage. (albuminuria, hematuria, electrolyte abnormalities)[1]

CKD is classified on the basis of eGFR and albuminuria. Albuminuria is pathological presence of albumin in urine and has a prognostic significance.Estimated Glomerular filtration rate (eGFR) is used to assess the function of kidney and to diagnose the stage of CKD according to increasing severity.

The 6 categories include:

- Stage 1: eGFR ≥ 90 mL/min per 1.73 m2 and persisting albuminuria
- Stage 2: eGFR ranging from 60 to 89 mL/min per 1.73 m2
- Stage 3: eGFR ranging from 30 to 59 mL/min per 1.73 m2
- Stage 4: eGFR ranging from 15 to 29 mL/min per 1.73 m2
- Stage 5: eGFR of < 15 mL/min per 1.73 m2 or end-stage kidney disease (ESRD)

The three levels of albuminuria include an albumin-creatinine ratio (ACR):

Category	ACR (mg/g)	Terms
A1	<30	Normal to mildly increased
A2	30-300	Moderately increased
A3	>300	Severely increased

ACR(Albumin Creatinine Ratio) [2]

EPIDEMIOLOGY:

The reported prevalence of CKD in different countries ranges from <1% to 13% and data from a study in 2017 shows that the global prevalence of CKD was 9.1% (697.5 million cases). There is a female preponderance (9.5%) and prevalence in men and boys is 7.3%. Around one third of CKD cases were found in China (132.3 million) or India (115.1 million). About 1.2 million deaths resulted from CKD which was the 12th

leading cause of death worldwide. Out of all cardiovascular related deaths, 7.6% were attributed to impaired kidney function[3]It is also estimated that CKD led to 35.8million disability-adjusted life years (DALYs) and 25.3 million CVD DALYs were ascribed to impaired kidney function[4]

The true burden of ESRD in India is not known due to underreporting, but the incidence of end-stage renal disease (ESRD) is assessed to be 150–200 pmp. More than half of patients of CKD are first diagnosed when eGFR is <15 ml/min per 1.73 m2 due to challenges in access to care[5] More than 90% of CKD patients requiring RRT (Renal Replacement Therapy) die because of financial constraints for complete care. Also, 60% who start the treatment stop due to financial hardships[6,7]Studies shows that the commonest cause of CKD is diabetes nephropathy in India. Other causes include hypertension, Primary glomerulonephritis, Chronic Tubulointerstitial nephritis, Hereditary or cystic diseases, Secondary glomerulonephritis or vasculitis, Plasma cell dyscrasias or neoplasm. Etc.

II. Dialysis As A Treatment Modality

Kidneys function to filter blood and remove excess fluid and waste from the body. They also help to maintain the blood pressure and electrolyte balance (sodium, potassium). In CKD , Kidneys are diseased and hence cannot perform their normal homeostatic functions .End stage kidney failure is a stage at which the functions are reduced to that level at which normal life sustaining functions cannot be carried out without renal replacement therapies(RRT).

There are two treatment modalities (RRT)for CKD:

1. Dialysis
2. Renal transplant

There are two types of dialysis

1.Hemodialysis:

The commonest type of dialysis in India . It is an extracorporeal process by which the blood is cleansed by removal of built up nitrogenous waste products in the blood like urea through a semipermeable membrane with the help of hemodialyzers.

There has to be a vascular access to obtain blood from the body into the dialyzer and for the return of blood. There are 3 types of accesses:

1.AV fistula: Its a direct connection between artery and a vein made surgically so as to facilitate needle placement for withdrawing the blood. It's the most common type of vascular access.

2.AV graft : A connecting prosthetic tube is placed between Artery and vein.

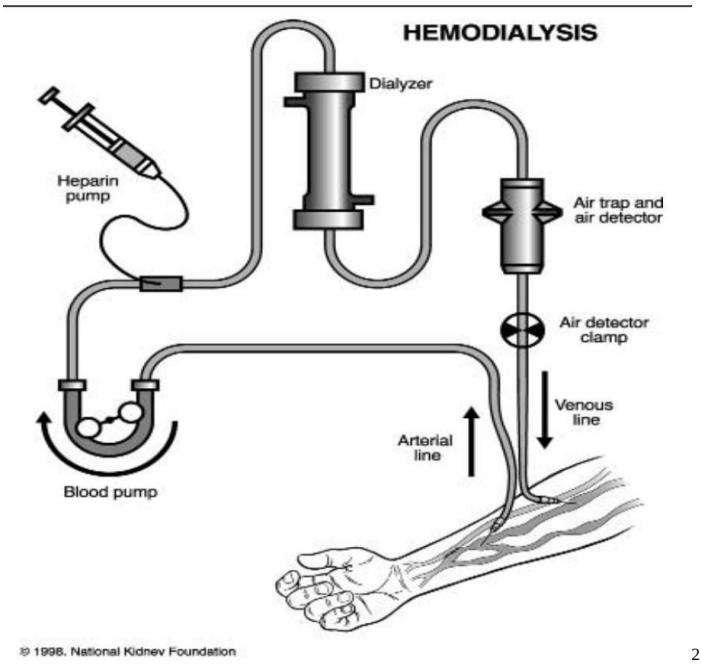
3.Central venous catheter: A large lumen vascular catheter is placed in one of the high flowing Central veins.

Mechanism:

Basic mechanisms that constitutes removal of solute and water in dialysis are diffusion, convection, adsorption and ultrafiltration across the semipermeable membrane.

Dialysate or dialysis fluid consist of water, electrolyte and salts like bicarbonate and sodium. The aim is to pull out toxins from the body into dialysate by the process of diffusion along the concentration gradient. 8,9

Hemodialysis cycles last for 4 hours (day) or 6-8 hours (nocturnal) thrice a week.



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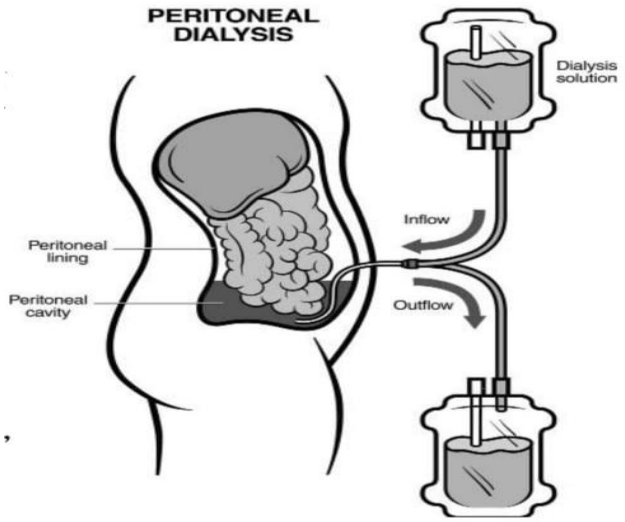
2. Peritoneal dialysis:

In this, fluid flows in and out of the peritoneal space filling the blood vessels in abdominal wall . Types of peritoneal dialyses are:

- Continuous ambulatory peritoneal dialysis (CAPD)
- Automated peritoneal dialysis (APD)

CAPD is a continuous process and can be done while carrying out regular activities. In this, peritoneal dialysis catheter (PDC)is surgically placed in the abdomen. Sterile cleansing fluid (peritoneal dialysis fluid -PD fluid) is instilled in the peritoneal cavity where the nitrogenous waste products diffuse in along the concentration gradient which is then replaced with fresh fluid after a predefined time . This process ,also called cycles, can be carried out throughout the day manually by the patient.

In APD, fluid bags are attached to the machine which automatically infuses the cleansing fluid into the peritoneal cavity and remains there for specific time and is automatically drained. [10]The APD can be carried out throughout the nighttime while the patient sleeps.



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SOCIAL IMPLICATIONS – Dependence on caregivers and care burden

CKD/ESRD is a chronic disease that affects somatic and mental health of an individual. Commonest treatment modality is haemodialysis which imposes many physical and psycho social stressors which is a big challenge to the patient as well as caregiver, these stressors affects the patients' long term outcome. Dialysis treatment

leads to loss of freedom, dependence on caregivers, marital, familial and social life disruption and also reduce income. Because of these reasons physical, psycho social, and environmental aspects of life are severely affected leading to a decreased quality of life of the patients .

The term caregiver refers to the people who take care of patients during the treatment procedure and look after them and help them to adapt to their chronic disease. They are a significant global source of health care [11,12]Generally, families are the first source of health care. Care burden refers to a kind of distress faced by the caregiver in the process of caring for the patient [13]

Dialysis is a disease affecting the whole family as family members of patients take part in the entire treatment process of dialysis and are most affected by this treatment procedure[14]

In CKD and dialysis , caregivers take care of patient's dialysis schedule, medication, diet, preparing meals, they accompany the patients to hospital, having frequent visits to the hospital, other related medical visits, providing personal hygiene, monitor them until full recovery after each dialysis session thus providing them with necessary physical, emotional, social support. Also, they help patients in adhering to some restrictions during hemodialysis. Family centered care is the most accepted approach in providing necessary holistic health care which requires the cooperation between patients, their families, and healthcare care professionals to provide healthcare effectively[14]

Caregivers have to provide help to severely ill and disabled persons on daily basis which may cause serious physical and psychological impact and may take a toll on their physical, social and emotional well being. Thus they are subjected to feelings of frustration and worry which in turn leads to negative feelings of guilt and burden. Other difficulties include change in social activity and work plans which further increase their burden.

A study by Gill et al showed a significantly higher burden in caregivers of dialysis patients than non dialysis patients suffering from ESRD. existing physical illness exhaust the caregivers[15]

Apart from physical pressure, features of chronic stress are also associated as there is no predictability and control. Secondary stresses are also caused by these factors like work and family relationships. These stressors lead to mental stress and disorder which further stimulate physiological responses, illnesses and death [16]

Caregivers have a potential risk of developing various diseases as they go unnoticed.Most of the times psychiatric illnesses are perceived as uncooperative and hostile behavior which add up to their burden in the process of care giving. Studies have shown a higher burden of psychiatric illnesses in caregivers of patients suffering from chronic diseases. Many of them give priority to patients health and overlook their own health needs and thus it takes a toll on their own health, well being and quality of life[17,18] Physical and mental damages which are caused to the ultimately affect the quality of care they provide to the patients which is inadequate[19-21]

Because of all these reasons, care is not only required for dialysis patients but also to the family caregivers as patients QOL is dependent on caregivers QOL. Family members and health care providers should be counseled regularly and every possible help extended to them. It is necessary for the health care provider to understand the experiences of family members so as to help and upgrade family skills to adapt to changing situations and challenges faced by them.

Increasing care burden can lead to worsening of patients condition and it becomes a vicious cycle leading to exhaustion of caregivers. Hence timely identification is required in promoting the physical and mental health of caregivers, determining their burden, paying attention to their needs and providing social, economic, physical and psychological support[22]

ECONOMIC IMPLICATIONS:

Estimated patients suffering from ESRD in India are about 1,00,000 out of which about 20,000 get treated as almost 3/4th of patients suffering from ESRD belong to rural area and hence not treated at all. This is because of lack of awareness of disease, lack of treatment options and most important being low income, non-affordability and non availability of insurances[23 24 25]

Dialysis is the most preferred but expensive treatment modality. There is less availability of dialysis centers and units in public sectors as compared to private sectors. The average cost for hemodialysis anywhere in India ranges from Rs.1200-2000 per session[26] The monthly cost comes to Rs12,000 and Rs.1,40,000 yearly. Additional expenses include lab tests, erythropoeitin, consultation fees, etc. thus, only upper or upper middle classes can afford the expenses. It becomes an area of concern for rest of the population who cannot afford these expenses and thus tend to quit the treatment because of financial restraints. This leads to worsening of their condition. Managing Co morbid conditions like diabetes and hypertension further worsens the situation as additional expenses are required to manage these conditions. In contrast to private settings, patients have to pay a nominal amount in government hospitals but many of these hospitals do not provide maintenance hemodialysis.

Recently various health schemes are being successfully run by the Central as well as State governments covering the expenses of Hemodialysis procedures which may somewhat improve the outcomes.

Various measures can be undertaken to reduce the cost of renal replacement therapy, most important being early detection and treatment of CKD and by preventing progression to ESRD and by treating other comorbidities as soon as they are detected. Patients should be counseled about making lifestyle changes , educating the high risk group by motivating them for regular checkups, adhering to the treatment. This will ensure better clinical outcomes, reduction of costs and satisfaction in patients[27]

PSYCHOLOGICAL IMPLICATIONS :

CKD is a multifactorial diseases having both physical and psychological implication. For management of such patients a collaborative effort of both mental health professionals and nephrologists is needed as they present with unusual psychological problems. Patients on dialysis are dependent on a machine, and medical professionals for the rest their lives[28] Dialysis as a procedure is stressful for the patient because of inadequate education and preparation with reference to end-stage renal disease (ESRD). There's also a substantial restraint on the choice of foods and fluids leading to feelings of distress. CKD can lead to following psychiatric illnesses:

1. **DEPRESSION:**

Depression is an emotional state characterized by somatic and cognitive symptoms such as feelings of sadness, worthlessness, hopelessness, loss of sleep appetite and sexual desires and loss of interest in normal day to day activities[29] A diagnosis of depression is made when symptoms are persisting for more than 2 weeks. Assessment of depression is quite challenging in CKD patients as there is overlapping of symptoms (fatigue, loss of appetite, sleep disturbances) of uraemia and depression and other medical comorbidities.

Studies have shown that there is a higher prevalence of depression in patients with CKD/ESRD than other chronic diseases. a study done by Kimmel et al, shows that the rates of hospitalization due to psychiatric illnesses amongst patients with ESRD (65 years and above) were higher than those with other comorbidities like ischemic heart disease, cerebrovascular disease, etc [30] Another study by Cukor et al stated that patients with CKD and ESRD face psychosocial challenges which could explain the high prevalence of depression and anxiety as compared to other comorbid conditions[31] in comparison with overall population, patients with ESRD show five times more suffering from depression [32]

The reported prevalence rate of depression in CKD patients ranges from 20% to 30%[33,34] Most of the employed patients on dialysis cannot return to full time work which leads to loss in income .Work is usually related to sense of achievement, self-esteem and identity in most patients which is severely affected .

The presently accepted guidelines for psychiatric treatment for depression include combined antidepressant therapy with psychotherapy. Presently, a good sort of antidepressant drugs are available for the management of depression for eg: Selective serotonin reuptake inhibitors (SSRIs), Tricyclic antidepressants, Newer antidepressants.

2. ANXIETY:

Anxiety is another emotional psychopathological state commonly occurring with CKD and ESRD. Extreme anxiety and anxiety somatic disorders manifest as shortness of breath, palpitations, chest pain, sweating and and fear of dying occur in CKD patients. There are numerous reasons with respect to the event of anxiety. The procedure of dialysis and a large number of potential medical complications give the patient a lot to worry about. Studies show that there is increasing prevalence of anxiety in CKD patients. Estimated prevalence rate of anxiety was found to be around 12-52%[35]

Pharmacological treatment is fundamental in management of anxiety and panic. Benzodiazepines for example clonazepam and alprazolam may reduce anxiety in such patients. Many patients with anxiety also experience insomnia. Drugs like zolpidem and zaleplon are useful in the treatment of such insomnias.

3.SUICIDAL BEHAVIOR:

Depression further brings up the point of suicidal behaviour in dialysis and CKD patients. Studies have shown that dialysis patients have higher rates of suicide than normal population[36] Suicidal behaviour is like a method of escape for these patients. Missing dialysis sessions, binging potassium rich food or even voluntary withdrawal from dialysis can lead to death.

4. DELIRIUM:

Delirium is commonly observed in dialysis patients due to disturbances in electrolytes also called as dialysis disequilibrium syndrome[37] Other causes leading to delirium in these patients are anemia, uremia and hyperparathyroidism. Diabetics receiving dialysis are prone to having dementia because Alzheimer's disease,

vascular causes and dialysis dementia syndrome. Drugs like antipsychotics, lorazepam and neurotropics have been tried as ameliorative treatment.

If these psychiatric comorbidites are ignored it can affect the patients treatment and mortality. The category of patients who are more prone to fall into depressions are the one with certain social, psychological clinical characteristics and these characteristics provide vital indicators for the clinician to identify and assess the psychological impact on the patient efficiently. It is necessary to individual psychotherapy to patients in dialysis unit as they are non compliant to treatment and medical regimens and do not visit doctors. This group of population consists of non compliant diabetics, non compliant hypertensives and alcoholics. These patients feel that they cannot lead a normal life as they are supposed to undergo medical procedures repeatedly throughout their life and thus they express their anger. These patients are usually 65 years and above and most of them suffer from comorbid conditions like diabetes, hypertension, peripheral arterial diseases, cardiomyopathies and arthropathies, which lead to a decrease in the quality of life (QOL) because of contribution of these symptoms. They have to be mentally prepared for the forthcoming event, hence mental health professionals are needed for end stage counseling and psychotherapy as there is fear or denial of death amongst these patients[38 39 40] Multidisciplinary approach is necessary for effective management of such patients for improved outcomes and better quality of life [41]

III. Conclusion:

Treatment of CKD includes hemodialysis and peritoneal dialysis . Hemodialysis is an effective option but at the same time it is expensive and has psychological, social and economic impact on patients, caregivers and family members who are involved. Not only it leads to decreased quality of life but also has a severe impact on physical and mental health limiting patient's daily work and activities. The treatment has to be taken lifelong, thus patients are dependent on the dialysis machine, healthcare professionals throughout their lives. As they have to take repeated dialysis sessions lifelong, it has a major impact on their mental health which can manifest as depression, anxiety, panic, delirium, suicidal behavior. Also, caregivers or family members are affected as they have to take the burden of looking after the patient throughout the treatment. They have to provide physical, social, psychological, economic support to the patients. But it is important to provide these supports to the caregivers as well as even their health takes a toll in the process of care giving. Thus proper counseling and health care facilities should be provided to both patients as well as caregivers. It necessary to evaluate and research more about the cost effectiveness, outcomes of treatment and the psychological and social implications of dialysis therapy and accordingly build appropriate measures to ensure their well being and make it less stressful throughout their treatment.

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